MODULE 1 CONTINUOUS ASSESSMENT: INTRODUCTION AND PUPILS' BEHAVIOUR

UNIT 1 INTRODUCTION TO CONTINUOUS ASSESSMENT

CONTENTS

1.0 INTRODUCTION

As a student teacher, you would have noticed that the introduction of continuous assessment (CA) in our school system is regarded as one of the most significant innovations of the National Policy on Education (NPE). Continuous assessment has been used as a testing modality in many school systems adopted in many developing countries. It is the correct assessment strategy for the educational evaluation of students' achievement in teaching-learning situations in the Nigerian school

system. It is also used for the evaluation of the educational system itself. In this unit, you will learn the concept of CA and the NPE; the nature and rationale for CA in the primary school system.

2.0 OBJECTIVES

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

- explain the relevance of the NPE to continuous assessment in primary schools;
- define continuous assessment;
- describe the nature of continuous assessment; and
- discuss the rationale for continuous assessment in primary schools.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Liberalized:** To make laws, systems, or opinions less severe.
- **Validated:** Check or prove the accuracy of something.
- **Incorporate:** Is to include or integrate a part into the whole.
- **Knowledge:** That aspect of an individual that deal with the cognition.
- **Comprehension:** Theability to understand the *meaning* of something.
- **Application:** The action of putting something into operation.
- **Analysis:** A careful study of something to learn about its parts, what they do, and how they are related to each other.
- **Synthesis:** The composition or combination of parts or elements so as to form a whole.

5.0 MAIN CONTENT

5.1 Continuous Assessment and the National Policy on Education

When the Nigeria Curriculum Conference was held in 1969, it was suggested that continuous assessment be introduced as a remedy to the undesirable effect of the one-time examination of students learning and achievement. In 1977, a bold attempt was made to adopt the CA as a

policy to guide evaluation strategy of students' learning and achievement. It is now entrenched in the National Policy on Education 1977, revised in 1981 and 2004. The National Policy on Education (NPE), paragraph 7, section 7.14 states in clear terms that "Educational assessment and evaluation will be liberalised by centering them in whole or in part on continuous assessment of the progress of the individual." The policy has gone further to make elaborations of the CA for the various levels and cycles of our educational system. Now, let us look at the provisions of NPE as it affects at the primary school level.

5.1.1 NPE for the Primary Education Level

Look at the NPE again, under paragraph 15 (8 and 9), it states:

> *Government plans that progress along the education cycle will be based on continuous overall guidance-oriented assessment by teachers and headmasters. Government will look into the possibility of abolishing the Primary School Leaving Certificate Examinations as soon as the processes for continuous assessment have been worked out and validated. Meanwhile, certification of this level of education will be based on continuous assessment and the result of the primary school leaving certificate examination.*

If you read further, under paragraph 23(2), it specified that the First School Leaving Certificate Examination will ultimately be abolished and primary school leaving certificate will be issued by the headmasters of individual schools and will be based on continuous assessment of pupils and not on the result of a single final examination.

The NPE also directed that the admission of pupils into secondary schools, which was hitherto based only on the performance in the National Common Entrance, should also be based on the pupils' continuous assessment. As an interim measure, the present system of a National Common Entrance Examination will be allowed to continue until the junior secondary system has taken off. "In the meantime, selection for entry into the secondary schools will, as soon as possible, be improved by incorporating headmasters' continuous assessment into the Common Entrance Examination results."

5.2 The Concept of Continuous Assessment

In its simplistic way, continuous assessment can be described as a systematic and regular method or technique of determining what a learner has gained from learning activities. These learning activities involve knowledge, thinking and reasoning (cognitive), character

development (affective) and industry (psychomotor). *The Federal Government Handbook on Continuous Assessment* (1985) defines the CA as:

> *A mechanism whereby the final grading of a student in the cognitive, affective and psychomotor domains of behaviour systematically takes account of all his performances during a given period of schooling. Such an assessment involves the use of a great variety of modes of evaluation for the purpose of guiding and improving the learning and performance of the student.*

In your previous course (Measurement and Evaluation), the cognitive, affective and psychomotor domains of objectives were discussed in details. As a way of refreshing your memory, the cognitive domain includes knowledge, comprehension, application, analysis, synthesis, and evaluation. The affective domain also includes attitudes, feelings, emotions, interest, punctuality, attendance in class, honesty, etc. It also has some hierarchical sublevels. While the psychomotor domain deals with motor-skills such as reflex movements, basic fundamental movement, physical abilities among others.

In his own description of the concept of continuous assessment, Yoloye (1984) says it is a method of evaluating the progress and achievement of students in educational institutions. It aims to get the truest possible picture of each student's ability; at the same time, helping each student to develop his or her abilities to the fullest. It is a method whereby the final grading of students takes account in a systematic way of their whole performance during a given period of schooling. You can notice that the emphasis here, as in other descriptions is on grading. It indicates that the individual pupil would be seen and assessed in totality. It also implies that the three 'H's – Head, Heart and Hand – relating to cognitive, affective and psychomotor domains respectively, should be taken care of in the CA strategy. The pupil is looked at as a whole person.

Folayajo (1979) states that continuous assessment is a system of assessment which is carried out at predetermined intervals, usually coinciding with some identifiable units of instruction or levels of educational system, for the purpose of monitoring the progress or otherwise of students and the general performance of the education system. If you look at this definition very well, you will notice that it goes beyond the assessment of the students and incorporates assessment of some aspects of the educational system. It also includes the monitoring of students' learning with a view to improving their

performances and helping them in the areas of deficiencies. Continuous assessment is a way of ensuring success that related to formative evaluation whereby formative tests are developed and administered to the pupils after a unit of lessons, and remediation given in areas of identified difficulties before the next unit is taken up.

In addition, Bajah (1984) defines continuous assessment as a continuous updating of judgment about performance in relation to specific criteria, which will allow a cumulative judgment to be made about performance upon these same criteria at any time. You may wish to bring out from this definition, that certain criteria must be present before any assessment can be effectively carried out.

Ezewu and Okoye (1981) gave another description, which is clearer and more comprehensive. They perceived continuous assessment, within the educational context, as a systematic and objective process of determining the extent of a student's performances and all the expected changes in his behaviour from the day he enters into a course of study in a continuous and progressive manner to the end of such a course of study. They also consider the CA as a judicious accumulation of all pieces of information derived from this purpose, with a view to using them to guide and shape the student in his learning from time to time and to serve as bases for important decision about the child.

From this description of continuous assessment, you can see that continuous assessment is a mechanism for progressive evaluation of changes in behaviour of individual child. It is used to determine a student's level of performance in a course of study. As a teacher, you are expected to examine periodically, your pupils' level of assimilation of the subject maters presented to them in the class. The results collected from this periodic assessment will be added and used as the final assessment of each child.

5.3 The Nature of Continuous Assessment

If you critically examine the various views and definitions of continuous assessment presented in the last section, you will notice some peculiar characteristics, which educators and evaluators have consistently emphasised. These are (i) systematic (ii) comprehensive (iii) cumulative (iv) guidance-oriented. Let us look at them in details.

5.3.1 The Systematic Nature of CA

Continuous assessment is said to be systematic because it has a definitive programme of assessment. Thus, it has an operational plan, which indicates or specifies what measurements to be used for the

students' performance, the time intervals when such measurements are to be made, the results to be recorded and the specific nature of the instruments or strategies to be adopted for the measurement. Usually, these are prepared in advance. This means that any school involved in CA programme must have to adopt a definite programme that should be made known to all participants especially students, teachers and even the ministry of education officials and parents who are directly involved.

5.3.2 The Comprehensive Nature of CA

A variety of instruments or assessment procedures are used in ascertaining the performance of the pupils. Such instruments include tests/examinations, assignments, projects, observations, questionnaires, interviews, socio-metric techniques, etc. As far as continuous assessment examines the total development of the pupil, it is said to be comprehensive. The cognitive, affective and psychomotor behaviours and domains are all considered and assessed. You have to note that the evaluation system before the introduction of continuous assessment system focused mainly on the cognitive domain of behaviour. Psychomotor and affective domains of behaviour are excluded.

5.3.3 The Cumulative Nature of CA

The specification here is that, there should be repeated measurement and all such measurements are taken into account in presenting a picture of a pupil at any point in time. It means, therefore, that any decisions to be made on any pupil at any time should also consider and take into account all previous decisions about the pupil. This implies that the final grade of any child at the end of the year or period of schooling must incorporate or integrate the data of the last assessment including in some degree all the assessment data throughout the school year or period of schooling. If you look at the NPE provision on CA again, you will see that it provides that assessment at the end of primary school level must reflect the cumulative nature. This was not so in the past. In the past, decisions on a pupil were based solely on a single examination.

5.3.4 The Guidance-Oriented Nature of CA

All information collected on the pupils during the process of continuous assessment is used for further development of the pupils. A major reason why pupils are assessed within a course of study rather than waiting until the end of the school year or even end of the programme, is to obtain information on the level of the pupil's achievement and then use such information, if need be, to assist the pupil in good time

before it becomes too late. One of the main values of assessment in education is that it can assist to identify areas of strengths and weaknesses in pupils' performances, the teachers' instructional strategies and the educational programme. The information obtained can be utilised as a sound basis for encouraging the pupils' efforts, for remediation of students' learning problems and necessary improvement of strategies and modalities of instruction.

5.4 Rationale for Continuous Assessment in the Primary School

Apart from the fact that continuous assessment has been entrenched in the NPE for the primary school level, there are other rationales for the introduction of continuous assessment in our primary school system. Let us look at them in details.

1. **Continuous assessment as an important aspect of teaching and learning process:**
   As a teacher, you should be involved in the final assessment of the pupil during teaching-learning process. This is a radical departure from the old assessment system where the final assessment is done through a single one-slot examination set by an external examination body or agency such as the Ministry of Education. This method does not give the teacher the opportunity to participate in the final assessment of the pupils he/she has taught.

2. **Continuous assessment gives a true picture of the pupils' ability:**
   The final grade, which a pupil makes at the end of his primary education, takes into account all his performances throughout the period of schooling. This gives the true picture of the total ability of the pupil.

3. **Continuous assessment facilitates appropriate guidance of the pupils:**
   CA provides procedures that bring about necessary guidance to the pupils in both their learning endeavour and in their preparations for careers. It also provides guidance in psychological areas to the pupils and their parents.

4. **Continuous assessment makes teachers more innovative and creative:**
   The CA system makes teachers more innovative, creative and exploratory in their approach to teaching. This is because teachers continuously assess the pupils, therefore they device various ways of making the assessment interesting and valuable.

Again, they assess pupils' performance on innovations, interesting and valuable topics introduced in their teaching. This forms part of the final grade of the pupils at the end of the primary school education.

5. **Continuous assessment helps teachers assess their own teaching:**
From time to time, teachers use the continuous assessment to assess their own teaching strategies. This helps them to improve on their performance.

6. **Continuous assessmenthelps to reduce examination malpractices:**
If after several years of work, one-slot examination, which is seen as very crucial is used to decide the fate of the future of the pupils, the temptation to pass by any means, fair or foul will be very high. This temptation is reduced since the final grade of the pupils includes all their performances during the entire period of schooling.

5.5 Implications of CA for the Classroom Teachers

In the continuous assessment system, the teachers, headmasters, Ministry of Education officials, school counsellors and the pupils are expected to be co-operatively involved in the implementation. We can infer from this that the CA has implication for every stakeholder in the primary school system. However, in the final analysis, much of the implementation depends on the teacher. Therefore, teachers need to do certain things and possess certain skills for effective implementation of the continuous assessment.

5.5.1 What the Teacher Should Do

In the practice of the continuous assessment, the teacher should do the following:

i. combine the different scores obtained by each pupil from the various aspects of assessment, such as tests, examinations, projects, practical works, assignments, etc. carried out within the specified period of classroom instruction. It means then that the sources through which scores should be collected must be decided and planned for in advance.
ii. usethe scores from the various aspects of the assessment to diagnose pupils' learning difficulties in order to assist the concerned pupils by giving them appropriate remedy. The scores should also be used for the assessment of the teacher's performances and the effectiveness of their instructional

strategies with a view to making an improvement where there is a need.

iii. be very close to the pupils in order to monitor the personality development of each pupil in the class. The teacher should monitor such aspects of personality as character, temperament, interest, attitude, life-style, adjustment, etc.

iv. providedata on the pupils' performance on measures of personality and make use of such data in arriving at the final assessment of each pupil.

v. make use of data accumulated from both pupils' academic achievement and personality characteristics for the counseling of the pupils. This will assist pupils immensely to overcome their difficulties and lead to the improvement in the level of performance.

5.5.2 Skills Required by Teachers to Implement the CA

The implementations of the continuous assessment of programmes in the primary schools require that the teacher should be proficient in a number of skills, which include:

i. **Skills in educational Measurement**: The primary school teacher should be proficient in planning, construction and utilisation of achievement tests and other assessment tools for the measurement of academic achievements of pupils. This means that the teacher should be able to carefully define and consider the objectives of the lessons in developing the instruments. These objectives must be stated in measurable terms. In addition, the teacher should have a sound knowledge of the relevant subject matter.

ii. **Skills in the assessment of affective and psychomotor behaviour:** The teacher should be proficient in planning, designing and utilising tools or instruments for the assessment of personality characteristics and psychomotor behaviours.

iii. **Skills in scoring and interpretation**: The teacher should also be vast in scoring and interpretation of scores from the assessment instruments of various types.

iv. **Skills in statistical computation**: The teacher should be able to use relevant statistical tests in the continuous assessment practice. This will involve simple tabular and graphical presentation of data, computation of measures of central tendency, measures of variability and computations relating to transformation of scores to standard scores.

v. **Skills in recording**: The teacher should be able to maintain proper and detailed records of pupils' assessment. He should also prepare and present the pupils' records periodically.

vi. **Skills in integration and co-ordination of teaching strategy**: The primary school teacher should have a careful planning of well integrated and co-ordinated teaching strategies compatible with particular subject matter areas.

6.0 ACTIVITY

1. What is continuous assessment?
2. Which kind of assessment existed before the introduction of continuous assessment and what were the problems associated with this kind of assessment
3. List any three records of continuous assessment in schools

7.0 SUMMARY

In this unit, you have learnt that the continuous assessment was introduced in the Nigeria education system through the NPE to remedy the undesirable effects and examination malpractices inherent in the one-slot examination system. The CA, among other definitions, was described as a systematic and regular method or technique for determining what a learner has gained from learning experiences.

You have also learnt that the CA is systematic, comprehensive, cumulative and guidance oriented in nature or characteristics. The rationale for the CA in the primary school system was given as follows.

i. Assessment is an important part of teaching and learning process.
ii. It gives a true picture of the pupils ability.
iii. It facilitates appropriate guidance of the pupils.
iv. It makes teachers become innovative and creative.
v. It helps teachers to assess their own teaching.
vi. It helps to reduce examination malpractices.

You also learnt what a teacher should do in a CA situation and the skills required of the teacher to implement them.

8.0 ASSIGNMENT

1. Mention any five problems encountered in the introduction of continuous assessment in schools.

2. Suggest any four ways of improving continuous assessment in schools.
3. What are the justifications for the introduction of continuous assessment in Nigeria.

9.0 REFERENCES

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UNIT 2 CONTINUOUS ASSESSMENT OF COGNITIVE DOMAIN

CONTENTS

1.0 INTRODUCTION

In the last unit, you were exposed to the concept of continuous assessment, the characteristics, rationale, implications and the skills you need to implement it in your primary school. You have seen that in the continuous assessment system, the pupil is expected to be seen in his or her totality. The pupil is required to exhibit behavioural changes in a desired and desirable direction after being exposed to the school educational programme. If you look at this word "behaviour" as we have used it here, it connotes all the activities in the cognitive, affective and psychomotor domains. All the possible learning outcomes, which you will learn in this unit, will fall within these three domains of behaviour. These should essentially be in respect of knowledge and understanding possessed by your pupils' attitude, interest and changes in behavior, developed thinking, feeling, belief and skills acquired. Therefore, you are required to state in clear and behavioural terms, the learning outcomes, which are expected of your pupils to attain after a period of teaching and learning. In this unit, you will be exposed to the cognitive domain of behaviour and how to apply them when specifying your objectives.

2.0 OBJECTIVES

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

- explain the cognitive domain;
- describe the six categories of cognitive domain; and
- discuss the sub-categories of the levels.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Learning outcomes:** are statements that describe significant and essential **learning** that **learners** have achieved, and can reliably demonstrate at the end of a course or program. In other words, **learning outcomes** identify what the learner will know and be able to do by the end of a course or program.
- **Thinking:** using thought or rational judgment; intelligent.
- **Feeling:** an emotional state or reaction

- **Belief:** a state or habit of mind in which trust or confidence is placed in some person or thing
- **Hierarchical order:** having *a structure* consisting of multiple levels.
- **Complexity:** the state of having many parts and being difficult to understand or find an answer to
- **Spearman Brown Rank order correlation:** measure of the relationship between two nominal or interval data

5.0 MAIN CONTENT

5.1 The Cognitive Domain

Bloom (1956) has described the cognitive domain to include objectives relating to recall or recognition of knowledge and the development of intellectual abilities and skills. Most of the instructional objectives or learning outcomes you find in educational literature or the ones formulated by most classroom teachers are in the area of cognitive domain. If you go through the objectives set by classroom teachers, you will see that most of them are on cognitive domain. In the assessment of the pupils too, teachers dwell much on the cognitive domain. The reason is very simple. Objectives in this domain are easier to formulate and to assess. In fact, most people believe that if "you seek first the kingdom of the cognitive, the rest will be added unto you." There are six major categories of objectives in the cognitive domain. These are arranged in hierarchical order of complexity of tasks involved. These categories include knowledge, comprehension, application, analysis, synthesis and evaluation. These categories can further be sub-divided. Before we look at these categories and the sub-categories, note that you are expected to assess your pupils in all the six categories. It means that your pupils are required to exhibit behaviour changes in these areas of behaviour after a period of teaching and learning. Now, let us look at the categories.

5.2 Knowledge

This, otherwise referred to as Memory Level, is the first category of the cognitive domain. It forms the foundation for the development of higher order cognitive skills. It refers to the ability to recognise or recall previously learnt information with no demand on the understanding or internalisation of the information. Krathwohl's (1973) perceived the mind as a store for information, data, facts etc. The task for a test at this level is that of ensuring that the items contain appropriate signals, cues and clues which will most effectively bring out whatever knowledge is filed or stored. Therefore, for measurement purposes, knowledge or memory involves bringing to mind the appropriate material. It emphasises the psychological process of remembering. When you specify objectives at this level, you can use such "action verbs" or words

that will effectively bring out the information stored in the mind. These verbs include *define, list, tell, identify, recall, recognise, remember, what, how many, how much, who, what, which, when, where* etc. Let us look at the sub-divisions of the memory or knowledge level.

5.2.1 Memory or Knowledge of Specifics (Terminology)

This refers to the cognitive ability to recognise, recall or remember the meaning, definition, and use of terms or vocabulary of the different subject matter. It is the basic to any aspect of further learning or higher order skill development. For instance, "Define reliability," "Who is the Senate President of the Federal Republic of Nigeria?" "List the states in the NDDC area."

5.2.2 Memory or Knowledge of Specifics (Facts)

When we talk about facts, we are talking about the bits and pieces of data which are gotten from direct observation from which knowledge is made. At this level, you will be considering the ability to recall or recognise significant and specific facts such as dates, names, events, etc. Memory or knowledge of specific is necessary for our understanding and application of the knowledge content of each subject matter area. For example, "list the factors that affect the reliability of a test", "list the different types of validity."

5.2.3 Memory or Knowledge of Ways and Means of Dealing with Specifics

At this level, you are looking at the memory of rules and practices in using, ordering and classifying specifics or in inquiry. It involves the methods and procedures used; the standards and criteria used to judge one an endeavour in every field; and of the resulting principles, theories and generalisations.

5.2.4 Memory or Knowledge of Conventions

Every area of study has its own characteristic way of testing and presenting specifics and communication, which involves specific styles, symbols, conventions, allegories and practices that have been adopted to represent certain ideas, entities and relationships in that field. Thus, the memory of convention involves learners' or pupils' ability to identify, recall or remember such conventions. For instance, "What is the conventional formula for calculating the reliability co-efficient using the Spearman Brown Rank order correlation?", "What is the conventional representation of 'Centre line' in drawing?"

5.2.5 Memory or Knowledge of Trends and Sequences

This deals with the memory of correct order or sequence of occurrence of specifics such as steps in inquiry, periods and events in nature. It involves the recalling or remembering trends in the development of historic periods or the relationship between such periods. For example, "List in a hierarchical order the Blooms taxonomy of the cognitive domain of objectives.", "List in order the layers of materials used in the construction of a solid ground floor."

5.2.6 Memory or Knowledge of Classifications and Categories

Here, you have the memory of broad classes, sets, or divisions to which a given subject matter, argument, problem etc is divided and the distinguishing characteristics or properties that determine the placement of an object or phenomenon in one category as opposed to the other. For example, "What are the bases for classifying a test as an achievement test?"

5.2.7 Memory or Knowledge of Criteria

Here, we are talking about memory of established standards and criteria by which findings, facts, principles, opinions, studies and words in a given area of study are judged e.g. List the criteria for judging a good observation. For example, "What criteria are used for assessing a good interview?"

5.2.8 Memory of Techniques and Procedures or Methodology

This deals with the pupils' ability to recall or remember methods, techniques and procedures used to conduct inquiries or solve problems in a given subject area. You can see that the emphasis here is on the pupils' knowledge of the method, criteria, classifications, etc and not the ability to use them. For example, "Mention the methods of determining the reliability of a test", "List four methods of selecting samples in research."

5.2.9 Memory of Universals and Abstractions

We have already stressed the need for pupils to have the memory of specifics, and ways and means of dealing with them. In addition, they should also have the memory or knowledge of major concepts, patterns, principles, generalizations, theories and structures which result from the organization of specifics, such as data and ideas in a given subject area. Note that these universals and abstractions provide the basis for further

enquiries for understanding and for solving new problems in a given field.

5.2.10 Memory of Principles and Generalisations

In every subject area, there are statements, formulae, or laws, which relate or bind two or more concepts together. These provide the basis for explanation and further understanding in that area. Your pupils should be able to learn these statements, formulae and laws be able to recall or remember them. For instance, write down the formulae for:

(a) Finding the correlation between two ranked scores

5.2.11 Memory or Knowledge of Theories and Structures

This requires that your pupils should have the ability to recall or remember the general theories, structures, models and philosophies on which different aspects of, and practices in the subject area are based. For example, "List the assumptions of inferential statistics," "List the philosophies of primary education."

5.3 Comprehension Level

This is concerned with the internalisation of the knowledge memorised in section 3.2 above. It requires making meaning out of what is stored in the brain based on what is understood; what could be translated, interpreted and extrapolated. It is not possible for you to understand what you have not known in the first place. It is only when you have the knowledge that you can restate it in another form of communication. You can also re-order or re-arrange the knowledge to provide a new view or determine its implications and consequences. In the memory level, the pupil is expected to give back what is given to him. However, at the level of comprehension, the pupil is expected to give back what he had learnt, (but in a different form) based on how well he has internalised, understood or made meaning out of it. He is required to give a translated or interpreted version or meaning of what is learnt. Some of the action verbs or words which you can use most appropriately to elicit comprehension skills and behaviour include *re-order, re-arrange, interpret, interpolate, illustrate, explain, demonstrate, differentiate, describe, distinguish, translate, transform, restate, summarise, represent, relate, rephrase*, etc. The sub-divisions here are discussed below:

5.3.1 Translation

This involves the ability of the pupils to change what they have known from one form of communication such as words, numbers, graphs, maps, charts, cartoons, pictures, formulae, symbols, models, equations, etc to any other form of communication. It implies the ability to translate from one language to another. It involves converting principles to formulae, restating in words or symbols and translating visual symbols into verbal terms. You can translate diagrammatic and symbolic representations to verbal descriptions. You can translate equations to verbal, pictorial or symbolic problems. You can translate abstract ideas and technical terms into less complex or more complex, or even more concrete languages. For instance, you can be given a graphical representation of your class scores against frequencies to translate into verbal description.

5.3.2 Interpretation

This is an extension of translation. It involves the ability of the pupils to go beyond literal translation of communication to the identification and comprehension of the major ideas in it, and of their inter-relationships. It involves the interpretation of all forms of communications, identification of inter-relationship among parts or components of a piece of communication and relating these to the main components. It involves part-by-part translation, ability to differentiate between components, a determination of the degree of relevance of each basic idea to the central theme of a communication or idea, and the relationships among these basic ideas. You may therefore require skills of examining, comparing, and describing identical or unidentical, simple or complex ideas, views or result of some study or piece of work. You can ask your pupils to interpret a graph or chart. To do this, they will first translate it to a verbal form, and then try to understand the relationship among different component parts, they re-order and re-arrange these parts according to their understanding, and based on this understanding they describe the meaning of the original communication, presenting it in a more concise form. For instance, given a graph showing the scores of your pupils in a test and the frequency, you are required to explain the graph and give the relationship between the scores and number of pupils making the scores.

5.3.3 Extrapolation

This goes a step further to draw implications and limited inference based on identified and existing trend. It involves the isolation or detection of consequences, suggestions of possible meaning and prediction or estimation of possible effects.When your pupils acquire the

extrapolation skills, they exceed the literal limit of communication. They have expanded interpretation beyond what is presented, (but based on the established trend). Extrapolation involves going beyond the data, extending the line of reasoning, pattern or trend. It gives you the ability to fill up a gap in a line of reasoning. For instance, from the graph of scores against frequencies, or from the gender distribution of the scores, you can reason that the average score of the female pupils would have increased if the length of the test were increased. Alternatively, that the boys would have done better if the test was on mechanical aptitude.

5.4 Application Level

This is the use of abstractions in particular and concrete situations (Bloom, 1956). These abstractions could be in the form of general idea, rules, procedures or generalised methods. They can also be in the form of technical terms, principles, ideas and theories, which must be remembered, understood and applied. You can see that comprehension is necessary for the correct application of what is learnt. According to Bloom *et al.* (1971), the ability to apply what you learnt is one of the permanent acquisitions in learning process. When a pupil is able to apply what he knows in trying to solve a new problem or in a new situation, we say he has skill in application. This is not the same as the ability to solve problem by remembering the solution or the precise method of solving a similar problem in the class. In application level, the problem situation must be new, unfamiliar and different from those used in the class during institution or those in the textbook. Such new situations should be real and should afford the pupil good practice in the transfer of training and learning to a real life problem. Apart from these skills, which include ability of the pupil to grasp exactly what the problem is all about and what generalisations or principles are relevant, useful or relevant skill for the solution statement to determine exactly what is given and what is needed to successfully solve the problem is also required. You have to first recognise and identify extraneous or irrelevant elements in the problem statement, which you must avoid or ignore to solve the problem. This can lead you to recast and restatement or redefine the problem.

The next step is for the pupil to search through the memory of generalisations, principles and methods to find those, which are relevant to the solution of the problem at hand. In other words, at this level you need to have the ability to determine which, and explain how such a generalisation, principle or method is appropriate in solving the problem. You must also be able to specify the limit within which; be able to recognise the exceptions to; be able to predict what will happen if; and justify the use of a particular generalisation; principle, and method used in solving the problem (Bloom *et al.*, 1971). There are

some action verbs or words appropriate for this level. These are *apply*, *employ*, *relate*, *build*, *calculate*, *explain*, *how*, *choose*, *classify*, *determine*, *present*, *predict*, *resolve*, *solve*, *specify*, *state*, *transfer*, *organize*, *demonstrate*, *restructure*, etc.

6.0 ACTIVITY

1. How many level of cognitive domain was developed by Benjamin Bloom?
2. State the level from the highest to the lowest.
3. The ability to use learned materials and put parts together is called _____ and _____.

7.0 SUMMARY

In this unit, you have gone through a detailed exposition of the cognitive domain. You have seen the components and the action verbs, which you can use when specifying instructional objectives at the respective taxonomic levels. In the next unit, we shall be looking at the remaining two domains together.

8.0 ASSIGNMENT

1. Differentiate between knowledge and comprehension.
2. Differentiate between analysis and synthesis.
3. The process of passing value judgment or worth of a programme is called_____.

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UNIT 3 AFFECTIVE AND PSYCHOMOTOR DOMAINS

CONTENTS

1.0 INTRODUCTION

In the last unit, you studied in details the cognitive domain. You also learnt that most classroom objectives focus on the cognitive behaviour. In a continuous assessment system, the cognitive, the affective and the psychomotor behaviours are supposed to be assessed. This unit therefore centers on the affective and psychomotor domains. It is hoped that you will incorporate objectives in these domains when specifying your instructional objectives.

2.0 OBJECTIVES

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

- describe the affective domain;
- explain the levels of affective domain;
- describe the psychomotor domain;

- explain the levels of psychomotor domain; and
- develop objectives in both affective and psychomotor.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Psychomotor domains:** this is characterized by progressive levels of behaviors from observation to mastery of a physical skill.
- **Emotional overtone:** an idea or quality that is suggested without being said directly.
- **Disposition:** a person's inherent qualities of mind and character.
- **Subjective:** based on or influenced by personal feelings, tastes, or opinions
- **Predominantly:** mostly of mainly

5.0 MAIN CONTENT

5.1 The Affective domain

This has to do with values and beliefs, attitudes and appreciation, interest, social relation, emotional adjustments, habits, life-styles, etc. When you talk about the affective domain, you are considering such behaviours and objectives that have emotional overtone as it encompasses likes and dislikes, attitudes, values, beliefs, etc. The instructional objectives in this domain deals with how the pupils have internalised and appreciated what they have learnt as demonstrated in the way it has influenced their feelings and behaviour. Affective behaviour is generally covert in nature. Examples of learning outcomes in this domain include:

- pupils should be able to develop an awareness of the importance of observing safety rules and regulations in a workshop;
- pupils should be able to discuss the need to take adequate care of drawing instruments; and
- pupils should be able to develop interest in science subjects.

Krattwohl *et al.* (1964) classified the affective domain into five hierarchical levels. These include:

i. receiving
ii. responding
iii. valuing
iv. organisation
v. characterisation by value

These hierarchical levels are discussed below.

5.1.1 Receiving

This refers to the pupils' willingness or disposition to respond to a particular stimuli such as classroom activities, art work, etc. The learning outcomes here can range from simple awareness that something exists to selective attention by the pupil. Receiving is the lowest level of the affective domain. The pupil is expected to listen attentively, develop an awareness of the importance of reading or learning, exhibit sensitivity to known human needs and social problems, attend closely to classroom activities, etc. The three sub-levels here are:

(a) **Awareness**: This relates to the pupils conscious recognition of the existence of some problems, conditions, situations, events, phenomena etc.
(b) **Willingness**: This refers to the pupils' ability to acknowledge the object, problem, event, condition, phenomenon, etc instead of ignoring or avoiding it.
(c) **Selected or Controlled attention**: This refers to the pupils' ability to choose or select to pay attention to the situation, event, problem, phenomenon, etc.

5.1.2 Responding

This refers to the active response of the pupils to stimuli and reacting to them. Specifically, learning outcomes in this level lay emphasis on the acquiescence in the act of responding, for example, reading assigned materials; willingness or disposition to respond, for example, voluntary reading beyond assigned material; or satisfaction in responding, for instance, reading for pleasure or enjoyment. You will observe that pupils' interest makes or propels them to seek for certain activities and enables them to enjoy the activities. This is the reason why in your class you may ask and get volunteers for special tasks. This is why you have pupils with interest in a particular subject. This is why you can have pupils who enjoy helping others. Responding has three sub-levels, these include:

i. **Acquiescence in responding:** This involves a simple obedience or a simple compliance

ii. **Willingness to respond**: In this case, there is a voluntary response to a given situation
iii. **Satisfaction in response**: This involves satisfaction with the response in a particular situation. This leads to the pupils enjoying reacting to such type of situation.

5.1.3 Valuing

This is referred to as the worth or value which a pupil attaches to a particular object, stimuli, phenomenon or behaviour. It could range from simple acceptance of a value such as the desire to improve his group skills to some more complex level such as commitment as in assuming responsibilities for effective and efficient domain. It is based on the internalisation of a set of specified values. The instructional objectives, which have commonly been classified under attitudes and appreciation, fall within this level. This is because values and beliefs determine attitudes and appreciation. According to Kibler*et al.* (1981), an important element of behavior characterised by valuing is that it is motivated not by the desire to comply or obey, but by the individual's commitment to the underlying value guiding the behaviour. At this level, pupils value more of group work; demonstrate belief in the democratic process; and appreciate traditional or classical music. At this level, they exhibit problem solving attitude etc. The sub-levels here include:

i. Acceptance of value: This concerns a situation where the pupils have a tentative belief in a doctrine, condition, situation or a proposition.
ii. Commitment to a value: At this stage, the pupil is convinced and committed to the doctrine, situation, principle or cause. The pupil internalises a set of specific values, which consistently manifest in his behaviour and attitude.

5.1.4 Organisation

This involves primarily the bringing together of different values, resolving any existing conflicts between them and then building an internalised consistent value system. According to Kibler *et al.*(1981), when pupils internalise values, they encounter situations for which more than one value is relevant. To this effect, they need to organise the values into a system; to determine the inter-relationships among them and to establish the dominant and pervasive ones. Here, emphasis is placed on comparing, relating and synthesising values. Learning outcomes in this level may include the conceptualisation of values such as recognising individual responsibility in respect of improvement to human relations. It also includes the organisation of a value system.

Instructional objectives, which are related to the development of a philosophy of life, fall within two categories.

i. **Conceptualisation of value**: This involves the ability to understand the relationship between abstract elements of a value and those already held or to new values which are gaining acceptance.
ii. **Organisation of value system**: This involves the development of a complex value system, which includes all the values that cannot be compared for making choices in order to promote public welfare, instead of the sheer aggrandisement of special personal interest.

5.1.5 Characterisation by Value or a Value Complex

Individual pupil exhibits a value system, which has controlled his behaviour for a sufficient time. This leads to the development of a characteristic life style. All behaviour developed at this stage could be pervasive, consistent and predictable. Such behaviour when exhibited does no longer arouse emotion except when the individual is challenged or threatened. Learning outcomes at this level cover a wide range of activities. However, it emphasises the fact that the behaviour is typical, peculiar or characteristic of the individual pupil. Instructional objectives at this level relate to the pupils' general patterns of personal, social and emotional adjustment. There are two levels here:

i. **Generalised set**: This refers to a situation where the orientation of the individual enables him/her to reduce or to order a complex environment and to act consistently and effectively in it. The individual is free to change his judgments and behaviours based on available new and valid evidence.

ii. **Characterisation**: This refers to the internalisation of a value system in such a way that the individual is consistently acting in harmony with it.

Look at the National Policy on Education (NPE, 2004). You will notice that out of the four educational objectives formulated or specified for the Nigerian Education System, two of them are predominantly affective in nature, but has occasional cognitive undertones. According to Nwana (1988), the third objective, which is predominantly cognitive, also has some in-built affective overtones. Let us look at the objectives.

i. The inculcation of national consciousness and national unity;

ii. The inculcation of the right type of values and attitudes for the survival of the individual and the Nigerian society; and

iii. The training of the mind in the understanding of the world around.

It is imperative therefore, that the affective behaviours be taken care of and be developed in pupils in the school system. These behaviours need to be assessed too. This is why the affective report indicated in the government handbook on continuous assessment indicated some dimensions of the affective domain, which you as a teacher have to assess in your pupils. These are:

i. attendance to class
ii. carrying out assignments
iii. helping others
iv. honesty
v. initiative
vi. neatness
vii. obedience
viii. participation in class activities
ix. politeness
x. punctuality
xi. relationship with staff and fellow students
xii. self control
xiii. sense of responsibility

As a teacher, you are expected to reflect these affective behaviours on a five point likert-type scale in every pupils' continuous assessment report card. These start from 5, 4, 3, 2, 1. The highest point shows excellent manifestation of the behaviour, while the least shows very poor manifestation. Note that these affective behaviours are not uniform in all the schools in this country. You can find some variations and other dimensions in different school report cards. However, most of the times, these affective behaviours are not assessed.

5.2 Why Teachers Donot always Assess the Affective Behaviours

Some of the factors why teachers do not always assess the affective behaviours include the following.

i. Assessment of these behaviours is inherently subjective and difficult.
ii. The dimensions are sometimes not clear for assessment.
iii. Lack of skills necessary for effective assessment of these behaviours
iv. Promotions, certifications, graduations, failure, etc in the school system are based entirely on cognitive and psychomotor achievement at the neglect of affective.

v. The long time focus on the cognitive domain in the school system.
vi. No objective, valid and reliable instrument for assessing these affective behaviour. Assessment here is based on subjective situations.

SELF-ASSESSMENT EXERCISE 1

i. Explain the affective domain.
ii. What are the levels of affective domain?
iii. State five examples of objectives in the affective domain.

5.3 The Psychomotor Domain

In this domain of behaviour, we talk about manipulative skills, which your pupils possess naturally, or have developed or acquired. It deals with body movements. It is concerned with dexterity in the body movement and the manipulation of the body and the limbs. Behaviours exhibited here could be in hand writing, drawing, setting up or using laboratory and workshop equipment, typing, operating machines, playing, dancing, swimming, driving, sheeting, playing music etc. You can see that most of the activities here fall within muscular activities such as games, athletics, gymnastics, etc, finger dexterity as in drawing, writing, typing and use of hand tools like burettes, forceps, etc and mechanical workshop operations like repairs, filing, fittings, paintings, etc. There are six hierarchical levels of the psychomotor domain. These are discussed below.

5.3.1 Reflex Movements

This is at the lowest level in which every normal human being should be able to make. All the movements involved in reflex movements are natural except where the case is abnormal. They include swallowing things, urinating or defaecating, twinkling of the eyes, jumping up when there is danger, etc.

5.3.2 Basic Fundamental Movements

This is similar to the reflex movement where we have basic movements that are natural. As a teacher, there is little or nothing you can do to modify them. However, if there is an abnormal case, special educators can step in to assist. There are three sub categories here. They are:

i. **Locomotor Movement**: This is concerned with movements of the body from place to place, such as crawling, leaping, walking etc.

ii. **Non-locomotor Movement**: The body movements here do not involve moving from place to place. They include muscular movements, shaking of the heads, waving of hands, wriggling of trunk, turning, twisting of the body, etc.

iii. **Manipulation Movements**: This involves the use of the hands or limbs to move things or to control them.

5.3.3 Perceptual abilities

This involves the senses and their developments. As a teacher, you do not have much to do in this case except to direct the use of these senses to conform to certain conditions. Ability to perceive and distinguish things using the senses is involved here. You can recognise and compare things by physically tasting, smelling, seeing, hearing, touching etc. You can use the sense of touch, smell, sound, feeling etc to associate and understand certain objects or situations and to determine conditions and necessary line of action.

5.3.4 Physical Abilities

This is concerned with the health and physical education. Sports or games and athletics require physical abilities, which can be developed to varying degrees of perfection through exercises. If you are a sportsman or woman, you need to practise in order to improve on your skills of endurance, strength, flexibility and agility.

5.3.5 Skilled Movements

Here, you can apply or combine the skills acquired in 3.3.4 in making or creating things. You can combine the skills inflexibility, endurance, manipulative etc to draw or write. You can combine neuromuscular movements with flexibility to help you in drawing. Combat sports like wrestling, boxing, judoka, weight lifting etc involve a combination of straight, endurance, flexibility and manipulative movements. There are three sub levels here. They are simple adaptive skills, compound adaptive skills and complex adaptive skills.

SELF-ASSESSMENT EXERCISE 2

Give five examples of activities in which skilled movements are involved.

5.3.6 Non-Discursive Communication

As the highest level of the psychomotor domain, non-discursive communication involves a combination of all the lower levels to get to

the high degree of expertise. For instance, you can only use the computers, if you have a good deal of training, practice and ability to combine certain movements of the fingers to manipulate the keyboard and the mouse. You also need certain level of perceptive abilities to interpret or decode the messages. You can move your limbs and legs. However, for you to do such activities as driving swimming, typing, cycling, browsing the internet, etc, you need some level of training, practice and abilities to combine a variety of movements and perceptual abilities. There are two sub levels here; they involve expressive movements and interpretive movements.

Now, let us examine the fourth national education objective. It talks about the acquisition of appropriate skills, abilities and competences (both mental and physical) as equipment for the individual to live and contribute to the development of the society. You can see that this objective embraces both the cognitive and psychomotor domains of behaviour. It implies that teaching and learning of psychomotor should be directed towards the acquisition and transfer of practical operational skills. These skills must be assessed in the continuous assessment situation.

Before we conclude this discussion on the domains of educational objectives, you need to know that all three domains of behaviour should be taught, assessed and the results used in taking decisions about the pupils. This is because the basis lies on the fact that education aims at molding and developing the individual in his totality.

6.0 ACTIVITY

1. How many level of affective and psychomotor domain do we have and arrange them in hierarchical order.
2. Differentiate between receiving and responding.
3. Valuing and characterization.

7.0 SUMMARY

In this unit, you have learnt that the affective domain has to do with values and beliefs, attitudes, interest, social relations, emotional, adjustments, habits, life styles, etc. The hierarchical levels include receiving, responding, valuing, organisation and characterisation by value or a value complex. Each of these levels has some sub-levels. You also studied the psychomotor domain with six levels including reflex movement, Basic fundamental movement, perceptual abilities, physical abilities skilled movement and non-discursive communication. Each of these has sub levels too. All the domains should be taught and assessed in order to develop the totality of the individual.

8.0 ASSIGNMENT

1. What is wrong with the current affective assessment?
2. Mention and explain one basic way of assessment of affective objectives.
3. Mention three instruments for measuring affective domain.

9.0 REFERENCES

Bloom, B. S, Hastings, H. T., & Maddus, G. F. (1971). *Handbook of Formative and Summative Evaluation of Students' Learning*. New York: McGraw-Hill Book Company.

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MODULE 2 CONTINUOUS ASSESSMENT INSTRUMENTS AND TECHNIQUES

UNIT 1 TESTS 1

CONTENTS

1.0 INTRODUCTION

In your previous course (measurement and evaluation), you studied tests and tests types. Your knowledge from that course is still relevant in this one. In this unit, we shall only touch on some of these pieces of information briefly. You are going to learn about tests, and types of tests items used in the continuous assessment system. It has been emphasised before, and we are emphasising again and throughout this course that tests are developed to measure whether objectives have been met. It implies that at every stage of the teaching-learning process, specification of the objectives in explicit terms is paramount.

2.0 OBJECTIVES

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

- define a test;
- describe the types of tests items;
- explain the types of objective tests;
- discuss essay tests;
- construct objective test items; and
- construct essay test items

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 MAIN CONTENT

4.1 Tests

Test is the major and most commonly used instrument for continuous assessment. It is defined as a sample of pupils' performance on items that have been designed to measure pre-selected objectives. In other words, it is a set of questions which pupils are expected to answer. The responses of the pupils to the questions give a measure of their level of performance or achievement. Test items are usually based on topics or sub-topics within a subject. These are directed to measure your pupils' level of attainment of pre-specified objectives. It means that the test and the performances they require are related to measure the objectives you want them to measure. It is important, therefore, that you always state your objectives using action verbs only. This will help you determine the test items you need to construct to measure pupils' mastery of those things you intent for pupils to master.

4.2 Preparation of Classroom Test

When you want to prepare your classroom test for the measurement of your pupils' academic achievement, you need to take the following steps:

1. Planning;
2. Development; and
3. Evaluation of test items (item analysis)

4.2.1 Planning Test

This is an important aspect of test construction. This is because it helps you ensure that the test you are constructing covers the pre-specified instructional objectives. It will also help you make sure that the topic and sub topics of the subject under consideration are covered. This implies that a major purpose of planning the test is to ensure content validity. To refresh your memory, content validity is concerned with the extent to which a test measures a representative sample of the subject matter content and instructional objectives specified for your class. Therefore, in order to make sure that the test you are preparing has content validity you will have to:

i. identify the instructional objectives specified for the subject;
ii. identify the subject matter covered during the teaching/learning period in the class; and
iii preparing the table of specifications.

i. **Identifying the instructions objectives**

In module 1, unit 2, you studied in details, the classification of the instructional objectives in the cognitive domain. You learnt that the objectives can be classified into six hierarchical levels of knowledge/memory, comprehension/understanding, application, analysis, synthesis and evaluation. These categories of Bloom's taxonomy of educational objectives in the cognitive domain were explained in details in that unit.

At the primary school level, specifying objectives and measuring them at the application, analysis, synthesis and evaluation categories are usually very difficult. This is very true especially with beginners in test construction. This is why some objectives are specified by condensing these four categories into one category. Now, let us see an example of such a condensed form developed by the Educational Testing Service (ETS), Princeton, New Jersey. This is highly recommended for the use of the classroom teacher in the primary school. Let us first look at the relationship between the Bloom's sub categories and the condensed ETS version as presented in the table below.

Table 1.1 Relationship between Bloom and ETS version

S/N	Bloom's Taxonomy	S/N	ETS Taxonomy
1.	Knowledge	1	Remembering
2.	Comprehension	2	Understanding
3.	Application)		
4.	Analysis)		
5.	Synthesis)	3.	Thinking
6.	Evaluation)		

You can see from the table above, how application, analysis, synthesis and evaluation levels are equated to and condensed to thinking level of the ETS version. It implies that instructional objectives beyond comprehension level fall within thinking level. It also means that after comprehending and recalling facts, pupils should think and make use of the facts in new situations. We shall be using the ETS here since we are already used to the Bloom's in the "Measurement and Evaluation."

ii. **Identifying the subject matter**

At the planning stage of a test, you need to identify the topics and/or sub-topics on which the test is to be based, the outline of the subject matter or content outline is based on what you as the classroom teacher have treated with your pupils during the period of teaching-learning. It is usually a better pedagogy to specify the objectives before the instruction and/or the content outline. A list of objectives forms the basis for a content outline. It serves as the basis for determining what test items must be written. Let us take a content outline as a list concepts or tasks to be mastered in a lesson; the following steps are ordinarily followed in the preparation of a content outline, for test construction.

a. Identify the segment of instruction for which testing will be done. This is for you to make sure that assessment accurately reflects the achievement of the pupils in that segment. A segment can be a unit, a week, a term, half a year or even a yearly instruction.
b. Specify the concepts, ideas, or skills covered in the segment.
c. Restate the concepts, ideas or skills in behavioural terms. This is becauseyou are measuring performances that reflect concepts, ideas and skilled to be learnt.
d. Indicate any differences in relative emphasis of various objectives since all the objectives in the outline may not be of equal emphasis apply the weighting system to the level of emphasis.

iii. **Preparing the table of specification**

As you already know, the test blueprint, otherwise called the table of specification is a device that enables you to arrive at a representative sample of the instructional objectives and the subject matter treated in the class. Once you have clearly identified the instructional objectives and the subject matter, you can go to the next step, which is preparing the test blueprint. This is to link both (instructional objectives and subject matter) and indicate the number of test items to be written for each level of

objective and each area of subject matter. The steps to follow are listed below.

a. Decide on the number of items or questions you intend to develop.
b. List the instructional objectives.
c. List the subject matter (content outline).
d. Indicate the number of test items to be set for each level of objectives and each content area.

You have to note that the relative emphasis given to the subject matter and the objectives depends on the emphasis given to them during the period of teaching and learning. Look at this example:

Table 1.2 Table of specification for a 46 items in statistics test

CONTENT	**OBJECTIVES**			
Subject Matter	**Remembering**	**Understanding**	**Thinking**	**TOTAL**
Frequency Table	2	2	3	7
Ideographs	1	2	2	5
Bar Graphs	2	2	2	6
Pie Chart	2	2	3	7
Histogram	3	3	3	9
Frequency Polygon	1	2	3	6
Cumulative Frequency Curve	1	1	1	3
Cumulative Percentage Curve	1	1	1	3
TOTAL	13	15	18	46

If you take a look at the table above, you will notice that among the eight subject matter, histogram attracted the highest number of items (9),while cumulative frequency and cumulative percentage curves attracted the least (3) each. We have already said that this depends on the emphasis you attach to the subject matter area. Having done with the table of specification, you can now proceed to constructing the test items. This must follow what you have specified in the table.

4.2.2 Construction of Test Items

When you want to construct a test, you will first consider the various kinds of tests items that can be used for your purpose. Having decided on the type of test items you want to use, you follow the guidelines in writing the test items. For your classroom use, there are two broad types of test items in common usage. These are (a) Essay type items and (b) Objective type items. We shall look at these in the next sub-sections.

4.3 Essay Test Items

As a classroom teacher, you must be familiar with the essay test items. They are the item types commonly used in the school system because of the ease of construction among other considerations. An essay item is that which allows pupils to select, organise, and integrate and synthesise their answers or responses in order to present them in their own styles and their own words. An essay item could be extended or restricted, depending on the amount of freedom given to the pupil to organise his ideas or facts in order to present his answer. Can you think of examples of each of the types, as you use them in your class? Look at these examples.

(a) Extended type

i. Describe the construction of a histogram.
ii. Explain the applications of the helix.
iii. Discuss the factors considered when choosing.

(b) Restricted type

i. Give 3 advantages of essay test
ii. List 4 sources of research problems
iii. Mention 5 parts of a circle

The nature of essay items makes marking or scoring to be subjective. Again, it is very easy to set; however, some teachers set essay items that are not good. These tend to affect the reliability and validity of the essay items. Therefore, you should give much care and attention to the construction and scoring of essay tests. The guidelines for constructing a suitable essay are discussed below.

4.3.1 Guidelines for Constructing Essay Test Items

i. Construct questions that are very clear: This will help to elicit accurate type of behaviour, which you intend to assess.
ii. Do not make the questions to be too many or too lengthy.
iii. Break long essay items into shorter ones that will require the pupils to give short answers.
iv. Make the pupils answer all the questions that is, there should be no optional items. This provides the basis for using the same instrument for the evaluation of their level of achievement.
v. The questions set should cover the objectives and the subject matter specified in the test blue print.
vi. Indicate the mark or point value for each question as well as the time limit for answering the questions.

vii. Restrict the use of essay questions to the learning outcome that cannot be satisfactorily measured by objective test items.

SELF-ASSESSMENT EXERCISE 1

In your area, select a topic and set five essay questions. Prepare the marking guide and identify the type of essay items.

4.4 Objective Test Items

As previously explained, objective test items are regarded as highly structured test items to which the pupils are expected to supply the answers. These could be a word or two, symbol or formula, numbers, figures, or select the correct answer from a limited number of alternatives or choices. This means that objectives test items can be classified into (a) supply items and (b) selection types. Each of these can be further sub divided into the following.

4.4.1 Supply Types

This type can be sub-divided into two. These are (a) short answer items and (b) completion items.

(a) Short answer items: In this case, the item is presented as a direct question. For example:

i. Who is the president of the Federal Republic of Nigeria?
ii. Where is the headquarters of United Nations Organisation?
iii. Who is the current world footballer of the year?

(b) Completion items: In this case, an incomplete statement is made and the pupils are expected to fill the blank space(s). For example:

i. Nigeria gained her independence in the year ……
ii. In the equation $3x + 4 = 19$; $x =$ _____
iii. A plane figure bounded by four straight sides is called _____

You can see from the examples, that most supply items require the pupils to recall information rather than recognise it. The two varieties are essentially the same, differing only in the method of presentation of the problem. They are very much appropriate for the lower classes of the primary schools.

4.4.2 Selection Types

There are three common types in this category. They are:

(a) alternative response type
(b) matching type and
(c) multiple choice items

(a) **Alternative response items**: In this type, pupils are presented with two choices or options. They are required to select one as the correct answer. The two options may be True/False, Correct/Incorrect, Yes/No, Right/Wrong, etc. The most common in the classroom usage is the True/False. Here, information or a statement is given and the pupils mark either True or False. For examples:

(i) Lagos is the capital of Nigeria. (True or False).
(ii) All plane figures bounded by four sides are called quadrilateral. (True or False).
(iii) The normal curve is asymmetrical. (True or False).

(b) **Matching items**: This is the type in which two columns of items, which are usually unequal, are provided and the pupils are expected to identify pairs of the items, which are associated based on specified direction. One column usually contains items to which a match is sought. These items are referred to as the premises. While the other column contains items, from which selections are to be made. The items here are referred to as responses. For example:

Column A		**Column B**	
i.	Coal City State	a.	Anambra State
ii.	The Big Heart	b.	Ogun State
iii.	The Gateway State	c.	Osun State
iv.	Gods own State	d.	Abia State
v.	The Food basket	e.	Enugu State
		f.	Delta State
		g.	Benue State
		i.	Edo State
		j.	Kano State
		k.	Plateau State

In this case, a corresponding instruction should be given. For instance, instruction to the above could be column A which contains names used for the identification of some states in

Nigeria, while column B contains some states in Nigeria. Select from column B the correct state for each of the identities in column A. Indicate the letter representing the state against the correct identity in column A.

Matching items can be very useful if you are interested in testing the pupils' knowledge of association of pairs of facts such as states and capitals, authors and books, dates and events, symbols, names etc.

(c) Multiple choice items: This is the most common of the objective test items in use today. It is made up of two parts. It is either the problem part, which is stated in the form of a direct question, or an incomplete statement known as the stem of the item. While a list of suggested solutions or answers are referred to the alternatives or options. The correct alternative or option is called the answer or the key. While the incorrect alternatives or options are referred to as the distracters. Their main function is to distract the uninformed examinee. There should be four or five options in a multiple-choice item. Examples include:

i. Direct question form: Example of this include
What is the name given to a plane figure bounded by five straight sides?

A. Polygon B. Irregular Pentagon C.Regular Pentagon D.Hexagon E. Re-entrant Polygon

ii. What is the plane figure generated by an ellipse rotating on its axis for one complete rotation?

A. Trapezoid B. Ellipsoid C.Trapezion D. Trapezium

2. Incomplete statement form: Example of this includes:

i. A nine-sided polygon is called _____

A. Nonagon B. Octagon C.Decagon D. Heptagon

ii. Nigeria became independent in the year _____

A. 1963 B. 1960 C. 1958 D. 1953

The multiple-choice items are considered the most flexible and useful. It can be employed in the measurement of different types of learning outcomes ranging from simple to complex.

4.5 Guidelines for Writing Good Multiple-choice Items

ii. Formulate the stem of the item in a clear and meaningful way that present a definite problem.
iii. The stem should be as brief as possible.
iv. The stem should include, as much of the item as possible and the alternatives should be as short as possible.
v. Each item should be formulated to test only one central idea.
vi. Make the distracters look as plausible as possible.
vii. Formulate each item in such a way that the alternatives are grammatically consistent with the stem.
viii. Write the items in such a way that the reading difficulty is reduced; and the vocabulary levels are as simple as possible.
ix. Use natural order (numbers, dates, alphabets etc) to position the options.
x. Use negatively worded item stems sparingly. Where you must use such negative words as 'no, 'not', etc, make sure that you capitalise them or underline them to avoid pupils overlooking them.
xi. Avoid the use of 'all of the above' as an option. Again the option "none of the above" should be sparingly used.
xii. The length of the alternatives should be relatively equal. This is to make sure that the length does not give clue to the correct answer.
xiii. For question testing definitions or the meaning of concepts, terms or words, you should try to have the definitions, concepts, terms or words in the stem.
xiv. The keys to the items should appear at different positions (that is, A, B, C, D) at an approximate number of times.
xv. There must be one and only one correct answer in an item.
xvi. There should be four or five options for each item.

4.6 Item Analysis

The questions, which were used for the assessment of the pupils in your class, may not be subjected to item analysis. However, if you decide to do an item analysis of your instrument, then you should first experiment the items constructed with a sample of students that are quite similar to those pupils for whom the test is designed. After the trial test, you proceed to analysing the responses of the pupils item by item. This analysis will enable you to determine the difficulty index, discriminatory index and the distracters effectiveness. This item analysis will help youto select the items, which are suitable for your final test. You can get the details from your course on Measurement and Evaluation: EDU 426.

SELF-ASSESSMENT EXERCISE 2

Select a topic in your subject area and set 10 objective items as follows: four supply types and six selection types. Provide the marking guide.

5.0 ACTIVITY

1. Mention two set of direction required for preparation of test instruction.
2. Explain these two directions.
3. Listany three questions item analysis is usually carried out to solve.

6.0 SUMMARY

In this unit, you have learnt that test is the most commonly used instrument for pupils' assessment in the continuous assessment system. For you to develop a test, you will have to plan for it, construct the items following the guidelines. In this unit, you learnt about the two types of tests, essay and objective tests. In essay test, we have the extended and the restricted types. In the objective types, we have the supply items and he selection items.You have learnt the guidelines to follow when constructing each types of the item.

7.0 ASSIGNMENT

Question 1: State three qualities of a good test.

Question 2: State 4 basic component of a good test.

Question 3: Highlight 6 main purpose of testing.

8.0 REFERENCES

Nwana, O. C. (1981). *Educational Measurement for Teachers*. Ikeja, Nairobi, Singapore, Hong Kong, Ontario, Victoria: Thomas nelson and Sons Ltd.

Obimba, F.U. (1989). *Fundamentals of Measurement and Evaluation in Education and Psychology*.O werri: Totan Publishers Ltd.

Ughamadu, K. A. (1984). *Understanding and Implementing Continuous Assessment*. (2nd ed.). Benin City: World of Books Publishers.

UNIT 2 TESTS II

CONTENTS

1.0 INTRODUCTION

In the last unit, you studied the different types, of tests: namely objectives and essay tests. From the examples given, you have learnt how to set the items. These are the basic things you are expected to do in the continuous assessment system as a teacher. We shall learn more of these things in this course. Meanwhile in this unit, we shall be discussing the guidelines for marking the tests items and formative evaluation in a continuous assessment system.

2.0 OBJECTIVES

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

- explain the guidelines for marking essay test items;
- list the guidelines for marking objective test items;
- describe formative evaluation; and
- discuss how to remedy pupils' problem areas.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Scoring stencil:** ananswer sheet scored by counting the number of correct responses.
- **Instrument:** a tool or device used to elicit information from respondents.
- **Instructional strategy:** are techniques teachers use to help students become independent, **strategic** learners.
- **Curriculum:** the subjects comprising a course of study in a school or college.
- **Remediation:** the action of remedying something, in particular of reversing or stopping environmental damage.
- **Periodical:** occurring or appearing at intervals; occasional
- **Problematic areas:** difficult to understand.
- **Strategy:**the fact of not being easy to do or understand.

5.0 MAIN CONTENT

5.1 Guidelines for Marking Essay Test Items

The following guidelines for marking essay tests will help to make your marking scheme less subjective:

i. **Marking Scheme**: Before you start marking, make sure you have the detailed marking scheme for each question. This will provide a common frame of reference for assessing each pupil's response or answer to the questions. This will ensure that the standard of marking for each item is uniform in all the pupils' scripts.

ii. **Mark each question separately**: Make sure that all the pupils' answers to one question are marked before going to the next question. This will help you to maintain a uniform standard of marking. It will also ensure reliability of the scores.

iii. **Mark the pupils' script without prejudice**: This will ensure objectivity in the marking.

5.2 Guidelines for Marking Objective Test Items

It is relatively easy to mark objective test items. It will be easier if you apply appropriate techniques. When the objective questions involve shading the correct option on a separate objective answer sheets, you should use the scoring stencil to mark the papers. You will prepare this by using the same objective answer sheet and shading the correct options on the sheet. After this, punch holes on the shaded answers. When you place the perforated stencil on each pupils answer sheet, make marks on the holes. After this, remove the stencil and count the

number of shaded spots appearing through the holes of the stencil or corresponding with the holes. This will give you the score of the pupil. Before you start marking, it is important that you check through the pupils' answer sheet to make sure that any item where more than one options are shaded will be crossed out before using the stencil. These days, there are computer-made objective answer sheets. Anytime you have objective items for your pupils, try to use them.

5.3 Formative Evaluation

In the Nigerian school system, formative evaluation is important and relevant to the continuous assessment practices. Formative tests are supposed to be administered to the pupils in the continuous assessment system as teaching-learning progresses. Formative tests can be described as the instruments primarily used for the continuous assessment of pupils learning in the teaching-learning situation. They are tests designed or developed and administered periodically to the pupils during the teaching learning process. They are used mainly for the monitoring of the learning progress of the pupils in particular and the teacher's instructional strategies. The feedback from these tests can be used to assess the pupils and teachers' performance, the appropriateness of the curriculum and for diagnosing individual pupil's problems. Formative tests are used by the teachers for the formative evaluation of pupils.

In this context, formative evaluation is regarded as the systematic and periodic evaluation of the pupil's progress in learning during the instructional programme. The focus of the formative evaluation is the improvement of the pupils' learning through the provision of constructive feedback and remediation mechanisms. Again, formative evaluation also focuses on the improvement of teaching. It is used to provide reinforcement when successful learning takes place and to identify weaknesses that require remediation.

According to Bloom *et al* (1981), since formative evaluation takes place during the formation stage, efforts should be made to use it to improve the teaching-learning process. We can rightly say that formative evaluation is very useful to the pupils. This is because it helps to pace their learning. It provides diagnosis to their learning difficulties and problems. It helps to provide reinforcement to their learning. It also helps to prescribe alternative remedial measures to their learning difficulties. Formative evaluation is also useful to you as the teacher. This is because it helps you in locating specific difficulties, which your pupils are experiencing in the subject matter content, quality control and prediction of summative evaluation results. For instance, through the feedback you get from the formative evaluation of your pupils, you should be able to say pupil X or Y may not be able to make it if the

pupil is not given adequate remediation exercises. For an effective utilisation of formative evaluation in the teaching learning process, Ughamadu (1994) recommends that the teacher needs to:

i. break up the subject matter content or course into smaller hierarchical units of instructions;
ii. specify the objectives for each unit;
iii. design and administer good formative tests;
vi offer remediation in groups or individually in the areas of deficiencies before treating a new unit; and
v. administer formative test after teaching all the units.

5.4 Formative Evaluation and Continuous Assessment

In our earlier discussion, you learnt that continuous assessment among other characteristics is guidance-oriented. This is because data collected on any of the pupils or learners can be useful in guiding his/her further growth and development. Note that this guidance-oriental nature of the continuous assessment is analogous to formative evaluation (Yoloye, 1978). The basis of operation for both continuous assessment and formative tests is the predisposition to assist the learners to succeed in their learning. We can therefore conclude this section by saying that guidance-oriented evaluation and formative evaluation are all integral aspects of continuous assessment.

SELF-ASSESSMENT EXERCISE 1

i. What is formative evaluation?
ii. What should the teacher do for effective utilisation of formative evaluation?

5.5 Remedy for Pupils' Problematic Areas

If you administer formative tests to your pupils regularly, there will be an improvement in their academic achievement. However, this academic feat is improved to a certain extent. If there is a prompt feedback and appropriate remediation accompanied with formative testing, there will be remarkable improvement in the level of the pupils' academic achievement. In addition, if you encourage your pupils to put more efforts in their class work by commenting on their class work, you will record higher improvement in the pupils' academic performance. When you want to administer a test for remediation of your pupil's problematic areas, a good strategy you can adopt is that of identifying the test items which majority of your pupils in the class answered incorrectly. According to Bloom *et al* (1981), two-thirds of the pupils or more can be used as an index to majority. Once these items have been identified,

you than go ahead to review the ideas underlying the items. You can even explain them in details or explain them differently from the way they were initially explained to the pupils in the teaching-learning process. This strategy is what Ughamadu (1994) referred to as the "group-based approach to remediation." Alternatively, you can review all the test items, but lay emphasis or direct your emphasis to the particular items which majority of the pupil in the class had problem with. You can also refer to specific pages of their textbooks, class notes or other relevant instructional materials for the pupils to consult in their further reading.

Another significant method is the one which Bloom *et al* (1981) considered as the most effective procedure for remediation. This method requires that you have small groups of two or three pupils to meet for a period of about 30 minutes or more to review their level of performance after every formative test. For this method to work effectively, pupils in a group can help each other to overcome the areas of the test that posed problem to them. However, with the high pupil-teacher ratio in our school system these days, the number of pupils in a group could be increased to be more than three. You have to use your discretion in this case.

In some cases and wherever possible, you can offer individualised attention to some pupils. This will be suitable for some pupils who may not be following the teaching-learning process or those who are slow learners. It is the expectation of the system that there will be an improvement in the pupils' learning and academic achievement if the pupils are exposed to regular formative testing with remediation in this era of continuous assessment in our school system.

6.0 ACTIVITY

Question 1: What is essay test?

Question 2: What are the advantages of essay test?

Question 3: State five limitations of using this test in school

7.0 SUMMARY

In this unit, you have learnt how to mark essay test without prejudice. You also learnt that to mark objective items shaded on objective test sheets; you have to make use of stencils. In this unit also, we discussed the formative evaluation, which makes use of formative tests designed or developed and administered periodically to the pupils during the teaching-learning process. The relationship between formative evaluation and continuous assessment was also discussed. You learnt

that formative evaluation is an integral part or aspect of continuous assessment. Strategies for, the remediation of pupils' problematic areas were also examined.

8.0 ASSIGNMENT

1. Briefly explain what essay test is all about.
2. Differentiate between formative and summative test.
3. State any two remedy for Pupils' problematic areas.

9.0 REFERENCES

Bloom, B. S. *etal.* (1981). *Evaluation to Improve Learning.* New York: McGraw-Hills Book Company.

Ughamadu, K. A. (1994). *Understanding and Implementing Continuous Assessment*.(2nd Ed.). Benin City: World of Books Publishers.

UNIT 3 PROJECTS AND ASSIGNMENTS

CONTENTS

1.0 INTRODUCTION

This is yet a continuation of the last two units. In this unit, we shall be examining more instruments and techniques used in the continuous assessment system. You may decide to use them in combination with others to improve the academic achievement of your pupils and to provide variations in the assessment. This will also make the continuous assessment programme more comprehensive.

2.0 OBJECTIVES

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

- explain the use of projects in continuous assessment;
- discuss the activities involved in the use of projects;
- mention important issues in the use of projects;
- describe the problems in evaluation of projects;
- explain the meaning of assignment; and
- mention the purposes of assignment.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 MAIN CONTENT

4.1 Projects

As pointed out in the introduction, tests are the most commonly used instruments for measurement of pupils' academic activities in the primary school system particularly in our educational system. In the continuous assessment system, another significant instrument for the measurement of the pupils' level of academic achievement is the project. Project is an integral part of the continuous assessment because it can be used for the assessment of all types of behaviours such as cognitive, affective, and psychomotor domains. It can be considered as an integrative instrument. This is because a single project could be used for the measurement of behaviours in all the three domains. We can describe a project as a task or large-scale exercise assigned to the pupils to work on over an extended period. Note that time constraint is not much of a problem in project work. An assigned project work can span over a period of one month, a term or even an academic year or session. A project work or task is expected to perform two major functions. These are (i) helping the pupils to learn through problem solving; and (ii) providing the teacher with the opportunity or basis for assessing the pupils' learning speed, creativity or creative thinking ability. Projects can also be useful in the assessment of some aspects of affective behaviour such as interest, and the display of some manipulative skills in the psychomotor domain can be accessed through some projects.

4.1.1 Projects Activities

Some activities, which are involved in project tasks, are as follows.

i. Allow pupils to carry out open-ended experiments in the school laboratories or workshops.
ii. Data collection and analysis: pupils can be asked to collect and analyse information on a variety of subjects and issues. For instance, they can be asked to collect information on the 'Mbomuzo festival' or 'IriJi Festival' from the East, the 'EyoFestival' from Lagos, 'ArgunguFestival'from the North, etc. Information in respect of Sallah or Christmas for the Muslims or Christians could also be collected and analysed.

iii. Pupils can be allowed to study a type of habit over a period.
iv. Making of models or moulds of objects: pupils can be asked to make models of 3-dimensional objects or geometrical shapes and figures. They can be asked to make molded illustrations of some physical features of the country.
v. Pupils can be asked to identify and solve or find solution to some or certain persistent problems in a community or a field of study. Such problems may include indiscriminate dumping of refuse, leaving bushy and unkempt roadsides, keeping the streams or water reservoir surroundings very dirty etc. Such problems as poor performances of pupils in Mathematics or Science subjects among pupils etc, the pupils can identify these problems with a view to collecting information on how to find solutions to such problems.
vi. Pupils can be asked to investigate underlying concepts and principles. This can get the pupils involved in selecting a concept or principle and carrying out a research study with a view to proving or disproving the applicability of such principle or concept.
vii. Pupils can be asked to draw plans for a model school, building, market town hall etc.
viii. Pupils can be asked to make systematic observation and recording of particular events. For instance, they can be asked to observe and record information on the rate of rainfall in a particular environment such as the school compound, the rising and setting of the sun, the germination and growth of a named plant etc. This will take place over an extended period.

You can see that from the list of possible projects, which your pupils can engage in, we can conclude that the extent of the complexity of each project varies. Young learners can carry some out, while others would be better carried out by more matured learners. Projects can be carried out in individual or group basis. It will depend on the extent of complexity of the project or the time available for carrying out the projects. Therefore, when you as the teacher assign projects to your pupils or you want the pupils to embark on project execution, you should have some purposes or objectives in mind. In other words, when you ask your pupils to set out for a project, you will obviously have some stated objectives which you intend achieving through the execution of such projects.

4.1.2 Skills and Abilities Developed by Pupils through Projects

It is expected that when pupils carry out projects, they will develop some of the following skills and abilities as shown by Ughamadu(1994:44)

i. Construct the particular equipment in a proper way.
ii. Set up the particular equipment in a proper way.
iii. Recognise the optimum conditions necessary for life in fresh water.
iv. Identify and provide the type of food the fish eats/apply their knowledge of nutrition of aquatic animals like fish.
v. Observe and record daily the life pattern of the fishes in the aquarium.
vi. Recognition of a good chain in secluded fresh water.
vii. Appreciate the economic importance of fishes.

When you take a close study of these objectives, though they are from a particular subject area, you will notice that they span through the three domains of behaviour. You remember, we have earlier said that projects can be used to cover behaviour in all the three domains.

4.1.3 Issues Associated with the Use of Projects

There are some important issues, which you need to know that are associated with the use of projects. These are listed below.

i. The degree of the teachers' participation in the project should be considered especially because the pupils are not to be given credit for the input of the teacher.
ii. Pupils develop originality and creativity by executing projects.
iii. The whole process involved in carrying out a project and the product should be assessed during assessment of the project.
iv. The project, which you assigned to our pupils or selected, by the pupils should be directed to the immediate environment of the pupil so that resource materials will be easily available.

All the criteria to be used for grading of pupils who participate in a group project should be properly worked out in advance. Listed below are the useful guides for projects evaluation.

i. Identify the purpose(s) for the project work.
ii. Break down the purpose(s) into specific objectives in the three domains of behaviour.
iii. Assign priorities to each of the objectives as to enable evaluators know the emphasis.

iv. Determine the degree of penetration desired for each objective.

SELF-ASSESSMENT EXERCISE 1

i. Identify some projects, which can be assigned to primary six pupils.
ii. Specify the objectives you intend to achieve by this project.
iii. Specify how you intend to assess the projects when they are completed.

4.1.4 Problems with Project Evaluation

Project work presents an important learning experience for pupils especially in developing their creative skills. It is also important to note that some problems may be associated with the evaluation of projects.

4.1.5 Teacher Participation

When a project is assigned to the pupils, it is a common knowledge that these pupils execute the project under the guidance and direction of the classroom teacher. The pupils usually consult their teachers who offer necessary advice and direction for the successful execution of the project work. This means that you as a teacher will play the role of a planner and consultant and when the project is completed, you will play the role of an assessor. You can see that these three roles are interdependent. Therefore, a problem arises from these roles of the teacher. This means that teachers invariably participated in the project. The first problem is to determine how much of the result of the project is due to the pupils. Again, you will observe that it is difficult to identify which work belongs to the pupils and the ideas that are yours as the teacher. Your participation in the project work is inevitable, so the final assessment of the project can be considered as much, a measure of the teacher as well as that of his pupil. This issue presents problems to the objective evaluation of projects. You have to be aware of this when you are evaluating your pupils' project.

4.1.6 Product versus Process

In Nigerian school system, when teachers assign project to their pupils, and when the project is completed, teachers tend to evaluate the outcome of the project or the finished product only. They do not consider the whole processes, which must have been inputted into the execution of the project. This is not a very good approach in assessing the project. This fault is similar to the problem of evaluation of pupils' academic performance based on one-slot examination that did not take into consideration the progress made by the pupils before the final

examination. As a teacher, you should put into account the efforts, interest, value, persistence, tolerance, appreciation, creativity, originality, mode of attacking the problem etc, as worthwhile behaviour characteristics that should be recognised by the teacher. All of these and more are elements and characteristics to be evaluated in addition to the finished or final product. You can assess the processes involved in the execution of a project by having consultation with the pupils while the execution of the project is in progress.

4.1.7 Group Projects

Most times, projects are assigned as group work to the pupils. Group projects pose a big problem for the teacher as an assessor. The inherent difficulty in this case is for you to identify or know each pupil's contribution in the completed project. It is possible that in group projects, some pupils will participate actively while some may not. Most teachers use this as an excuse for not using projects in the assessment of their pupils. If you want to use the project for the assessment of the pupils especially in the continuous assessment, you should consult with the pupils. By doing this, you will note the type of questions raised by each pupil, the pupils' comments and then the responses of the pupils to your own questions.

4.1.8 Availability of Adequate Material/Resources

This involves problem posed by lack or unavailability of materials or resources for the execution of a good and quality project. Pupils may need raw materials for designing a project but may not be available; pupils in the rural areas may not be able to get enough magazines, newspapers, cardboard papers etc, from which to get cut-outs for preparing an album of animals, rulers, priests, etc. On the other hand, pupils in the urban areas may not be able to get such materials as palm fronds, fruits, roots etc, which may be necessary for the execution of a specific project. It means, therefore, that you need to consider the availability and easyway of getting the material resources before you assign the project to the pupils and in evaluating the projects.

To avoid the problem, whenever you use projects in assessing your pupils, you should give considerable attention to the availability of materials or resources. However, a factor of primary importance is the main purpose of the project under consideration. For instance, some of the knowledge, skills, interests, abilities, attitudes, values, feelings, etc, which you would wish to have in your pupils may be achieved through the execution of the assigned projects. As such, the purpose and objectives of any project are clearly stated at the planning stage to increase the objectivity in the evaluation of the projects.

4.1.9 Pupils' Involvement in Assignment

4.1.10 Purposes of Assignment

5.0 Activity

Question 1: What is Projects?

Question 2: What are best practices for designing group projects?

Question 3: What are the likely skills students need to handle a good project

6.0 SUMMARY

In this unit, you were exposed to project and assignments as instruments and techniques used in the continuous assessment system. You learnt that a project is a task or large-scale exercise assigned to pupils, which they may work on over an extended period. You learnt about different types of project activities that you can assign to your pupils, how pupils are involved in the skills and abilities to be developed in pupils. You also learnt the issues associated with the use of the projects and availability of adequate material resources.

Under assignments, you learnt how pupils could be involved in the assignments, purposes of assignments etc. In the next unit, we shall continue with other instruments and techniques.

7.0 ASSIGNMENT

1. What is the meaning of the term assignment?
2. List any two problems of executing assignment in school.
3. State two likely problems encountered in carry out group project in schools.

8.0 REFERENCES

Ezewu, E. E., & Okoye, N. W. (1981).*Principles and Practice of Continuous Assessment*. Ibadan: Evans Publishers.

Ughamadu, K. A. (1994). *Understanding and Implementing Continuous Assessment.* (2nd Ed.). Benin City: World of Books Publishers.

UNIT 4 OTHER INSTRUMENTS AND TECHNIQUES

CONTENTS

1.0 INTRODUCTION

In the previous units, you were exposed to the instruments and techniques used in the continuous assessment programme. You as a classroom teacher, who is to implement the programme, should be able to know how to use all these techniques. In this unit, you will be learning the remaining instruments and techniques.

2.0 OBJECTIVES

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

- explain systematic observation in continuous assessment;
- design a checklist for use in the class;
- describe a rating scale;
- explain how to use anecdotal records;
- describe the use of interview;
- design a questionnaire that can be used in the class; and
- explain socio-metric technique.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Techniques:** this is a way of carrying out a particular task, especially the execution or performance of an artistic work or a scientific procedure.
- **Systematic:** done or acting according to a fixed plan or system;
- **Observation:** the action or process of observing something or someone carefully or in order to gain information.
- **Manipulative:** characterized by unscrupulous control of a situation or person
- **Perception:** the ability to see, hear, or become aware of something through the senses.
- **Checklist:** a list of items required, things to be done, or points to be considered, used as a reminder.
- **Pre-meditation:** the action of planning something (especially a crime) beforehand.
- **Self-reporting instrument:** this is a type of survey, questionnaire, or poll in which respondents read the question and select a response by themselves without researcher's assistance.
- **Neglectee:** not receiving proper attention; disregarded.
- **Rejectee:** to refuse to accept, use, or believe something or someone

5.0 MAIN CONTENT

5.1 Observation

Observation as a continuous assessment technique has been in use (for collecting data or information) since the olden days. It is a common instrument among teachers. However, it is not systematically used. What is mostly used in Nigerian school system is the casual observation, which is not enough if one has to place some confidence on the information got through observation. If you have confidence in the information you have collected on your pupils, you will be better disposed to include such information in the pupils' reports. Therefore, it is important to use systematic observation in which pupils are observed in an organised manner. This will entail observing your pupils' behaviour systematically. When observation is systematic and

organised, it is considered an appropriate technique that can be used for the assessment of both affective and psychomotor behaviours. Before we continue let us define observation. Observation can be defined as the act of looking out for and recording the presence or absence of verbal and non-verbal behaviour of a person or group of persons. The use of specially designed evaluation instruments to collect observational data is referred to as *observation technique*.

5.1.1 Guidelines for Systematic Observation

Conducting a systematic observation that will yield useful information and that can be relied on, requires the following guidelines.

i. Identify the quality or behaviour to be observed for example, leadership quality.
ii. Determine the appropriate behaviour that characterises the identified quality.
iii. Determine the appropriate activities that can make the pupils display the quality. This entails creating a situation in which such behaviour or quality will be displayed. This process is referred to as *manipulative situational technique*. It is a method of observation. For instance, you can test the honesty of your pupils by dropping some money or anything that is attractive at a place where it can easily be stolen. You can then observe the pupils' behaviour to the money or the item. Some of the times, you can observe behaviours in their natural occurring situation or natural setting.
iv. Determine methods of observation. You can have direct observation in which you carry it out yourself; you can use trained observers or employ the use of electronic recording devices.
v. Observe the pupils in different situations to ascertain the regularity or establish the regular display of such behaviour to get a reliable and valid data.
vi. Device a method of recording the observations made.

At this juncture, you should note that the use of systematic observation as an instrument for the assessment of the pupils' behaviour and its successful utilisation depends to a great extent, on certain factors. These factors hinge on the extent to which teachers are bias, exercises his powers of perception and the accuracy with which the results of observations made are recorded.

4.1 Checklist

Checklist as an assessment instrument essentially consists of a list of steps, activities, events, behaviours or statements associated with given behavioural traits, which the observer records when such incident is noticed or occurs. It you are using the checklist; you will be able to determine whether particular behavioural traits or characteristics are present or absent. A checklist may not permit you as the observer to rate the quality of, degree to which, or the frequency of occurrence of a particular behaviour. Nevertheless, it can be used effectively in the assessment of affective and psychomotor behaviour. You can use the checklists in most subject matter areas. It can be useful in the assessment or make evaluation of learning activities especially those that involve product, process and some aspects of personal-social adjustment. Checklist can be more useful in the evaluation of processes, which can be sub-divided into a set of clear, district and separate actions as in the use saws in the workshop, welding, casting, drawing or the use of thermometer etc. When you make use of a properly prepared checklist, you will notice that your attention will be focused to the clearly defined characteristics or traits. It will also permit different individuals who used the same instrument to compare their results on a common list of characteristics or traits and provide a very simple and definite method of recording observation. For you to conduct a test in your subject area, the following checklist should be considered:

i. Specify instructional objectives in measurable terms.
ii. Specify the content area to be covered.
iii. Prepare a table of specification.
iv. Determine the test item type to be used.
v. Construct the test items.
vi. Trail test the instrument.
vii. Carry out item analysis.
viii. Edit the items.
ix. Prepare the marking scheme.
x. Update the instructions.

Below is the checklist for assessing pupils drawing attitude.

i. correct type of pencils
ii. pencilscorrectly sharpened
iii. correctdrawing paper
iv. neatdrawing paper
v. drawing paper well placed
vi. correctdrawing board
vii. correcteraser
viii. correctsharpener

ix. othermaterials in use
x correct use of the materials
xi. maintainsneat drawing
xii. correctconcentration

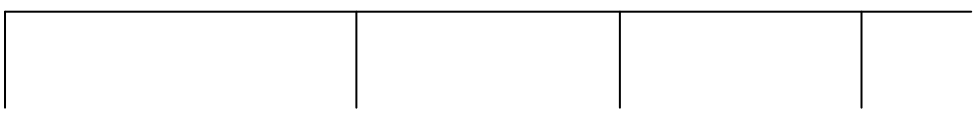
When you have this type of checklist, all you need to do is to tick when you notice the incidence. It is important that you use the checklist when you are to ascertain the presence or absence of a particular behaviour or trait or characteristics. Note that the trait to be observed must always be specified so that observation is confined only to those points specified in the checklist.

SELF-ASSESSMENT EXERCISE 1

Make a checklist for assessing your pupils' cleanliness.

4.2 Rating Scale

This involves qualitative description of a limited number of aspects of a thing or of traits of a person. It is similar to checklist, but it is more useful when final discriminations are to be made. In the checklist discussed above, you are expected to indicate just the presence or absence of a trait, behaviour or characteristics. However, in the rating scale, you are expected to show the degree of presence or status or quality of what is being rated. From this discussion, you will note that the major difference between a checklist and rating scale is that a checklist requires that you only indicate the presence or absence of a behaviour, characteristic or trait. It means therefore that an item in a checklist can be converted to an item in a rating scale. For instance, if you take up "item iv" in the checklist, where we have neat drawing paper, we can ask such question as "To what extent is the drawing paper neat?" You need to provide a scale for rating. Thus, we have:



Very dirty Dirty Neat Very neat

When you have something like this, the user of the scale will just decide where to make a mark or tick. More classifications could be set out by some definite categories as shown below:

i. Superior, above average, Average, below average, poor
ii. Excellent, Very good, Average, below average, poor

iii. Always late, frequently late, occasionally late, rarely late, never late

For you to use the rating scale effectively, you have to define very carefully, in observable or behavioural terms, the traits, behaviours, characteristics, or categories for observation.

5.4 Anecdotal Records

This is yet another simple technique, which you can use for the assessment of affective behaviour of your pupils. It can be described as a brief written description of some specific behaviour in the day-to-day life of a pupil as observed by the teacher or the researcher. In other words, they are records of specific incidents of the pupil's behaviour, over a period. You can now see that anecdotal records can provide you as a classroom teacher, with a longitudinal picture of changes that have taken place in a particular pupil. This is done in such a way that any person who wants to look through a pupil's anecdotal records can use it to assess the typical behaviour of the pupil. Note that anecdotal records are normally restricted for use in the area of social adjustment. It is regarded as an informed technique. This is because there is usually no pre-meditation about observing the particular pupil. What may happen is that you as the teacher will observe the pupil and record objectively any striking behaviour on a card or any other device. This is done for sometime without any explanation or judgement of the behaviour. These are some of the characteristics of anecdotal records.

i. It should contain factual description of what happened and the circumstance under which the behaviour occurred.
ii. Each anecdotal record should contain just a record of one incident.
iii. Any incident recorded should be one that can be considered as significant to the pupils' growth and development.
iv. Any interpretation and recommendation action should be separated from the description (Ughamadu, 1994).

5.5 Interview

This is used to gather information regarding an individual's experience and knowledge, opinion, beliefs, feeling and demographic data. Questions are asked to obtain or determine past or current information as well as predictions for future. It is a technique by which relevant information is obtained from a person through direct oral questioning of a conversational nature. This information may be about the interviewee or another person or event. If you use the interview technique in your class, you can obtain information about the affective behaviour of the

pupils. With the interview technique, you can get to know much about the pupils' interest, family background, and relationship with teachers and classmates, participation in school and community activities. You can pose some oral questions to the pupils and based on their responses, you can probe further until you obtain the required information in details. You need to have a skill in the interview process. This is because some of the times, you have to manipulate and prompt your respondents into revealing very useful information. From the way some pupils respond to the interview questions, you can have insight into the behaviour of such pupils.

In your basic research methods, where these techniques were explained in details, you were told that there are two major types of interviews patterns. These are structured and unstructured. Structured interviews use interview schedules, which contain series of questions to be asked in a particular order. It means that you as the interviewer cannot deviate from the questions as specified and in the order to which they are specified. The unstructured interview has no limitation in terms of scope or the number of questions to be asked or the order of asking them. It allows you to probe further in order to obtain more or additional information. It is much more time consuming than the structured interview because you need to probe deeper to get more information.

5.5.1 Useful Guide in Conducting Interviews

i. Define the objectives and plan of the interview in very clear terms. You should do this in advance and should include the necessary lead questions.
ii. Try as much as possible to create a friendly atmosphere throughout the period of the interview.
iii. Always have written notes about important answers.
iv. Crosscheck the respondents' answers with other techniques. This is to avoid the use of fake information, which may be supplied by the respondents. Some subjects may have the faking tendency while others give fake information due to ignorance.
v. Occasionally, employ guide questions to re-direct the respondents or to elicit the relevant information when the subject drifts away from the area of paramount importance.
vi. Avoid arguments with your interviewee and do not get involved in very touchy or sensitive issues.

As a teacher, you may not have received any training as an interviewer, but you should aim at successful interviews with your pupils by practicing all the time, there will be continuous improvements.

SELF-ASSESSMENT EXERCISE 2

i. What is an interview?
ii. What are the types of interview?
iii. Prepare a rating scale on any five items of cleanliness of pupils.

5.6 Questionnaire

This is an instrument, which consists of a set of questions that are presented in written form to a respondent who is expected to answer the questions in writing. It is mostly employed in survey researchers for a large number of subjects at the same time. You can use questionnaire effectively to collect information on opinions, attitudes, interests etc in the school system; it is a self-reporting instrument. Like the interview, the questionnaire can be of two types. These are the structured or closed-ended and the unstructured or open-ended. The closed-ended questionnaires are called restricted type because it calls for short, check, tick, mark answers. The questions are such that you can only answer yes or no, true or false, or choose the correct option from a number of options available. The open-ended questionnaire gives the respondents freedom to answer the questions in their own way and their own words. There is no restriction. You can use the questionnaire to get information relating to your pupils study habits, personality characteristics, feelings, etc.

5.6.1 Steps in Constructing a Questionnaire

i. Identify the objectives and specific information to be obtained.
ii. Select a response format.
iii. Identify the frame of reference of the respondents.
iv. Write the items/questions.
v. Prepare a data summary sheet.
vi. Critique the questions, typing them out and revising them.
vii. Assemble the questions.
viii. Administer the questionnaires.

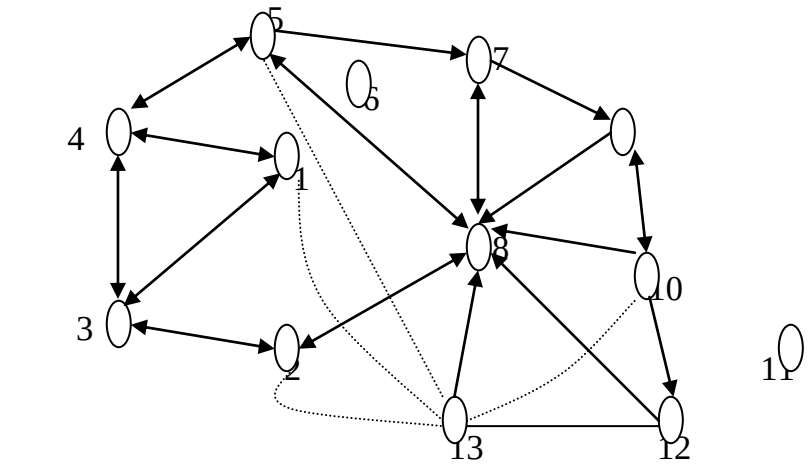
5.7 Socio-metric Technique

This is a technique for assessing some aspects of non-cognitive behaviour of the pupils. It is the study of interrelationships among members of a group or a class. It can be used to determine the type of relationships that exist among members of the group. In a classroom situation, it can be used to assess the social acceptance of the individual pupils in the class and thereby their personal qualities. This is mainly based on pupils' choices of companions for some group activity. For instance, pupils can be asked to do the following in writing:

i. Name your choice of best friend in the class.
ii. Name the pupils you would like to work with in a group project.
iii. Indicate the pupils you would not like to work with at all.

The choices and rejections made by the pupils are analysed and they tell a lot about pupils nominated or not nominated. The most chosen pupils or members of the group are called stars. Those who do not choose anyone but are chosen by someone are called isolates. A person who receives only one choice is a neglectee. If a person receives only rejection choices, he is called a rejectee. Pupils among whom there are mutual choices.That is, those who choose among themselves, constitute a clique.

Socio-metric choices describe the existing flow of interaction and relationship among pupils. A sociogram is a diagram or visual representation of the socio-metric choices within a group.



Choice

Mutual choice

Pupil 8	=	Mutual choice
Pupil 13	=	Star
Pupil 5	=	Rejectee
Pupils 6 & 11	=	Isolates
Pupils 1,2,3&4		Clique

In using the socio-metric technique, you have to note that information obtained from one occasion can be true for that occasion only and for a particular basis of choice. If a different basis of choice is given to the pupils, the pattern shown in the sociogrammay likely change completely. Again, a different pattern can also emerge with the same

basis of choice at another time. This means that the pattern of social relationship in a class is not constant for all the time.

SELF-ASSESSMENT EXERCISE 3

Construct a questionnaire of 10 items for use in determining the interest of your pupils' practical agriculture.

6.0 ACTIVITY

1. Mention any three types of rating scale.
2. What are the advantages and disadvantages of questionnaire?
3. What are the limitations of questionnaire?

7.0 SUMMARY

In this unit, you have learnt some of the instruments and techniques used in continuous assessment programme. You also learnt that observation is the act of looking out for and recording the presence or absence of verbal and non-verbal behaviour of a person or group of persons. Guidelines for systematic observation were also highlighted. Checklists, rating scales, anecdotal records, interview, questionnaire and sociometric techniques were all treated.

8.0 ASSIGHMENT

9.0 REFERENCES

Obimba, F. U. (1989). *Fundamentals of Measurement and Evaluation in Education and Psychology.* Owerri: Totan Publishers Ltd.

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MODULE 3 RECORDS, ADMINISTRATION AND PROBLEMS

UNIT 1 RECORD KEEPING

CONTENTS

1.0 INTRODUCTION

Record keeping is an important aspect of the continuous assessment programme in our educational system. Records of the pupils' academic achievements and their non-academic achievements must be properly kept. We have already said that continuous assessment is cumulative, guidance oriented among other characteristics. If records are properly kept, it will be of immense benefits to the head teachers, teachers, pupils, school counsellors and parents. This is because, well-kept records will help anybody at any point in time to determine whether a pupil is making progress or not. In other words, the strengths and weaknesses of the pupils can be identified so that appropriate remediation of the given. Again, good record keeping can facilitate the continuity of assessment for some pupils who may want to change from one school to another for some obvious reasons. In this unit, you will learn about record keeping in the school system.

2.0 OBJECTIVES

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

- describe the different types of records; and
- explain the guidelines for good record keeping.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Cumulative record:** this is the working record of the school that takes account of all the child's activities from the day he/he starts school to the year he/she graduates.
- **Grade:** the total marks obtain by a student.
- **Personality:** the combination of characteristics or qualities that form an individual's distinctive character.
- **Psychomotor scores:** the total score obtained from the measure of a child's skills.
- **Continuous assessment:** this is the educational policy in which students are examined continuously over most of the duration of their education, the results of which are taken into account after leaving school.

5.0 MAIN CONTENT

5.1 Types of Records

In the implementation of the continuous assessment programme, different types of records are expected to be maintained in the primary schools. These include, among others, (a) teachers class/school records (b) pupils cumulative record file or folder (c) the transcript. Let us look at them one after the other.

5.1.1 Teachers Class/school Records

This is one of the permanent school records, which you are expected to keep as a classroom teacher. Examples of such school records are:

i. **Detailed Scheme of Work**: This essentially is a breakdown of the school syllabus, showing what the classroom teacher intends to cover for each week within a term; it is therefore organised or arranged in weeks on term basis. In other words, the term academic activities are broken down into units so that each unit is arranged into weekly basis. With this arrangement, you would be able to know what you are to teach at any particular period.

ii. **Dairy of Daily Record of Work**: This contains the actual work covered for each week. All the learning experiences, which your pupils passed through, including the evaluation strategies given to the pupils during the week, are all indicated in the dairy.

iii. **Progress Report**: This contains a comprehensive and systematic record of all the performances of the pupils. All the pupils' academic achievements in class tests, assignments, projects and other assessments in the non-cognitive domain should be recorded in the progress report. This progress report, no doubts is one of the most important aspects of the teachers' class records in the implementation of the continuous assessment progamme. It is designed to make provision for:

   a. Weekly, monthly or periodic records of the pupils' achievement.
   b. Broad summaries of the students' progress at such intervals as prescribed by the particular school. This is done usually at least twice a term.
   c. Terminal progress reports, which incorporates both academic grades/scores, also scores, and grades in social development and manipulative skills.

These records are expected to be maintained at all levels of the educational system. However, it is compulsory in the primary schools. There may be some modifications depending on the school.

5.1.2 Students' Cumulative Record File

This file contains all the relevant and necessary information of the pupils. It is kept on an annual basis throughout the period of the pupils' stay in a particular school. The information kept covers the entire six-year period of primary school education. This file is said to be cumulative because every pupil is expected to have the file maintained for him throughout the primary school period. This cumulative record file should at any given time provide the following information:

i. Personal information about the pupil

ii. Periodic report of the academic achievement of the pupil. (The modalities for doing this are always prescribed by the school.)
iii. Report of each term's examination
iv. Report of social and physical developments/activities.
v. Yearly summary of progress. This should also include the weightings (Ughamadu, 1994).

The cumulative record file is useful in the sense that with all the information recorded, parent or guardian will adequately and properly be informed of their child or ward progress. Thus, at a glance you can make a comparison of the pupils' progress at different periods of their stay in the school. This is because all the information required is accumulated in the file.

5.1.3 Transcript

This is usually a report which is given to pupils who may wish to change or transfer from one school to another. It contains the cumulative scores of such pupil in the three domains of behaviour. Since continuous assessment is cumulative and practiced almost in the same way in every school, pupils cumulative scores from one school should be relevant in his new school. This academic achievement scores are the most important scores and are recorded in the form of standardised scores called T-scores and the percentile ranks. We shall explain these in the last module of this course. A typical transcript contains the following:

i. The term summaries: This is the average scores of the periodic tests for the respective half or third or quarter of each term. However, most schools do the summaries twice in a term.
ii. The end of term examination scores and results
iii. Scores in the affective and psychomotor domains

The format of the transcript is not exactly the same in all the states. There exist some little variations from state to state.
Note the following points about records:

i. All school records should be systematic, cumulative and comprehensive.
ii. All school records should be kept in such a way that they would be easily understood by anyone who wants to use them.
iii. All school records should be confidential, but should be easily accessible to anyone authorized to see them.

5.2 Guidelines for Good Record Keeping

You have seen that it is an important obligation for every school, no matter the type, to keep appropriate records. The type and format of records are usually specified by the Ministries of Education at the local government, state and federal levels. Most of these records are the same in most schools. Now, let us look at the guidelines for keeping these records.

For keeping academic records of pupils by the class teacher, the following guidelines should be followed.

i. Records of academic achievement in each subject should be kept separately
ii. Raw scores from different assessment instruments such as tests, assignments, projects etc should be recorded; and the maximum possible score that a pupil can obtain should be indicated.
iii. The scores of all the pupils in the class should be recorded together. It should be done serially.
iv. Aggregates of all the raw scores should be computed.
v. Transform the raw scores of the pupils into percentages. Then, the percentages should be transformed into standard scores such as Z-score and T-score or percentile ranks.

For recording personality (Affective) and psychomotor scores, the following guidelines should be followed.

i. Record all the rating scores in the same way you record test scores.
ii. The ratings from different teachers, in such situations where different teachers do ratings, you should record one rating for each pupil. This rating should be the mean of all the ratings from the different teachers. The mean is got by the addition of all the ratings from all the teachers and have the sum divided by the number of teachers.
iii. When you record the scores, do that serially as in the academics.
iv. You do not need to transform the scores from personality and psychomotor assessment to standard scores as you did in the academic scores.
v. Rating of performance in the case of personality could be done once in a term or once in a year.

For the schools' records of academic performance of pupils, the following guidelines should be followed.

i. Make a list of all the subjects, which the pupils have studied during the period under consideration.

ii. You should also record the summaries for each school terms and the summary for the whole year or session.
iii. You should transform each of the summaries into standard scores such as T-score or Z-score and the percentage rank.
iv. Only one set of scores should be adequate for personality and psychomotor domains of behaviour.
v. Where different teachers have participated in rating the pupils, the mean value of the different teachers' ratings should be computed and recorded.
vi. Finally, the numerical values recorded can be transformed into qualitative descriptions using such adjectives as excellent, good, fair, poor and very poor.

6.0 ACTIVITY

1. What is transcript?
2. Suggest any four general tips on how to keep appropriate record by parents.
3. List and explain any five official school records to be keep.

7.0 SUMMARY

In this unit, you have studied the types of records kept in the primary school system. These include teachers class/school records – scheme of work, diary, progress report, students' cumulative record files and transcripts. You also studied the guidelines for keeping these records. These include guidelines for teachers in keeping academic records of the pupils, records of personality and psychomotor scores and school records of academic performance.

8.0 ASSIGNMENT

i. What is record keeping?
ii. Give 4 recommendation for appropriate record keeping in primary/secondary schools.

9.0 REFERENCES

Chifwepa,V. (2001).*Managing records at school level*. Retrieved December 5, 2008 from: http://www.adeanet.org/adeaPortal/adea/downloadcenter/NESIS/E-records-021065.pdf.

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UNIT 2 GRADING, INTERPRETATION AND REPORTING OF EVALUATION RESULTS

CONTENTS

1.0 INTRODUCTION

In the last unit, you studied the different types of records keeping in the primary school system. In order to generate some of these reports, the pupils have to undergo tests and examinations. Before grading and reporting pupils' test and examination results, you would have decided what type of interpretation you are going to give to the test. If it is a norm-referenced test, a norm-referenced interpretation should be given to it. However, if it is a criterion-referenced test, you have to give it a criterion-referenced interpretation. In this unit, you will learn the grading of the tests, interpreting test scores and reporting the results.

2.0 OBJECTIVES

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

- differentiate between norm-referenced and criterion-reference;
- define the weighting of test items;
- explain types of grading;
- discuss how to interpret test scores;
- describe how to report evaluation results;
- explain the handling of school report cards; and
- mention the functions of the school report cards.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Norm-referenced test**: anorm-referenced test (NRT) is a type of test, assessment, or evaluation which yields an estimate of the position of the tested individual in a predefined population, with respect to the trait being measured.
- **Criterion-referenced test**: criterion-referenced tests and assessments are designed to measure student performance against a fixed set of predetermined criteria or learning standards i.e., concise, written descriptions of what students are expected to know and be able to do at a specific stage of their education
- **Weighing**: assess the nature or importance of, especially with a view to a decision or action.
- **Multiple choice**: this is a form of assessment in which respondents are asked to select the best possible answer (or answers) out of the choices from a list
- **Norm**: something that is usual, typical, or standard.

5.0 MAIN CONTENT

5.1 Norm-referenced versus Criterion-referenced Tests

In the norm-referenced tests, pupils' performances in the achievement test are interpreted in terms of how they compare with the norms established for the test. (That is, the pupils' relative positions among the typical group or class of pupils for whom the test is designed.) In this type of interpretation, the description is not the percentage of the test items the pupil answered correctly, but the percentage of the pupils in

the group or class that surpassed or fell below. For instance, Femi solved the Mathematics problems more accurately than 80% of the pupils in his class. Again, Uche's performance in English test places him in the 3rd position in his class of pupils. Various entrance examinations, the civil service promotion examinations and all examinations for selections are given this type of interpretation. It is also used for grouping and grading of pupils because the test is designed to rank pupils from high to low on basis of achievement. The items in this test are pulled from across a widespread area of learning. It is usually standardised.

In the case of the criterion-referenced tests, pupils' performance in the achievement test is interpreted according to how they meet a set standard or criterion. This criterion can be a performance task or the attainment of an instructional objective. The pupils' performances are judged, but not in comparison with the other pupils' performances. The interpretation is based on the percentage of the test items answered correctly. How well other pupils performed is not considered, individual mastery of the subject is the important issue here. Some classroom tests and certificate examinations are given this type of interpretation. For instance, Musa made six credits in his NECO examination. John can multiply two digit numbers correctly. Test items are designed to measure proficiency in a specified task.

For all measurement purposes, note that neither the norm-referenced nor the criterion-referenced tests is superior to the other. The use of one may be more appropriate than the use of the other at different time in particular testing situations.

5.2 Weighting

When you construct a test for your pupils, you assign weights to the various test items. What you have done is to assign scores to the test items for scoring the responses. The weight is the point or score value for the correct response to each item. It is the point to be earned by any pupil who responded correctly to the test item. For instance, a test containing multiple-choice items and essay items may be weighted I marked for each correct multiple-choice answer and 15 marks for each correct essay answers. There are two types of weighting-uniform and differential.

In the uniform scoring weights, all the items score equal points or marks; while in the differential scoring weights some test items are scored more than the others. This may be due to their level of difficulty, relative importance or because they are considered more time-

consuming. All the same, as much as possible try to avoid differential weighting.

5.3 Grading

When your pupils have succeeded in taking the test, the next step that follows is grading. The first step in grading is scoring, the teacher marks or scores the pupils test items responses by awarding scores appropriately according to the predetermined weights. The sum total of all the points or scores or marks obtained by a pupil is called the raw score. We shall look at two major types of grading. These are the percentage system and letter system.

5.3.1 The Percentage System of Grading

This is a grading system in which a 100-point scale is used for indicating the level of pupils' achievement in a test or an examination. What a pupil scored is based on the percentage of the items, which he has answered correctly. For instance, Obi scored 80 marks out of a maximum mark of 100. It means Obi has 80%. However, if he makes 60 points out of 80 maximum marks obtainable, it means that Obi's percentage score is $\frac{60}{80} x \frac{100}{1}\% = 75\%$

Pupils like Tunde, Simbi, Ada can score 50%, 73% and 82% respectively in a subject. Again, Ibe may score 70% in English, 60% in Mathematics, 81% in CRC etc.

5.3.2 Letter Grading System

Letter grading can be used to indicate pupils' performance in a test. There are mainly two types of letter grades used. These are five and nine letter grades. Most testing organisations and educational institutions make use of either of the two. The five letter grades make use of A, B, C, D, E; while the nine letter grade use A, AB, BC. C, CD, D, DE, E. Some may use A, B^+, B, C^+, C, D^+, D, E, F. The percentage score range of each letter grade and description can be given as follows:

A	=	80% to 100%	=	Very good or Excellent
B	=	60% to 79%	=	Good
C	=	40% to 59%	=	Average
D	=	30% to 39%	=	Poor or Below Average
E	=	0% to 29%	=	Very Poor

In the nine-letter grade, we may have something like this:

A	=	80% - 100%	=	Excellent
AB	=	70% - 79%	=	Very Good
B	=	60% - 69%	=	Good
BC	=	50% - 59%	=	Fairly good or Above average
C	=	40% - 49%	=	Average, Fair or Satisfactory
CD	=	30% - 39%	=	Poor or Below Average
D	=	20% - 29%	=	Poor
DE	=	10% - 19%	=	Very Poor
E	=	0% - 9%	=	Extremely Poor

The West African School Certificate and General Certificate in Education use A_1, A_2, A_3, C_4, C_5, C_6, P_7, P_8, and F_9. Different institutions use their own grade to suite their own purpose.

5.4 Interpreting Test Scores

In your course EDU 426: Measurement and Evaluation, you studied in details the various ways of interpreting scores. In this section, we shall discuss it briefly to refresh your memory and for you to know that it is your function as a teacher to interpret the scores of your pupils. The raw score (derived from marking the test), does not mean much. It does not give meaningful information on the relative standing in the class, or how many pupils scored more or less. For instance, a raw score of 70% does not tell you whether it is above or below average performance. It can only be interpreted based on a set of standards, if it is a norm-referenced test or based on a criterion if it is a criterion-referenced test. In the continuous assessment programme, it is important that test scores are properly interpreted and the pupils' academic progress effectively reported to parents. Let us look at some ways of interpretation.

5.4.1 Age Norms

This can be obtained by assembling the scores of pupils from the same age group or age bracket and getting their average. For instance, we can assemble 12-year-old pupils in the class, collect their scores in a particular test and sum the scores and then divide the sum by the number of these12 year-olds. The result gives us the age norm for this age group. It means, therefore, that any member of this age group can have his scores interpreted as above or below the age norm.

5.4.2 Grade Norms

The reference group here is a grade or class. If a class is given a test, the average score of the class is calculated by adding the scores from all the pupils in the class and dividing the sum by the number of pupils in the

class. The result is the classroom. Pupils' scores can be interpreted using this norm.

5.4.3 Standard or Derived Score Norms

Under this, we have the percentile norm and the standard scores such as Z-Score, T-Scores and Stanine. In this section, we shall briefly describe the percentile. This is because the others are discussed in the next module. The percentiles divide a distribution of scores into 100 equal parts. The percentile norm interprets a pupil's score in terms of what percentage of the pupils in the class that took the test that he surpassed. For instance, a percentile of 65th or P_{65} shows that it is a value below which 65 percent of the individuals in the group lie. For each of your pupil's raw score, the percent of pupils or cases that fall below that score should be computed.

5.5 Reporting Evaluation Results

The process of informing parents about their child or children's progress in school is called reporting. It includes test results as well as information collected on the pupils through all other evaluation techniques. All the test and non-test data collected, processed and stored in the child's cumulative record folder are retrieved and reported to parents. It means that the progress report of the child is a combination of academic and non-academic reports. There are three main ways of reporting. These are:

5.5.1 Parent-Teacher Conference

Most of the times, especially during PTA meetings, a class teacher meets face-to-face with the parents of their pupils. In this meeting, the teacher reports the children's progress academically or otherwise in the school to the parents. The information given out is usually from that stored in every child's cumulative record folder. Apart from the report, parents or the teacher can also ask questions for clarifications on the child's behaviour. Since the parents in the home and teachers or administrators in the schoolwork in partnership for the all-round development of the child which is the common interest.

5.5.2 Written Report or Personal Letter

This is another way through which the class teacher reports the progress of the child to the parents. It involves a comprehensive report of written information on:

i. the objectives of the subjects taught and the criteria for marking the pupils performance in such subjects;
ii. the academic performance of the pupils; and
iii. other significant qualities of the child.

All information about the child is communicated to the parents in writing. It is therefore difficult to do if there are too many pupils in a class, and can be time consuming.

5.5.3 Report Card

This the most common medium through which pupils progress in the school are reported to parents in Nigeria. It is given periodically and regularly. It contains all the information obtained from the continuous assessment records of the pupils in the school the report cards vary from state to state and from private school to public schools. However, the information contained is almost the same.

5.6 Handling the School Report Card

A report card should contain such information as:

i. the name of the pupils and his class
ii. the number of days of attendance at school and the number of days absent
iii. the grades made in the various school subjects for the term or period covered by the report, given as a letter grades or numerical grades or both. For instance A or 81% or 81% A. You can go a step further to define the grade as Excellent or Very Good etc.
iv. some brief comments by the teacher:
    - pupils specific difficulties, if any
    - pupils specific behaviour, and
    - other significant personal qualities of the pupil

Most states have common report cards for all the primary schools in the state. They use one booklet for each pupil in the school. This will be used throughout his school life. Look at the different information contained and the way they are completed.

5.7 Functions of the School Report Card

There are various people concerned in the education and well-being of a child. Functions of the report card to various people are discussed below.

(a) The Pupil: The information contained in the report card:

i. gives the pupil a feedback on his strength and weaknesses in learning
ii. motivates the pupil to work hard for improvement or to maintain his standard if it is already a high one.
iii. helps him in making his educational and vocational plans.

(b) The Parents: Information contained in the report card:

i. reports pupils school progress to the parents
ii. reports school objectives to the parents
iii. helps them to know how best to assist their child make sound future educational and vocational plans
iv. helps them to know how best to help their children in his school work in view of the child's strength and weaknesses
v. enables parents cooperate better with the school in promoting the development of their child, since they are aware of their child's progress in respect to the school objectives

(c) The Teacher: Information contained in the report card:

i. helps the teacher in diagnosing pupil's learning difficulties
ii. helps the teacher to plan what to teach and how to teach, having known the teaching success and outcomes of the educational effort in respect of the pupils.
iii. helps the teacher in understanding pupils' personal-social problems

(d) The school counsellors: Information contained in the report card assists the school counsellor:

i. in helping the pupils to understand themselves more; and
ii. in educational, vocational, and emotional counselling of the pupils.

(e) The School Administrators:

Some administrative decisions and actions are based on the progress report of the pupils contained in their report cards. School administrators use information contained in the report card to:

i. determine the promotion of pupils to new classes
ii. determine deserving pupils for the award of honours and prizes

iii. determine the eligibility of pupils for sporting activities, and
iv. recommend pupils to other schools and prospective employers as the need arises.

6.0 ACTIVITY

1. Define weighing and grading
2. Mention any two type of interpreting test scores
3. State any three advantages of weighing and grading

7.0 SUMMARY

In this unit, you have studied the difference between the norm-referenced and criterion-referenced tests. You also learnt that weighting is the assignment of scores to the test items for the purpose of scoring or marking the responses. Raw scores are used to grade the pupils. Grading is the conversion of the raw scores into meaningful ratings of quality. The types of grading include percentage and letter grades. Test scores can be interpreted in the form of age norms, grade norms and standard or derived score norms. The various ways of reporting evaluation reports are through parent-teacher conference, written report or personal letters and using report cards. You also learnt about how to handle the report cards and the functions of the report cards to various people.

8.0 ASSIGNMENT

1. State any seven types of test scores and their different purpose
2. What are the disadvantages of weighing
3. Explain any four Cautions in interpreting test score

9.0 REFERENCES

Obimba, F. U. (1989). *Fundamentals of Measurement and Evaluation in Education and Psychology*. Owerri: Totan Publishers Ltd.

Ughamadu, K. A. (1994). *Understanding and Implementing Continuous Assessment*. (2nd Ed.). Benin City: World of Books Publishers.

UNIT 3 ADMINISTRATION OF THE CONTINUOUS ASSESSMENT

CONTENTS

1.0 INTRODUCTION

The administration of continuous assessment programme in the school system is not a small project. It requires huge efforts; demands a lot of co-operation (between stakeholders) and requires a careful and systematic co-ordinated synergy. As a result, it is not possible for you to handle it alone. You can only do it through the systematic co-ordination and co-operation, which can be achieved through the setting up of school's continuous assessment committees. These committees should be responsible for the effective implementation of the various aspects of the continuous assessment in the school. Apart from this, efforts should be made to create such committees at the local government level, state and national levels.

2.0 OBJECTIVES

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

- describe the composition of the school continuous assessment committee;
- mention the functions of the committees; and
- describe continuous assessment at the various levels.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Systematic co-ordination:** the organization of the different elements of a complex body or activity so as to enable them to work together effectively.
- **Co-operation:** the process of working together to the same end.
- **Committees:** a group of people appointed for a specific function, typically consisting of members of a larger group.
- **Implementation:** the process of putting a decision or plan into effect; execution.
- **Monitoring:** this simply means toobserve and check the progress or quality of (something) over a period of time.

5.0 MAIN CONTENT

5.1 School Continuous Assessment Committee

As you have learnt in the introduction, the implementation of the continuous assessment in the school system is not a small project. Therefore, it should be handled in co-operation between the teacher and the school continuous assessment committee. It means that at the various levels where continuous assessment is practised, there should be a constituted committee. At the primary school continuous assessment level, the committee should consist of:

i. the teacher,
ii. the assistant headteacher, and
iii. the most senior members of staff with at least one of them coming from the junior primary section of the school.

At the secondary school level, (although this is not within the scope of this course, but let us look at it to have an insight on what the committee should look like at different levels) the continuous assessment committee should consist of:

i. the school principal or the vice principal (academics),
ii. the school guidance counselor,
iii. three senior members of staff who should be the heads of science, arts, and technical departments or their assistants, and

iv. any member of staff who is a specialist in evaluation, test and measurement, psychology or related areas.

5.1.1 Objectives of the School Continuous Assessment Committee

i. reporting performances of learners to parents and persons who are interested in the performances,
ii. identifying the achievement levels and affective development of various pupils and group of pupils,
iii. diagnosing learning difficulties of individual learners and groups of pupils for the purpose of improving instructions,
iv. evaluating co-operatively designed standardised instruments, which are useful for the evaluation of locally introduced innovations, and
v. assessing special aptitudes and interests of pupils for the purposes of counseling.

5.2 Functions of the School Continuous Assessment Committee

The functions of the continuous assessment committee in the school are:

i. assigning duties on continuous assessment to the various teachers in the school,
ii. overseeing the keeping of records and reporting,
iii. organising training and orientation programmes for teachers according to necessary required skills for the operation of the continuous assessment,
iv. planning assessment programmes to know the frequency of assessment, instruments of assessment and how to report and send the reports to the parents or guardians,
v. ensuring the availability and provision of appropriate and adequate assessment materials,
vi. facilitating joint and co-operative development and assembling of assessment instruments such as tests, questionnaires, rating scales, etc including test question banks among schools within the same locality, local government etc,
vii. making contacts with similar committees in other schools and with committees at local or state levels. This will help to reinforce the efforts of the schools and make for some degree of uniformity in the continuous assessment exercises.

5.3 Continuous Assessment at Various Levels

5.3.1 Zonal / Local Government Level

Every state has zonal education authorities at the zonal boards. There should be an officer at each zonal or local government level whose responsibility is to co-ordinate the continuous assessment activities at the zonal education board and local government levels. This officer is to be in-charge of the following activities and functions:

i. organisation of workshops for the development of continuous assessment instruments,
ii. execution of test administration in schools within the local government area or zone. The tests to be administered may be the ones developed in the locality or these being administered on behalf of the state Ministry of Education or even the National Centre for Continuous Assessment,
iii. taking custody of the developed instruments and or other instruments obtained from some external agencies and sources, and
iv. placing and acting the role of local adviser to the various school committees in the zonal and local government area.

5.3.2 State Level

At this level, it is expected that an implementation committee should be set up to monitor the implementation of the continuous assessment practices within the state. Apart from the setting up of this committee, the State Ministry of Education should also have in place a functioning Research, Planning and Evaluation units. Using these units and committee, the state should be able to monitor the progress of the pupils and help to maintain standard in all the schools in the state. The state should also be able to monitor the performance of pupils at public examinations. The state should also use these set ups to administer standardised tests to all state schools on term or yearly basis. With these, the state can generate normative data using various school levels committees.

5.3.3 National Level

Any continuous assessment committee set up at the national level will have the objectives based primarily on that of monitoring the implementation of the continuous assessment. This committee will obtain national indices of the performances of the educational system. The National Continuous Assessment Programme and Committee or set up will have such objectives, which essentially include:

i. formulating competencies expected of pupils of various age or school grade level in various school activities,
ii. undertaking national surveys to ascertain the level of attainment of the competencies specified,
iii. planning for strategies for arresting and the remediation of any identified unacceptable trends,
iv. providing leadership in constructing instruments for continuous assessments with detailed normative data,
v. providing aids, resources and technical support for the implementation of the continuous assessment activities, and
vi. organizing workshops, seminars and conferences to enrich and illuminate the implementation of the continuous assessment.

6.0 ACTIVITY

1. What is continuous assessment?
2. State any 4 functions of the officer is to be in-charge of the continuous assessment is to perform in the primary school.
3. Suggest any five techniques for continuous assessment.

7.0 SUMMARY

In this unit, you have studied the school continuous assessment committee and their objectives. You learnt the functions of the continuous assessment committee at the school level. You also studied the continuous assessment administration at the local level, state and national levels.

8.0 ASSIGNMENT

1. State the various levels of continuous assessment in Nigeria.
2. List and explain any four tools a teacher needs in handling continuous assessment in primary schools.

9.0 REFERENCES

Obimba, F. U. (1989*). Fundamentals of Measurement and Evaluation in Education and Psychology*. Owerri: Totan Publishers Ltd.

Ughamadu, K. A. (1994). *Understanding and Implementing Continuous Assessment*.(2nd Ed.). Benin City: World of Books Publishers.

UNIT 4 PROSPECTS AND PROBLEMS OF THE CONTINUOUS ASSESSMENT

CONTENTS

1.0 INTRODUCTION

In the last unit, you studied the administration of the continuous assessment at different levels. In addition, in this course you observed that continuous assessment practices are not peculiar to Nigeria alone. Some other African countries such as Kenya, Liberia and Zambia also practise the continuous assessment. Some scholars have acknowledged that this continuous assessment strategy as it is being practised in the Nigerian educational system has been regarded as a worthy innovation and acclaimed a bold step in our educational system. Therefore, if there is any reservation about the strategy, it is with the implementation and monitoring. In this unit, you will be looking at the prospects, the problems and some recommendations for the continuous assessment.

2.0 OBJECTIVES

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

- explain the prospects of the continuous assessment;
- describe the problems of continuous assessment; and
- make recommendations for improvement of the continuous assessment process.

3.0 HOW TO STUDY THIS UNIT

Read through this unit with care.
Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Prospect:** the possibility or likelihood of some future event occurring.
- **Implementation:** the process of putting a decision or plan into effect; execution
- **Reinforcement:** the process of encouraging or establishing a belief or pattern of behavior, especially by encouragement or reward.
- **Validity:** the degree to which a test measures what it was designed to measure.
- **Utilization:** to put to use, especially to make profitable or effective use
- **Innovation:** the process of translating an idea or invention into a good or service that creates value or for which customers will pay
- **Technique:** a skillful or efficient way of doing or achieving something.

5.0 MAIN CONTENT

5.1 Prospects of the Continuous Assessment

We have already stated that there are great prospects for continuous assessment in our educational system, particularly in the primary schools. The extent and level of implementation of continuous assessment in the Nigerian schools cannot be the same. Nevertheless, the hope is that the schools should make conscious efforts to follow a greater or substantial part of the specifications on the implementation and monitoring of continuous assessment as contained in the *Federal Government Handbook on Continuous Assessment*. If this is done, there is every possibility that the continuous assessment will be a success. Talking about success here, we are not just talking about success in implementation but also success in the pupils learning endeavours. You will recall that the continuous assessment was introduced in our educational system at a time when most of the people were nearly fed up with the former end of course external one-shot examination. According to Ezewu and Okoye (1981); Yoloye (1984); Osafehinti (1984) and Osokoya (1987), the continuous assessment system is a more valid assessment method of the pupils' overall ability. Validity here arises because continuous assessment samples a much wider range of skills and abilities, which are inherent in the course of study. In other words,

the continuous assessment strategy probably gives a complete and clearer picture of the learners' ability.

In the primary education level, the pupils are exposed to the teaching-learning experiences. These pupils are therefore expected to study and achieve the specified objectives. The continuous assessment acts as a reinforcement of pupils' learning and better study habits. This results in improved learning and subsequently attainment of the instructional objectives. To this, Osafehinti (1984) expressed the view that it will reduce, if not completely, eliminate examination leakages. This is because pupils in the school set-up see the need to work continuously and at a steady pace rather than wait for the examination week before getting involved in any serious studies. You know that this situation, which was associated with the one-shot examination system, very often leads to permutation of questions for success. It creates anxiety in the pupils. The continuous assessment, which involves a continuous and steady pace, studying makes the pupils seek help on those aspects of their work that they have not mastered in the preceding tests. Even the parents, guardians and relations are afforded the opportunity or privilege to monitor the progress of the pupils in order to give them the needed remedial attention. It is true that in the past, some schools were given weekly or monthly tests which most of the times, the results did not reflect in the final grades of the pupils. The resultant effect of that was pupils not taking such tests seriously. Pupils' performance in a single examination can be influenced by some factors, which are beyond the pupils control at that point in time. Therefore, such an examination will not be enough to give the time picture of the pupils' performance. The continuous assessment takes care of all that to a reasonable degree. Since, it is not very likely that most pupils perform at their best in single examinations, continuous assessment strategy then becomes a worthy and acceptable alternative. It should therefore be implemented with all vigours.

Continuous assessment makes use of variety of assessment instruments for the assessment of the pupils. This gives the pupils more opportunities to exhibit their talents. It also caters for individual strengths and weaknesses. If a pupil is not very good for instance, in verbal testing, he may be good in projects, assignment, etc. These assessment tools such as project and assignments, which are emphasised in the continuous assessment can be used to reveal more about the pupils' other characteristics such as leadership qualities or lack of it, determination, perseverance, creativity, cooperation with others and many more of other acceptable behaviours associated with schooling.

You are already aware that many types of assessment instrument are employed in the implementation of the continuous assessment in

schools. This is because of the fact attributed that continuous assessment lays emphasis on all the levels of objectives in all the domains of behaviours such as cognitive, affective and psychomotor domains. Of course, this is why the continuous assessment is said to be comprehensive. The previous system of assessment did not recognise this aspect. This is why Obemeata (1984), described it as measurement of pupils' achievements directed mainly towards measures of cognitive behaviour; neglecting the assessment of skills which are normally associated with personality characteristics of pupils.

According to Oluche (1983), the utilisation of a variety of instruments and repeated measurements tend to make the final grade of a pupil in the school become a crystalisation of his overall course endeavour and performance. Let us look at the teaching-learning situation, you will note that pupils' maximum achievement is the interest of everybody including the teacher, who is a key agent in programme implementation and who contributes much to the level of pupils' achievement. By now, you should be aware of the fact that assessment is an integral and important aspect of the teaching-learning process. You should also be aware that the teacher is the key person in the curriculum implementation process. Therefore, any assessment procedure like the continuous assessment should make the teacher much more involved and have the opportunity to participate in the final or overall assessment of the pupils. These processes make the teachers introduce innovations in assessment and teaching. Teachers become more flexible in their classroom interaction. They become more creative and more self-reliant. They are no longer slaves to examination syllabus. They know that their assessment of the pupils, which are based on innovations or new ideas, may not be included in the examination syllabus; though they feel it will contribute to the overall or all round development of the pupils and will surely become part of the final assessment.

The school heads and teachers are very much conscious of the fact that promotion examinations, class assignments, house assignments, periodic tests, projects and all other types of assessments contribute to the overall results of the external examination. To this effect, they put more efforts and direct these efforts to their teaching instead of directing more efforts on examination preparations. Of course, any pupil who is already doing very well in the continuous assessment is expected to do well in the overall evaluation.

The teacher's self-assessment of his instructional methods or techniques is another prospect of the continuous assessment process. They do this by reviewing the feedback of the continuous assessment exercises from time to time. This therefore, leads to great improvement of such techniques and methods. The teachers' job becomes more complete as

he assesses not only his pupils but also himself. Regular assessment of the pupils and prompt feedback from the teacher to the pupils on their efforts allow them to make adjustments where they are necessary. The teacher's regular self-assessment helps him get feedback about his teaching and as to what strategies to be adopted to achieve the desired goals and to know which strategies are failing to meet the desired goals.

Recall that we said that continuous assessment is guidance-oriented. Continuous assessment is useful for diagnostic purposes the result of which is used for guidance and counseling. The areas of strengths and weaknesses in pupils performance, teacher's instructional procedures and the curriculum itself are diagnosed the information obtained acts as a basis for encouraging the pupils' improvement on their efforts, remedial work and the improvement in the techniques of instruction.

You are also aware that continuous assessment is systematic in nature. This is because the purpose and timing of the assessment procedures are specified in advance. This helps the pupils, teachers, parents or guardians in planning for the promotion of the pupils' progress. This also provides the basis for more career guidance of the pupils. Data from continuous assessment are used for appropriate guidance of the pupils concerning choice and preparation for career. This may be in the area of technical, vocational, professional, business or pure academics. A well-kept record, which is a part of continuous assessment, will enable the parents or guardians to accept the teacher's advice on the pupils' ability to proceed beyond a particular level of schooling and in what direction. A comprehensive, cumulative and reliable data collected, recorded and stored help to show the type of progress pupils can make because of exposure to arranged and incidental experiences within and outside the classroom setting in a particular cultural setting.

Let us reiterate once again, that the teacher is the key agent for the effective implementation of the continuous assessment programme. Its success in our school system is greatly dependent on the teacher's ability to produce and use various assessment instruments, which met the requirement of the programme. This is why you should take this course very seriously.

5.2 Problems of Continuous Assessment

In the forgoing section, you learnt about the prospects of the continuous assessment in our primary school system. However, we want to say that already, some problems and fears have been detected and expressed. You are aware that the continuous assessment programme was adopted and introduced without any trial or pilot testing. This has already created some problems, especially in the area of implementation and monitoring

which are necessary for the success of the programme. On the area of implementation, two major problems have been identified. These are comparability of standards and records keeping and continuity of records.

If you participated in the former single or national examination system, you would have noticed that there was a basis for comparing pupils' performances across the schools in different parts of the state or country. This is difficult in the case of the continuous assessment system. This problem is attributable to (i) variations in the quality of tests and other assessment instruments used in the schools and (ii) variations in the procedures for scoring and grading of the different schools.

It is a common knowledge and we have to accept that standards of assessments by different teachers in various schools across the country, state, zone or local government areas cannot be the same. Can you guarantee that a score of 72% in Social Studies in school X is the same in school Y in the same subject? Teachers assess their pupils. However, it is difficult to ascertain whether the standards of all assessments by the different teachers are the same. Some teachers may set easy tests, while others may set difficult ones. The tests and other instruments may not have been designed to cover the same topic areas. It is even questionable and difficult to think of comparability of standards in a situation where schools and pupils within the system differ considerably in terms of programmes offered, tradition, inputs, teacher's qualifications, pupils' abilities, entry behaviours, etc.

Record keeping according to Ughamadu (1994), is one of the most intransigent problems of continuous assessment. Schools do not have the same pattern of record keeping. Records are not properly kept, workload of teachers do not allow them do effective record keeping, especially where the schools are under-staffed. Teachers are not thorough with record keeping. Some do not even know the great need for proper and accurate record keeping. Owing to lack of space in most schools, they do away with some records after some times. This is not good at all. Some schools do not have facilities for record keeping. In some cases, headteachers keep school records in their private residence, due to lack of space or office. When pupils change schools for one reason or the other, if the records are not available, transfer of records becomes impossible. Where it is possible to transfer the records, comparability of standards becomes an issue of concern.

Another problem is that of abuse. According to Kosemani (1986), the power of assessment, which is the greatest instrument placed at the disposal of the teacher in the school system, can be abused. His fear is that in a country like Nigeria, where moral decadence is manifested in

all spheres of life, the problem of objectivity on the part of the operation of the educational system is called to question with reference to continuous assessment.

Some teachers are in the habit of awarding pass marks to their relations or friends who do not deserve such marks. While some others do not feel it is improper to deprive pupils of their rightful scores or marks for reasons other than their performance. Another problem is that of objectivity in the pupils' assessment. The concern is with the accurate and fair assessment. Is justice going to be done equally to all pupils irrespective of tribe, culture, areas of residence-rural or urban etc?

Pupils who are given home assignment may eventually have the assignments done with the assistance of indulgent parents or relations and sometimes the scores are prejudiced by pupil-teacher relationships. It may therefore not reflect the true pupils' achievement. Parents may like to influence the scores of their children by inducing the teachers. This will bring about examination malpractices at a higher level.

In the past, we have witnessed occasions when school heads allow teachers to assist pupils by way of giving them unfair assistance, to ensure higher percentage of passes. Some schools treat and pamper external examiners with goodies. With this in mind, what do you think such teachers will do when they are left alone with everything? Certification is based on continuous assessment scores in the primary schools. It is the duty of the head teacher to issue these certificates. However, where the teacher is the sole determinant of the assessment data, then one should be very cautious here.

Emphasis on the continuous assessment is about assessment in the three domains of behaviour. Although teachers most of the times, do not assess the areas of affective and psychomotor domain. Most of the times too, the assessment instruments are not available. In fact, some teachers put down fictitious marks in the pupils' records as grades of tests, which are not actually conducted. The three domains of behaviour are supposed to be considered before arriving at the overall decisions on each child. The reports from schools have remarks or points for each domain, but most of the times, decisions are based on the cognitive components only.

Population explosion in our schools makes it difficult to have effective assessments. Teachers find it difficult to cope with the task of effective teaching of very large number of pupils and adequately conduct the continuous assessment. Some primary schools in the urban schools have up to 90 pupils being handled by one teacher. In such a situation, one test administration takes a long time to mark. This takes more of the

teaching time. Again, feedback is not adequately given to the pupils and the teachers do not give remediation lessons.

Most teachers are not vast or skilled in the art of test construction. According to Ipaye (1984), a major problem of the continuous assessment in the schools is that many teachers are still very much deficient in test construction. Some teachers, who use multiple choices because of the ease in marking, and because of large classes, end up constructing very poor items, which have ambiguous answers. People have, therefore, expressed concerns over the non-availability of tests constructed by professional testers for use in our school system.

The comprehensive nature of continuous assessments demands that varieties of instruments be used for the assessments of pupils. However, research findings indicate that only tests and assignments are the most popular instruments in use, currently by the teachers. Other instruments such as projects, interviews, inventory, sociometric, observations, rating-scales, questionnaires, checklists, anecdotal records, etc are rarely used. (Alausa, 1988; Nkobi, 1988; Osuocha,1988;and Ughamadu,1990)

Unfortunately, with the instruments recommended for use in the continuous assessment practice not properly employed and lack of required training for the teachers pose another problem of continuous assessment implementation in our schools. *The Federal Government Handbook on Continuous Assessment*shows that scores from the pupils' assessment will be transformed into percentile ranks and standard scores such as Z and T-scores. However, teachers use only averages and the raw scores. The standard scores are not used. According to Nkobi (1988) and Ughamadu (1990), teachers do not use them because they lack the necessary computational skills.

5.3 Recommendations for Improvement

As you know, continuous assessment is practised in the Nigerian school system. Therefore, no matter the size of the problems facing the operation and whatever problems the teachers are experiencing with the system, they cannot back out or stop it. This is because they cannot afford to break a national education policy. Of course, you know that it is enshrined in the National Policy on Education (NPE).Therefore, Nigerian schools have to see how best to implement it in schools. For the improvement of the continuous assessment, we recommend:

i. **Pre-service training for all prospective teachers**: The teacher is the key agent in the implementation of the continuous assessment. It is important that all prospective teachers pass through intensive and rigorous training involving the concepts,

modalities and techniques of continuous assessment. It should be a full time course in colleges of education, faculties of education and all the institutions that train teachers.

ii. **In-service training for all teachers**: There should be intensive and regular in-service training for every teacher in the school system, headteachers, ministries of education officials and every other person concerned with the education of the pupils. This may be done through workshops and seminars. The training and retraining should focus on the following skills:

   a. effective planning of teaching strategies compatible with subject areas,
   b. planning, construction and utilisation of achievement tests and other assessment instruments necessary for measuring pupils learning,
   c. effective planning, designing and utilisation of instruments for the assessment of personality characteristics and psychomotor behaviour,
   d. scoring and interpreting scores from assessment instrument,
   e. remediation of identified problem areas of the pupils,
   f. Skills in the relevant statistical computations and operations. This will include tabular and graphic presentations of data, computations of the measures of central tendency and transformation of raw scores to standard scores and percentile ranks, and
   g. maintenance of detailed records and preparation of pupils' reports and reporting.

iii. The in-service training of the teachers should be handled by experts in the areas. The Federal Ministry of Education, various states and local governments should ensure the effective trainings.

iv. **Pupil-teacher ratio should be reduced**: The pupil-teacher ratio should be drastically reduced to help teachers cope with the rigours of the implementations of the continuous assessment.

v. **Effective use of assessment data or test scores**: These should be used for the identification of the pupils' difficulties and helping them to learn and master areas of deficiency before going to the next unit of work.

vi. **Make use of all relevant information**: All information about the pupils' learning and personality characteristics should be used to get a clear and total picture of the pupils and build their guidance and counselling on this total picture.

vii. **Effective coordination**: This should be used for the proper attainment of comparable standards. The committees should be made use of towards this area.

viii. **Uniform procedures**: Teachers operating in the same system should keep to uniform procedures, especially in the areas of planning, construction of tests and other assessment instruments. This is to help them cover the same areas and essentially assess the same thing.

ix. **Provide test resource centres**: Test resource centres should be provided to have the responsibility of creating question banks for the use of the schools. A group of teachers at every coordination level should be assembled and charged with the responsibility of developing assessment instruments with the supervision of experts in testing, measurement and evaluation.

x. **Development of tests**: Teachers should be called upon from time to time to set questions, which should be sent to the zonal or chief inspectors of education at the local or state levels. Those questions should be assembled, moderated and pilot tested. They are to be stored in question banks for the use of the schools at different assessment periods.

xi. **Uniform system of weighting**: A final grade of the pupils derived from class tests, home assignments, projects and final examinations should have their weights decided in advance. These should be used consistently in all the schools.

xii. **Standard scores**: Scores from variety of assessment tools used in assessing the pupils should be converted to standard scores such as Z- scores and T-scores.

xiii. **Ensure comparability**: Comparability of standards can be ensured through various ways. These include:
   a. Using table of specifications when developing tests and providing marking schemes during the marking of scripts.
   b. Transforming scores to standard scores and percentile ranks.
   c. Making use of standardised tests in the school system.

xiv. **Uniform system of recording**: Reliable and necessary information comes from good records. For reporting to parents and other bodies, for easy transfer, combination of records, a uniform system of recording should be maintained.

xv. **Uniform system of grading**: Weighting of scores and keeping pupils records should be adopted in a uniform system.

xvi. Adequate storage space and durable facilities should be provided for all schools.

xvii. **Create a continuous assessment unit in all the schools**: This unit should be an annex to the head teachers' office and should be headed by a senior non- teaching staff that is vast in office work and statistics. He should also be computer literate. The unit

should be supervised by the head teacher. He should work in cooperation with the continuous assessment committee. The unit should be in charge of:

a. systematic keeping of all information relating to individual pupils in the school,
b. collection of all assessment scores from the teachers and subsequent entry into the pupils' report sheets,
c. coordination of all assessment decisions arrived at by the school continuous assessment committee,
d. ensuring that committee's decisions are promptly communicated to all the teachers, and
e. theunit head should function as the secretary of the committee.

xviii. Pupils should always be exposed to practical work through whole class activities, group works, individual activities, project works, etc. These should be assessed to have comprehensive data as required in the continuous assessment.

xix. Evaluation of antecedents and transactions should be conducted. Manpower in the area of teaching and supportive staff with respect to quality, qualifications, predisposition, pupils intellectual ability, socio-economic status, the school setting, administration, etc should be evaluated from time to time. On the side of transaction, such elements as instructional materials and the instructional strategies applied in the teaching- learning process should be constantly assessed for improvement.

xx. **Provision of computers**: This is information and technological age. Therefore, every school should be provided with computers to help in record keeping and storage.

Note that these recommendations are not exhaustive. There are many more. The most important is the implementation.

6.0 ACTIVITY

1. State any three continuous assessment records in primary schools.
2. What are the rationales for the introduction of continuous assessment in Nigeria?
3. State the characteristics of continuous assessment.

7.0 SUMMARY

In this unit, you learnt that the continuous assessment has prospects if it is well implemented in our school system. You also studied most of the problems encountered in the implementation of the continuous

assessment in the schools. We have made a number of recommendations to improve the implementation and therefore, improve the academic performance of the pupils. It is hoped that if these recommendations are implemented, there will be many improvements.

8.0 ASSIGNMENT

1. Before the introduction of continuous assessment, which test existed and what is it usedfor?
2. State any one suggestion on how to improve continuous assessment in primary schools.
3. State any 4 problems of continuous assessment in Nigeria.

9.0 REFERENCES

Obimba, F.U. (1989).*Fundamentals of Measurement and Evaluation in Education in Education and Psychology*.Owerri: Totan Publishers Ltd.

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MODULE 4 ANALYSING DATA FROM CONTINUOUS ASSESSMENT

UNIT 1 ORGANISATION OF DATA

CONTENTS

1.0 INTRODUCTION

As a teacher, when you teach your pupils, you have to assess them. When you assess them, you have to measure their level of achievement. Therefore, you generate scores. You may wish to present the scores to be meaningful and give people a clear idea of the general pattern in the set of scores and so the general pattern of performance. You may also wish to present the highest and lowest scores, the mean performance of the pupils, comparison of the performances of the pupils with those of others and also, comparison of a pupil's performance in different subjects etc. It means that you will be involved in some statistical operations. In this unit, you will be exposed to the organisation of data which will subsequently lead you to some of these statistical operations you need in the continuous assessment system. Every other statisticaltests are treated in the forthcoming course which you will study on Basic Research.

2.0 OBJECTIVES

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

- explain what is data presentation;
- prepare a frequency table given some scores;
- draw a histogram with a set of scores; and
- constructs a frequency polygon with a given set of scores.

3.0 HOW TO STUDY THIS UNIT

Read through this unit with care.

Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Classification:** the action or process of classifying something according to shared qualities or characteristics: A feature or quality belonging typically to a person, place, or thing and serving to identify it.
- **Approximate**: close to the actual, but not completely accurate or exact.
- **Frequency distribution table**: in statistics, a frequency distribution is a table that displays the frequency of various outcomes in a sample. Each entry in the table contains the frequency or count of the occurrences of values within a particular group or interval, and in this way, the table summarizes the distribution of values in the sample.
- **Charts:** a sheet of information in the form of a table, graph, or diagram.
- **Graphs:** a diagram showing the relation between variable quantities, typically of two variables, each measured along one of a pair of axes at right angles.
- **Vertical axis:** also called axis of ordinates (in a plane Cartesian coordinate system) the axis, usually vertical, along which the ordinate is measured and from which the abscissa is measured.
- **Horizontal axis:** also called axis of abscissas, usually horizontal, along which the abscissa is measured and from which the ordinate is measured.

5.0 MAIN CONTENT

5.1 Data Presentation

When you teach and assess your class, you have a group of scores which are called raw scores. At this stage, they are unorganised and cannot be interpreted with ease. If you want to get the highest or the lowest scores, you will see that it will not be easy at a glance, especially when the scores are many. But you can make the scores more meaningful if you arrange them in order. You can arrange them from the highest to the lowest or the other way round for easy interpretation.If you have been teaching, you would notice that this is what teachers usually do. For instance, the scores of 15 pupils in English are given as follows: 24, 34, 39, 15, 19, 18, 30, 29, 27, 12, 37, 10, 21, 28, 17. These scores can be arranged in ascending or descending order: 10, 12, 15, 17, 18, 19, 21, 24, 27, 28, 29, 30, 34, 37, 39. With this, you can see at a glance the highest and the lowest scores.

5.1.1 Tabular Presentation

A table is an orderly arrangement of data in columns and rows. It is designed in such a way that information can be conveyed crisply. Continuous assessment data are presented in tabular forms. A considerable variety of tables is possible in the way statistical tables are designed. But this depends on the classification of the data. For instance, the set of scores above can be put in a table:

Table 1.1 Scores of 15 pupils in a test on a table

S/N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Score	24	34	39	15	19	18	30	29	27	12	37	10	21	28	17

Note that a table can have two columns, or many columns. It could be two dimensional or multi-dimensional. Whatever the nature of the table, there are certain general rules you have to apply when you are drawing tables. Some of these are:

i. Every table should have a short, self-explanatory, descriptive title.
ii. When necessary, additional explanatory notes should be added.
iii. The columns and rows should be arranged in logical sequence.
iv. The table should be neat and simple to make for effectiveness.

5.2 Frequency Distribution-Ungrouped Data

This is a set of ordered scores and their corresponding frequencies. When scores are presented in this way, which is also in tabular form

they become much more meaningful. Let us define frequency of a score as the number of times the score occurs. For instance, if a score of 50 appears five times in a distribution, we say that the frequency of 50 is 5. Distribution can be taken to mean a set of ordered scores, or scores arranged from lowest to highest. For example, look at the following scores.

25, 30, 50, 60, 75, 30, 60, 65, 70, 25, 30, 40, 45, 50, 30, 45, 72, 80, 85, 75, 50, 65, 72, 40, 55, 72, 60, 82, 90, 85, 82, 70, 75, 60, 55, 50, 45, 35, 70, 50, 37, 42.

These scores can be arranged in frequency table as shown below.

Table 1.2 Frequency distribution

Score	Tally	Frequency
90	I	1
85	II	2
82	II	2
80	I	1
75	III	3
72	IIII	4
70	II	2
65	II	2
60	IIII	4
55	II	2
50	~~IIII~~	5
45	III	3
42	I	1
40	II	2
37	I	1
35	I	1
30	III	4
25	II	2
		42

5.2.1 Frequency Distribution of Grouped Data

When you have many scores, for instance, in a class tests, it is economical and easier to resort to grouping the scores into broader categories by class intervals. When you do this, the data will be in a more compact form for more meaningful interpretation. A composite table for a frequency distribution of grouped data contains (i) the class interval, which is a group of scores forming a single category such that there are two extreme scores – lowest and the highest, within the category (ii) class limit referring to each of the two extreme scores in a class interval. The lowest is called the lowest class limit, while the highest is the upper class limit. (iii) Class boundary, which is the

midpoint between two consecutive class intervals. Now let us represent the scores above in a group data table. See Table 3

Table1. 3: Grouped Data

Of scores of 42 pupils

S/N	Class Interval	Class Limits
1	86-90	85.5-90.5
2	81-85	80.5-85.5
3	76-80	75.5-80.5
4	71-75	70.5-75.5
5	66-70	65.5-70.5
6	61-65	60.5-65.5
7	56-60	55.5-60.5
8	51-55	50.5-55.5
9	46-50	45.5-50.5
10	41-45	40.5-45.5
11	36-40	35.5-40.5
12	31-35	30.5-35.5
13	26-30	25.5-30.5
14	21-25	20.5-25.5

When you want to determine the class size for the class intervals, first you need to find out the range of the set of scores. That is the highest minus the lowest score. Then divide this range by the approximate number of class intervals you want to have. For instance, in the example we have above, the range is 90-25 that is 65. If we have decided to have 14 groups, we will divide 65 by 14 and approximate to the nearest odd number, which is 5. It is better to have odd number so that when you want to have the midpoint; it will be a whole number.

5.2.2 Cumulative Frequency

This is obtained by adding the frequencies of a frequency distribution in turns and consecutively from the lowest class interval to the highest. Let us use another example in table 4. The cumulative frequency distribution can be used by teacher to present class results. It gives a clear picture of the pupils' performances. For example, if you want to present the number of pupils who have scored below a particular class interval, all you need to do is to read off the cumulative frequency immediately below the cumulative frequency corresponding to the particular class interval. From the table 4 above, you can see that 35 pupils scored below 70-74.

Table 1.4: Frequency distribution for grouped data showing cumulative frequency

S/N	Class Interval	Frequency	Cumulative Freq
1	90-94	1	49
2	85-89	1	48
3	8084	4	47
4	75-79	5	43
5	70-74	3	38
6	65-69	6	35
7	60-64	10	29
8	55-59	8	19
9	50-54	4	11
10	45-49	5	7
11	40-44	2	2

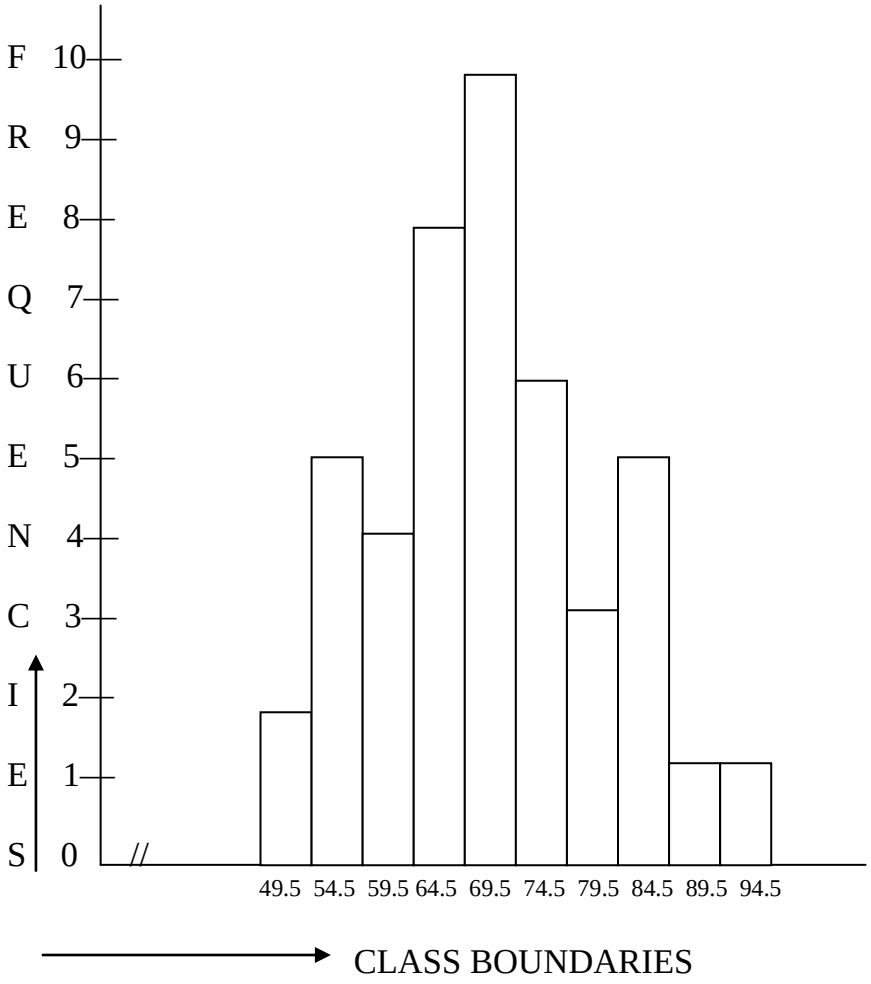
5.3 Histogram

This is generally a graphical representation of data. In histogram, data are represented in the form of rectangular columns or bars. The bars on adjacent sides touch each other. It is drawn by presenting the class boundaries along the horizontal axis and the frequency corresponding to the class intervals on the vertical axis. When these are plotted, we construct rectangular bars for each of the class boundaries to correspond with the frequencies of the class intervals. Let us use the data in table 4 to draw a histogram. To do this, prepare a composite table to include the class boundaries or the real limits of the class intervals. If you look at the histogram, you will notice that along the horizontal axis, between zero and the first class boundary, there are two strokes //. This shows that the class boundary does not start from zero.

Table *1.5*: Composite table

S/N	Class Interval	Class Boundaries	f
1	90-94	89.5 - 94.5	1
2	85-89	84.5 - 89.5	1
3	80-84	79.5 – 84.5	4
4	75-79	74.5 – 79.5	5
5	70-74	69.5 – 74.5	3
6	65-69	64.5 – 69.5	6
7	60-64	59.5 – 64.5	10
8	55-59	54.5 – 59.5	8
9	50-54	49.5 – 54.5	4
10	45-49	44.5 – 49.5	5
11	40-44	39.5 – 44.5	2

Figure 1.1: Histogram



5.4 Frequency Polygon

In this case, the mid-points corresponding to each class interval are used along the horizontal axis while the corresponding frequencies are placed along the vertical axis. This is followed by plotting the corresponding points and joining them with straight lines, which rest on the horizontal axis. Let us do this with the data on table 5.

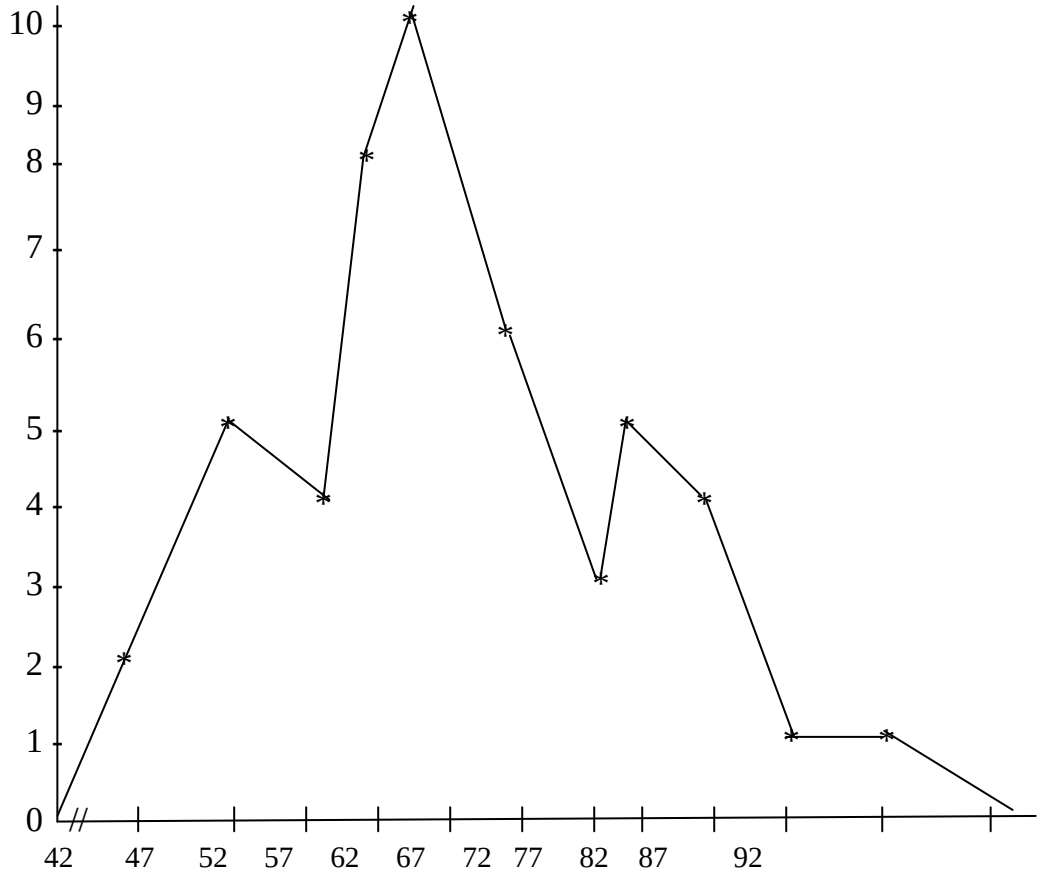
For this, we need to prepare a composite table containing the class intervals, mid points and frequencies.

Table 1.2: Composite Table

S/N	Class Interval	Mid Point	f
1	90 – 94	92	1
2	85 – 89	87	1
3	80 – 84	82	4
4	75 – 79	77	5
5	70 – 74	72	3
6	65 – 69	67	6
7	60 – 64	62	10
8	55 – 59	57	8

9	50 – 54	52	4
10	45 – 49	47	5
11	40 – 44	42	2

Figure 1.3: Frequency polygon



There are other methods of presenting data. You will recall that we are talking about continuous assessment. Therefore, we have decided to present only those that are very important in the classroom situation. You can read the rest from your Course in Basic Research.

6.0 ACTIVITY

1. Differentiate between ungrouped and grouped data.
2. List the steps in grouping data in to frequency distribution.
3. Differentiate between lower and upper real limit.

7.0 SUMMARY

In this unit, you learnt that data presentation implies the organisation and arrangement of the data obtained from your class tests in a way that they will be meaningful and for easier interpretation. Data can be presented in a variety of forms such as tabular, frequency distribution, graphical etc. You learnt about some of these methods including frequency distribution of grouped data, cumulative frequencies, histogram and frequency polygon.

8.0 ASSIGNMENT

Present the scores below in a frequency distribution table showing the class intervals, mid points, class boundaries, frequencies and cumulative frequencies.

30, 32, 32, 32, 39, 41, 41, 41, 42, 43

45, 46, 46, 46, 47, 47, 48, 49, 50, 50

50, 50, 51, 51, 52, 54, 55, 55, 58, 59

60, 60, 60, 60, 61, 61, 61, 63, 64, 64

65, 66, 67, 67, 68, 68, 72, 73, 74, 75

75, 76, 76, 79, 80, 80, 81, 84, 88, 90

9.0 REFERENCES/FURTHER READING

Obimba, F. U. (1989). *Fundamentals of Measurement and Evaluation in Education and Psychology*.Owerri:Totan Publishers Ltd.

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UNIT 2 RANKING OF SCORES

CONTENTS

1.0 INTRODUCTION

In the last unit, you studied how to organise data generated from your class for meaningful interpretations. It is not sufficient to arrange the scores from test administered to pupils, especially in the continuous assessment programme. You need to go another step further to assign results to each of the pupils' scores. In this unit, we shall be looking at how you can rank the scores of your pupils in the class.

2.0 OBJECTIVES

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

- rank pupils scores in a set of distribution; and
- explain percentile ranking.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Ranking:** a position in a scale of achievement or status; a classification.
- **Corresponding:** similar in character, form, or function.

- **Tied rank:** it meansdata that have the same value; for instance if you have 1,2,3,3,4.
- **Percentile rank: apercentile rank:** This is the percentage of scores that fall at or below a given score.
- **Approximate percentage:** in statistics, a percentage is a number or ratio expressed as a fraction of 100.

5.0 MAIN CONTENT

5.1 Ranking

At the end of every test, or examination, the pupils want to know their position in the test or examination. They want to find out their rank in relation to other pupils. Parents and guidance are interested first, to know the position of their child or ward before they go into the details of the result. It is important, therefore, that you know how to do the ranking of the pupils in your class at the end of a test, examination or at the end of the term or session.

The rank assigned to scores indicates how such scores stand in relation to others. In other words, the ranks indicate the relative position of each score in the group. We can then define ranking in simple terms as the positioning of pupils in a class in terms of the scores they obtained in a test or examination. There are two basic methods of ranking. These are the simple ranking and the percentile rank. In this section, we are talking about the simple ranking. In this method, the highest score is assigned a rank of one or first, the next is two or second, the next three or third, etc. until all the scores are ranked. This last rank must correspond to the total number of scores under consideration. For you to rank scores, you are first required to arrange the scores in order of decreasing magnitude. In other words, arrange the scores from the highest to the lowest. The next step is to start from the highest score to assign the ranks from one and to increase the ranks as the scores decrease in value. For example, 80, 40, 25, 60, 55, 72, 36, 50, 68, 28, 75, 62. You can arrange the scores in the highest order as follows.

Table *2.1* Ranking of scores

Scores	80	75	72	68	62	60	55	50	40	36	28	25
Rank	1	2	3	4	5	6	7	8	9	10	11	12

It is easy to rank scores listed without ties. However, most of the times, it is not like this. Pupils' scores are bound to tie. Therefore, when too or more scores are tied for the same rank, you have to find the average of ranks of the scores that are tied and assign this average to the tied scores,

then the ones following will have their usual ranks. Let us look at this example.

Table 2.2 Scores and Ranks with ties

Scores	25	22	20	20	19	18	16	14	14	14	11	12	10	9
Rank	1	2	3	4	5	6	7	8	9	10	11	12	14	15

From this table you can see that 20 appeared twice. Therefore, their ranks at $3 + 4 \div 2 = 3.5$, two of them have the same rank. It means there is no fourth position. You can also see that 14 appeared three times. Their ranks should be $8 + 9 + 10 \div 3 = 9$. All the three scores are ranked ninth, but there is no 8 and 10. In the school system especially the primary schools, what they do is avoid decimal points by assigning the next rank to the scores that tie and skipping the next, to continue normally. Now let us use the same scores in table 2 as an example.

Table 2.3 Scores and Ranks with ties

Scores	25	22	20	20	19	18	16	14	14	14	11	12	10	9
Rank	1	2	3	4	5	6	7	8	9	10	11	12	14	15

5.2 Percentile Ranking

The percentile rank of a score shows the approximate percentage of the pupils in the class who scored lower than the particular score. It shows that the higher the percentile rank, the better the performance. This type of ranking is better than the familiar ranking of pupils with raw scores. It is true that ordinary ranking gives useful information about pupils' performance compared to others in the same class, but it has its own limitations. For instance

Table 2.4 Scores of a pupil and ranks in different subjects

Subject	Raw Score	Simple Rank	No. of Pupils in Class
Mathematics	60	8^{th}	40
English	65	10^{th}	42
Science	50	8^{th}	37
CRK	65	12^{th}	40

From this table, you would have observed that this particular pupil got the same rank of eight in Mathematics and Science, although the raw scores are not the same. On the face value, it looks as if these pupils have the same ability in both subjects. This is because the number of pupils who sat for the two subjects are different. Again, look at the scores from English and CRK. You will also see that the scores are the same, but the ranks and number of pupils are different. These bring out

the mal-appropriateness of the use of simple ranks. The simple rank therefore is not of much help.

The use of percentile ranks solves the problem and makes interpretation easier. This is because if a percentile rank is higher in any situation, performance is better. One added advantage of the percentile rank is that a given percentile rank has the same meaning in respect of relative performance in a given class. You have seen that the ordinary rank position with raw scores does not have the same meaning for comparison of performance. Therefore, it is better to use the percentile ranks to compare pupils' level of performance or achievement when tested by a teacher or by different teachers or even with different assessment instruments. In other words, performance of a pupil in different tests can be compared with percentile ranks; across subjects areas for a particular pupil or even across groups for a given subject.

5.2.1 Computation of Percentile Rank

You can use various methods for calculating percentile ranks of pupils' raw scores. Let us look at some of the methods here.

(a) **Ungrouped data**: This method is used especially when the scores are not too many. This involves simply totaling all the frequencies below the particular score plus half the frequency at the score and dividing by the number of scores or cases. The value obtained is then multiplied by 100. The percentile rank of a score is given as:

$$PRx = \frac{Number\ of\ scores\ below\ the\ score + \frac{1}{2}\ of\ the\ seat\ the\ score}{Total\ Number\ of\ scores} x \frac{100}{1}$$

Example1: Given that the scores of 20 pupils in a class are as follows:

Scores	30	28	25	24	20	18	16	15
Rank	1	2	4	5	4	2	1	1
Cumf.	20	19	17	13	8	4	2	1

$$PR_{28} = \frac{17+1}{20} \text{ x } \frac{100}{1} = \frac{18}{20} \text{ x } \frac{100}{1} = \underline{90}$$

$$PR_{24} = \frac{8+2.5}{20} \text{ X } \frac{100}{1} = \frac{10.5}{20} = \frac{100}{1} = \underline{52.5}$$

$$Pr_{18} = \frac{2+1}{20} \text{ X } \frac{100}{1} = \frac{3}{20} \text{ X } \frac{100}{1} = \underline{.5}$$

(b) **Grouped Data**: This method is useful when you have a large number of pupils' scores to handle and you decide to group the scores. It is given as:

PRx = % CFL+ (%CFH-%CFL)(X-XL_

Where %CFL = Percentage cumulative frequency below the class interval

c/o CFH = Percentage cumulative frequency of the class interval

XL = Upper class of the class interval immediately below the class interval of which the score is to be determined.

Example 2 Using the following scores find the PR

Class Interval	F	CF	%CF
75-79	1	43	
70-74	2	42	
65-69	4	40	$\frac{40}{43}x\frac{100}{1}$
60-64	5	36	
55-59	6	31	
50-54	10	25	$\frac{25}{43}x\frac{100}{1}$
45-49	8	15	
40-44	4	7	
35-39	2	3	
30-34	1	1	$\frac{1}{43}x\frac{100}{1}2.3\%$

PR_{47} = % CFL+

$$\frac{(\%CFH - \%CFL)(X - XL)}{1}$$

$$\% \text{ CFL} = \frac{7}{43} X \frac{100}{1} = -16.28$$

$$\% \text{ CFH} = \frac{15}{43} X \frac{100}{} = 34.88$$

X = 47
XL = 44
C = 5

$PR_{47} = 16.28 + \frac{(34.88 - 16.28)(47 - 44)}{5}$

$= 16.28 + \frac{16.6 X 3}{5} = \frac{16.28 + 49.8}{5} + 16.28$

$= 11.16 + 16.28 = 27.44$

2. For PR62: $\%CFL = \frac{31}{43} X \frac{100}{1} = 72.1$

$\% CFH = \frac{36}{43} x \frac{100}{1} = 83.7$

X = 62

XL = 59

i = 5

$PR62 = 72.1 + \frac{(83.7 - 72.1)(62 - 59)}{5}$

$= 72.1 + \frac{11.6 X 3}{5} = \frac{34.8}{5}$

$= 72.1 + 6.96 = 79.06$

There is yet another method, which can be used to determine the percentile ranks. This method is called the **graphical method**. It is also used for large number of scores. It requires the plotting of a graph or percentage cumulative frequency (% CF) against the corresponding top score or upper class limit of each class interval. The curve got in this graph is called **ogive**. Once an ogive is plotted, you can read with ease the percentile rank of any score by tracing a line from the score until it cuts the graph and from the point, trace a line to the left until it intersects with the percentile rank line.

6.0 ACTIVITY

1. What is percentile rank?
2. Define percentile point?
3. What are the uses of percentiles?

7.0 SUMMARY

In this unit, you studied the two methods of ranking which can be used in the continuous assessment programme. Ranking is defined as the positioning of pupils in a class in terms of the scores they obtained in a test or examination. You have seen the method used in simple ranking when the scores do not tie or when you have ties.

The percentile rank of a score shows the approximate percentage of the pupils in the class who scored lower than the particular score. In this case and unlike the simple ranking, the higher the percentile rank, the better the performance. You learnt how to determine the percentile ranks with single scores or ungrouped scores and with grouped scores. The percentile rank is preferred when you have large class or scores from different teachers, subjects and sources.

8.0 ASSIGNMENT

8.1 Find the percentile rank of 40 and 52 in the scores given

Class Interval	60-64	55-59	50-54	45-49	40-44	35-39	30-34	25-29
Frequency	2	5	6	8	7	4	3	2

8.2 State one basic uses of Percentiles and percentile ranks

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UNIT 3 MEASURES OF CENTRAL TENDENCY

CONTENTS

1.0 INTRODUCTION

It is important that scores generated from classroom tests are given appropriate and meaningful interpretation. In the last unit, you studied the ranking of pupils' scores in order to interpret them in relation to others. In this unit, you are going to study the measures of central tendency or location, which are measures of averages. Each of the measures is an average of a group of data. It gives an indication of the central value of a group of data. The average is said to be typical or representative of the group. The three measures are the Mean, the Median and the Mode.

2.0 OBJECTIVES

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

- describe the mean, the median and mode;
- compute the mean from a group of scores;
- locate the median in a distribution of scores; and
- identify the mode in a distribution of scores.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Average:** a number expressing the central or typical value in a set of data, in particular the mode, median, or (most commonly) the mean, which is calculated by dividing the sum of the values in the set by their number.
- **Compute:** a figure or amount
- **Computation:** the action of mathematical calculation.
- **Mid-point**: the middle position of a number
- **Preliminary estimate:** a unique number that represents a unit of materials
- **Unimodal:** having or involving one mode.

5.0 MAIN CONTENT

5.1 The Mean

As a teacher, you must be familiar with the mean, which is the same thing as the arithmetic average. It is used for finding the average performance of the pupils in the class or in different school subjects. It is usually represented with the symbol M or $\overline{X}$. To find the mean of a set of scores, you simply add all the scores and divide the sum by the total number of scores or cases. You can find the mean for grouped data and for ungrouped data. We shall see how to do this in this section. You know that in the continuous assessment system, the teacher administers at least two tests in a subject in a term. You are expected to compute the mean scores of the pupils in each of the tests. With the values obtained, you can assess the progress or otherwise of the pupils in the class over a period. You will compare the values to know if the pupils are doing well or not. Now let us go into the computation.

5.1.1 Ungrouped Data

When you have ungrouped data, the mean is given as $\overline{X} = \frac{\sum X}{N}$

Where $\overline{X} = mean$, $\sum = Sum\ of$ N = Number of scores and X = the raw score.

Example I. Find the mean of the following scores:

45, 38, 60, 52, 78, 36, 65, 40, 62, 48, 36, 28. The mean will be got by adding all the scores and dividing by 12 i.e. (45+38+60+52+78+36+65+40+62+48+36+28) ÷ 12

$$\overline{X} = \frac{588}{12} = \underline{49}$$

Assuming you have given two tests to your pupils and they have come out with scores which you have added to get the mean performances as follows:

Mean for Test 1 = 45.5%, Test 2 = 50.4%. When you compare the two means, definitely you will conclude that the class has improved because they did better in Test 2 than in Test 1. In this way, you can also compare performance from pupils in different arms of a class.

5.1.2 Grouped Data

Most of the times, you may have to deal with a large class. In this case, the number of scores will also be larger. It means that you have to group the scores. You will recall that we have done grouping of score using class intervals. You should refresh your memory on that. For grouped data, the formula is given by $\overline{X} = \frac{\sum fx}{\sum f}$ where f = frequency.

Example 2 Find the mean of the scores in the distribution.

S/N	Class interval	f	Midpt	Fx
1	80 – 84	2	82	164
2	75 – 79	4	77	308
3	70 – 74	4	72	288
4	65 – 69	6	67	402
5	60 – 64	8	62	496
6	55 – 59	7	57	399
7	50 – 54	6	52	312
8	45 – 49	5	47	235
9	40 – 44	3	42	126
10	35 – 39	1	37	37
∑		46		2767

1. Prepare the composite table to include the mid points of the class intervals and fx i.e. frequency multiplied by the mid points.
2. Find the sum of fx = 2767.
3. Find the sum of f = 46.

4. Divide $\sum$fx by $\sum$f = $\frac{\sum fx}{\sum f}$

$= \frac{2767}{46} = \underline{\underline{60.15}}$

There is another method of computing the mean. This method is called the **assumed mean method**. You are referred to your basic research method to refresh your memory on that, if you need to use it. For the continuous assessment exercises, you can use any of the two methods you have learnt in this section.

SELF-ASSESSMENT EXERCISE

1. Find the mean of the following scores generated from a test by 12 pupils in a class. 30, 40, 54, 20, 60, 72, 34, 42, 31, 40, 16, 25.
2. A group of pupils was given a test each in English and Mathematics. Their teacher computed the mean for the two subjects as follows: English = 70%, Mathematics = 65%. What will be the conclusion of the teacher?

5.2 The Median

This is the mid-point of a set of scores when arranged in a particular order. It is the point on either side of which half the scores lie. In other words, it divides the set of scores into two halves.

If you are given a set of scores to obtain the median, you will need to arrange the scores in order, from the highest to the lowest or from the lowest to the highest. You then count from above or below up to the middle numbers for which there are equal number of cases or scores above and below. For odd number of cases, the median is the middle score. For even number of cases, the median is half the sum of the two middle scores.

Example 1: For odd number of scores:

Find the median of scores: 5, 7, 6, 3, 4, 2, 8, 9, 8.

First step is to arrange them = 2, 3, 4, 5, 6, 7, 8, 8, 9. Then, count to get the middle number. You can see that 6 is the middle number. Therefore, 6 is the median.

Example 2: For even numbers of scores:

Find the median of the scores; 12, 14 10, 8, 9, 15, 6, 7, 11, 13. As usual, arrange them in order = 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Now if you

count from either side, you will see that there are two middle numbers. These are 10 and 11. You will add them and divide by two = 10 + 11÷2 = 21÷2 = 10.5. The median is 10.5.

The median is not affected by the presence or addition of extreme scores. Therefore, in the continuous assessment situation, if you are faced with extreme scores, the best measure of central tendency for you to use is the median.

Example 3: For grouped data:

Find the median of the scores:

S/N	Class Interval	F	Cf
1	80 – 84	2	46
2	75 – 79	4	44
3	70 – 74	4	40
4	65 – 69	6	36
5	60 – 64	8	30
6	55 – 59	7	22
7	50 – 54	6	15
8	45 – 49	5	9
9	40 – 44	3	4
10	35 - 39	1	1

The median formula = $L + \left(\frac{\frac{N}{2} - Cfb}{f10} \right) i$

Where L = real lower limit of the median class
N = total number of scores in the scale
Cfb = Cumulative frequency below the median class
F_w = frequency within the median class
i = class interval size.

Now let us take serial number 5, i.e. 60-64 as the median class. Then, substituting the formulae we have

$$59.5 + \frac{\frac{46}{2} - 22}{8} x5 = 59.5 + \frac{23 - 22}{8} x5$$

$$= 59.5 + 0.625 = \underline{60.13}$$

Note that the median class is the class with half the number of scores. In the above case, you can see that half of 46 is 23. From cumulative frequency 23 is in the class of 60-64.

5.3 The Mode

In a set of scores, the mode is simply the score that occurred most. It is the most frequent or most popular score. In other words, it is the score with the highest frequency. The mode is the least reliable type of statistical average. Most of the times, it is on used as preliminary estimate of central tendency. There is always a score in a distribution, which has the highest frequency. When it is only one score, we say the distribution or set of scores is unimodal. Some of the times, there may be two modes. This is called bimodal. It is possible to have more than two modes. In this case, it is called multimodal.

Example 1: Find the mode of the following: 2, 8, 9, 7, 6, 5, 7, 3. You can see that seven (7) is the only score that appeared twice. Therefore, 7 is the mode. This is unimodal.

Example 2: Find the mode of the following: 3, 5, 9, 5, 7, 6, 7, 8. Look at this set of scores. You can see that 5 and 7 appeared twice each. Therefore, this set is bimodal with 5 and 7 as the modes.

Example 1 and 2 are used with ungrouped data. However, when the data are grouped, you can use the approximation of the mode method, which is getting the mode by locating the class interval with the highest frequency. Then find theme point of the class interval. However, when you want to find the actual mode, you can follow the next example.

Example 3 Find the mode of the grouped data below:

The formula is given by $L + \left(\frac{d1}{d1+d2}\right) i$

Where d_1 = difference between the frequency of the modal class and frequency of the class below it

d_2 = difference between the frequency of the modal class and frequency of the class above it

i = class interval size.

S/N	Class Interval	F
1	80 – 84	2
2	75 – 79	4

3	70 – 74	4
4	65 – 69	6
5	60 – 64	8
6	55 – 59	7
7	50 – 54	6
8	45 – 49	5
9	40 – 44	3
10	35 - 39	1

From this distribution, you can see that the mode class is serial number 5 that is, 60 – 64. When we substitute, we have:

$$59.5 + \left(\frac{8-7}{(8-7)+(8-6)}\right)5 = 59.5 + \left(\frac{1}{1+2}\right)5 = 59.5 + \left(\frac{1}{5}\right)^5 = \underline{61.17}$$

Note that for the operations in the continuous assessment, the mean is the most useful of all the measures of central tendency. This is because you can use it as a versatile measure, including using it with the standard deviation in the transformation of raw scores into standard scores such as the Z-score and T-score. What is the implication? It means that every classroom teacher must be familiar with how to compute the mean from both grouped and ungrouped data.

SELF-ASSESSMENT EXERCISE

Find the mode of the following distribution of scores:

T. Interval	85-89	80-84	75-79	70-74	65-69	60-64	55-59	50-54
Frequency	3	5	6	7	10	8	6	4

6.0 ACTIVITY

1. What are measures of central tendency?
2. What are the advantages and disadvantages of the mean?
3. State any three characteristics of median and mode.

7.0 SUMMARY

In this unit, you have studied the measures of central tendency or locations. You learnt that there are three of them: the mean, the median and the mode. You were told that the mean is simply the sum of all the scores in the group divided by the total number of scores. It is the most popular of all the measures. You saw how to compute the mean using $\overline{X} = \frac{\sum X}{N}$ or $\overline{X} = \frac{\sum fx}{\sum f}$ for grouped data.

The median is the mid-point of a set of scores. You also learnt how to get the median by inspection or by formula in grouped data using L + $\left(\frac{\frac{N}{2} - Cfb}{fw}\right)$ i

The mode is the most popular score in a group of scores. You have unimodal, bimodal and multimodal. It can be determined by inspection in ungrouped data and with the formula L + $\left(\frac{d1}{d1+d2}\right)\times$ C in grouped data.

8.0 ASSIGNMENT

1. Find the mean of the following scores: 20, 30, 40, 50, 45, 60.
2. What is the Median? Find the median of the following: 8, 5, 2, 8, 3, 9, 10, 7, 4, 9
3. What is the mode? Find the mode in the following distribution

Class Interval	60-64	55-59	50-54	45-49	40-44	35-39	30-34	25-29
Frequency	3	4	6	8	7	5	3	2

9.0 REFERENCES

Obimba, F.U. (1989). *Fundamentals of Measurement and Evaluation in Education and Psychology*.Owerri: Totan Publishers Ltd.

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Publishers.

UNIT 4 MEASURES OF VARIABILITY

CONTENTS

1.0 INTRODUCTION

In the last unit, you worked through the measures of central tendency or locations, which were said to be very important for the continuous assessment activities. You learnt that the mean is a versatile measure used in conjunction with other tests. It is also used with and in the computation of the variance and standard deviation. In this unit, you will learn about the measures of variability, which gives information about the degree to which scores, or values obtained from measurement of pupils achievement vary from one another. However, we shall only look at the range, the variance and standard deviations and a little of the quartile deviation. Details of these and more of the measure you will get in your research methods course materials.

2.0 OBJECTIVES

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

- explain the measures of variability;
- describe the range;
- compute the variance and standard deviations; and
- explain the quartile deviations.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.

4.0 WORD STUDY

- **Temperament:** this is the combination of mental, physical, and emotional traits of a person; natural predisposition.
- **Propensities:** an inclination or natural tendency to behave in a particular way.
- **Capacity:** the ability or power to do, experience, or understand something.
- **Quartile:** this has to do witheach of the three values of the random variable that divide a population into four groups.
- **Inter-quartile:** it is **defined** as the difference between the largest and smallest values in the middle 50% of a set of data.
- **Firstquartile (Q_1):** this is defined as the middle number between the smallest number and the median of the data set.
- **Thesecond quartile(Q_2):** this is the median of the data.
- **The third quartile (Q_3):** this is the middle value between the median and the highest value of the data set.

5.0 MAIN CONTENT

5.1 Measures of Variability

Variability denotes differences in the test scores of individual pupil. Differences can arise as a result of a number of factors. These factors make the scores obtained by an individual different from those obtained from another pupil. They even make the scores obtained from by one pupil at one time under certain conditions to be different from the scores, which would be obtained some other time under the same, or different conditions. In other words, the scores obtained by pupils in tests, assignments, projects and other modes of assessment normally vary considerably. Therefore, there is a need to use statistical tools that will enable you as a teacher to find out the extent to which group of scores vary among from the mean. These statistical tools are called measures of variability.

The concept of individual differences is a well-known one in psychology. Pupils are characterised by traits, which make them differ from one another. Some of such traits may be peculiar to an individual pupil. They may be common to many pupils but may exist in varying degrees in different pupils. Some of such variables or traits are

temperament, health propensities, intelligence and capacity for endurance. Pupils' performances in tests are influenced by individual differences and other extraneous factors which may be environmental; the health, the physical condition, the intellectual capacity, the temperament, the temperature, lighting, ventilation, space available and other general conditions of the room for the test, the absence or presence of distracting noise etc. All these influence the pupils' performance in the test. These are included in such qualities as credibility and civility in testing.

The measures of variability therefore indicate how far, uniform, similar or homogenous the group taking a test is or how dissimilar, unalike, or varied or heterogeneous the group is in its qualities and therefore in its scores. For the continuous assessment activities, the standard deviation is the most important and will be treated as such.

5.2 The Range

This is the simplest and most straightforward measure of variability. It is the difference between the highest and the lowest score. It is found by subtracting the lowest score from the highest score. It is a quick way of determining the extent or nature of the spread of scores. However, it is not a very reliable measure of variability because two extreme scores influence it.

Example 1 Find the range of the following scores:

2, 8, 15, 3, 9, 7, 20, 14, 29, 8, 10.

From the scores, you can see that the lowest score is 2 and the highest scores is 29. Therefore, the range = 29 – 2 = 27. Note that when we talk about the range without any qualification, it means we are talking about the Exclusive Range. It means that range can be Exclusive or Inclusive. When we say highest score-lowest score plus one, we are referring to the inclusive range.

5.3 Standard Deviation

This is the most dependable and most commonly used measure of variability. This is because it takes into account all the scores thereby indicating the extent to which each individual score deviates from the mean score. It shows the homogeneity or heterogeneity of the group. It is a kind of average, which indicates the extent to which all t he scores deviate or vary from the mean of that set of scores, indicating the spread

of that set of scores. It is the square root of the variance. It is given by the formula $\sqrt{\sum\left(\frac{X-X}{N}\right)^2}$

Example 2 Find the square root of the following scores: 5, 6, 8, 7, 4, 3, 9.

In this case, you can prepare a composite table as shown below:

S/N	X	X^2
1	5	25
2	6	36
3	8	64
4	7	49
5	4	16
6	3	9
7	9	81
$\sum$	42	280

1. Find the mean of the scores = 6.
2. Find the deviations from the mean.
3. Square the deviations from the mean.
4. Find the sum of the squared deviations = 28.
5. Substitute for the formula

$S = \sqrt{\frac{28}{7}} = \sqrt{4.00} = \underline{\underline{2.00}}$

An alternative method of computing the standard deviation is by the use of direct raw scores. This is given by the formula below:

$S = \sqrt{\frac{\sum X2 - \left(\frac{\sum X}{N}\right)^2}{N}}$

S/N	X	X-X	$(X-X)^2$
1	5	-1	1
2	6	0	0
3	8	2	4
4	7	1	1
5	4	-2	4
6	3	-3	9
7	9	3	9
$\frac{\sum}{X}$	42 7		28

Let us use the former example with this formula

$$S = \sqrt{\frac{280 - \frac{42^2}{7}}{7}} = \sqrt{\frac{280 - 252}{7}}$$

$$= \sqrt{\frac{28}{7}} = \sqrt{4} = \underline{2}$$

5.4 Standard Deviation for Grouped Data

When you have grouped data, you will use the same method for the ungrouped data except that you will also use the mid points of the class interval. In this case, you will use the formula:

$S = (\sum f) \sum fX - (\sum fX)2/ (\sum f)2$

S/N	Class Interval	f	Mid PointX	fX	fX^2
1	30-34	2	32	64	4096
2	25-29	3	27	81	6561
3	20-24	4	22	88	7744
4	15-19	6	17	102	10404
5	10-14	3	12	36	1296
6	5-9	2	7	14	196
7	0-4	1	2	2	4
		21		387	30301

Step i. Complete the composite table.

ii. Find $\frac{\sum FX^2}{X} = 30301$

iii. Find fX =-387

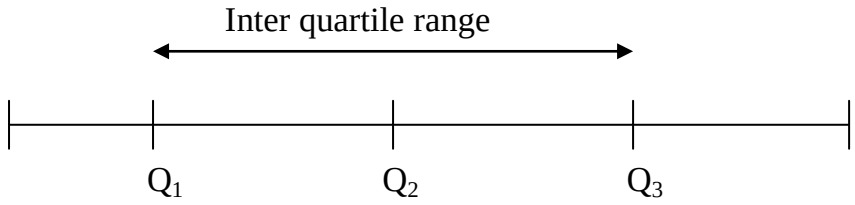
Substituting we have S = 21x30301—387x387/21x21

= 636321—149769 / 441 = 486552 / 441. =1103.2925. The square root of this number is 10.27.

5.5 The Quartile Deviation

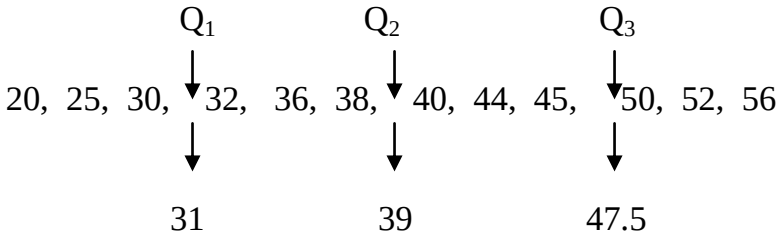
This is also called semi inter quartile range. The quartiles are points on the distribution of scores, which divide the distribution into four equal parts. There are three quartiles and four quartiles. The first quartile, Q_1 is equal to the 25th percentile. The 3rd quartile is equal to the 75th percentile; while the 2nd quartile is equal to the median, the 50th

percentile and the 5th quartile. If we use a linear representation, we will have:



From this diagram, you can see that from $Q_1 - Q_3$ is called the inter-quartile range. If you divide this range by 2, you will have what is called quartile deviation or the semi inter-quartile range. It is given as $\frac{Q_3 - Q_1}{2}$

Example: Find the semi inter-quartile range in the following scores:
20, 25, 30, 32, 36, 38, 40, 44, 45, 50, 52, 56. You need to arrange the scores in order first.



You can see that Q_1 is the point between 30 and 32 i.e. 30 + 32 ÷ 2 = 31. Q_3 is got by adding 45 and 50 and dividing by 2 = 45 + 50 ÷ 2 = 47.5

If you want to get the semi inter-quartile range = $\frac{47.5 - 31}{2} = 8.25$

For grouped data, consult your basic research.

6.0 ACTIVITY

Take a critical examination of the following scores 4, 5, 7, 3, 4, 6 5

Required

a. Calculate the standard deviation using sample and population method.
b. If the variance is 3.4, what is the standard deviation.

7.0 SUMMARY

In this unit, you have studied the measures of variability and the range, which we said, is the highest minus the lowest scores. You also studied the standard deviation, which we said is the square root of the variance. You have seen the methods of computing the standard deviation. The

quartiles are the points which divide a distribution of scores into four equal parts. Q_1 = 25th percentile. Q_3 = 75th percentile. $\frac{Q_3 - Q_1}{2}$ = semi inter-quartile range or quartile deviation.

8.0 ASSIGNMENT

i. What is measure of variability?
ii. State any four names that these measure can be called
iii. Find the range.
iv. Find the population variance.
v. Differentiate between the inter-quartile and semi-inter-quartile range.

9.0 REFERENCES

Obimba, F. U. (1989). *Fundamental of Measurement and Evaluation in Education and Psychology*.Owerri: Totan Publishers.

Ughamadu, K. A. (1994). *Understanding and Implementing Continuous Assessment*.(2nd Ed.). Benin City:World of Books Publishers.

UNIT 5 STANDARD SCORES

CONTENTS

1.0 INTRODUCTION

In the last unit, you learnt that the standard deviation, which is a measure of variability, is a versatile measure, which can be used in conjunction with the mean, which is a measure of central tendency or location in transforming the raw scores into standard scores. You know that the scores generated by the teachers directly from tests or examinations and other modes of assessments in the continuous assessment activities are called raw scores. For these scores to be meaningful and useful, they have to be transformed into standard scores. You have already studied the percentile ranking in the previous unit. In this unit, you will learn about the T-score, Z-score and the Stanine scores.

2.0 OBJECTIVES

Bythe end of this unit, you should be able to:

- explain transformation of raw scores;
- transform raw scores to Z-scores; and
- transform raw scores to T-scores.

3.0 HOW TO STUDY THIS UNIT

- Read through this unit with care.
- Study the unit step by step as the points are well arranged.

NOTE: **All answers to activities and assignment are at the end of this book. This applies to every other unit in this book.**

4.0 WORD STUDY

- **T-score: T-scores** are standardized scores on each dimension for each type. A score of 50 represents the mean. A difference of 10 from the mean indicates a difference of one standard deviation. Thus, a score of 60 is one standard deviation above the mean, while a **score** of 30 is two standard deviations below the mean.

- **Z-score:** A Z-Score is a statistical measurement of a score's relationship to the mean in a group of scores. A Z-score of 0 means the score is the same as the mean. A Z-score can also be positive or negative, indicating whether it is above or below the mean and by how many standard deviations.

- **Stanine:** This is a method of scaling test scores on a nine-point standard scale with a mean of five and a standard deviation of two.

5.0 MAIN CONTENT

5.1 Transformation of Raw Scores

Transformed scores are also known as **derived or converted scores**. Raw scores are transformed to percentile rank and the standard scores to be useful and meaningful. The standard scores are the Z-scores, T-score and Stanines. They involve statistical transformations designed to facilitate the process of the interpretation or giving meaning to a test score in relation to a group of scores. In the continuous assessment activities, teachers are required to transform raw scores of the pupils to percentile ranks and standard scores. For you as a classroom teacher to be able to compare the pupils' performances meaningfully, you need to transform their raw scores to percentile ranks. However, for you to combine scores from different sources, the scores have to be transformed to standard scores. The most popular standard score is the T-score.

5.1.1 Standard Scores

Transformed scores are called **standard scores** when they are based on the standard deviation. Stand scores are transformation of raw scores of a distribution to a new type of distribution that has a preferred arithmetic mean and standard deviation. They are popular in the representation and interpretation of relative performance of pupils on a norm-referenced test because raw scores cannot be meaningfully compared. All the standard scores provide common basis that permit meaningful

comparison of test scores. There are different types of standard or derived scores. Each of them has its own arithmetic mean and standard deviation. The most important of them all is the Z-score. It is from the Z-score that the others are derived or improved. Note that standard scores in different subjects by a pupil can be added together. You are aware that percentile ranks cannot be added. You are also aware that it is misleading to compare performance of pupils using percentages or raw scores. Look at this example: A pupil X scored 60% in test A in Arithmetic. Another pupil Y scored 80% in test B in the same Arithmetic. By mere looking at the two scores, you will easily conclude that pupil Y's performance is better than that of pupil X. This is a wrong conclusion. This is because it is possible that test A is more difficult than test B. Again, if pupil Z scores 45% in Mathematics, 80% in English, 70% in CRK, etc. It is also wrong to compare the performance of this pupil based on these raw scores. This is because there is no common scale for comparison. It is therefore more meaningful and useful to bring all the scores obtained by a pupil in different subject or in different tests into the same scale. It is also possible to bring the scores by different pupils in the same or even different subjects and different test to a common scale. If you do this, we can say that the scores compare meaningfully. Do you know that the Federal Government Handbook on Continuous Assessment did recommend the use of T-scores in the continuous assessment activities in our schools?

5.2 Z-Score

This is a deviation from the mean divided by the standard deviation. It tells us how many standard deviations above or below the mean raw scores falls at. For a set of Z-scores, the mean is always 0 (zero) and the standard deviation is I (unity). To transform a raw scores to a Z-score, you use the formula: Z-score = $\frac{Rawscore - Mean}{S\tan darddeviation}$

This can be represented symbolically as Z = $\frac{X - \overline{X}}{S}$

Example 1: Given the following raw scores obtained by some pupils in a class as 20, 50, 45, 30, 25, 15, 35. Find the Z-scores for 20, 50 and 35.

Step 1 – Find the standard deviation of the scores

S/N	Raw Score	$X - \overline{X}$	$\left(X - \overline{X}\right)^2$
1	20	-11.43	130.64
2	50	18.57	344.84
3	45	13.57	184.14
4	30	-1.43	2.04
5	25	-6.43	41.34
6	15	-16.43	269.94

7	35	3.57	12.74
$\sum$	220		985.68

$\overline{X}$ 31.43

S = $\sqrt{\sum \frac{(X-\overline{X})^2}{N}} = \sqrt{\frac{985.68}{7}} = \sqrt{140.81143}$

= 11.87

Step 2: Using Z = $\frac{X-\overline{X}}{S}$ Find the Z-scores given:

i. $Z_{20} = \frac{20-31-43}{11.87} = \frac{-11.43}{11.87} = 0.96$

ii. $Z_{50} = \frac{50-31.43}{11.87} = \frac{18.57}{11.87} = 1.56$

iii. $Z_{35} = \frac{35-31.43}{11.87} = \frac{3.57}{11.87} = 0.30$

If you take a critical look at the Z-scores, you will notice that the values have negative, positive and decimal values. It is a problem during interpretation. To avoid the negative values T-score becomes handy. This is why we say that the T-score is an improvement of the Z-score.

5.3 T-score

This has a standard deviation of 10 and arithmetic mean of 50. It is derived by multiplying the Z-score by 10 to remove the decimal points and adding 50 to remove the negative values. Therefore, to obtain the T-score you will use the formula T = 50 + 10Z where Z = $\frac{X-\overline{X}}{S}$. In other words, T-score is given by T = 50 + 10 $\left(\frac{X-\overline{X}}{S}\right)$

Example 2: Let us use the scores in Example 1

It means that Z_{20} = -0.96

Therefore T_{20} = 50 + 10 X -0.96 = 50 – 9.6 = 40.04

For Z_{50} = 50 + 10 x 1.56 = 65.6

For Z_{35} = 0.30

Therefore, T^{35} = 50 + 10 x 0.30 = 53.0

Now, if the T-scores of pupils in different subjects are computed, the values can be compared. This is because they are now on the same scale. They can also be added. As a classroom teacher, you should be able to have the skills necessary for computing mean and standard deviation of raw scores obtained by your pupils. These will help you to convert scores into T-scores. This is to conform and adhere to the National Education Law which requires that raw scores be converted to T-scores for meaningful comparison of the performances of pupils.

5.4 Stanines Scores

The scale here is another standard scores system used for converting raw scores obtained from standardised tests. It is pronounced as **stay-nine**. It is a contradiction of standardised nine. It simply means standard scores with nine categories. These categories are 1, 2, 3, 4, 5, 6, 7, 8, 9. To convert raw scores into stanine scores, follow these steps.

i. Arrange the scores in rank order from the highest to the lowest
ii. Assign the top 4% to stanine score of 9.
iii. Assign the next 7% to stanine score of 8.
iv. Assign the next 12% to stanine score of 7.
v. Assign the next 17% to stanine score of 6.
vi. Assign the next 20% to stanine score of 5.
vii. Assign the next 17% to stanine score of 4.
viii. Assign the next 12% to stanine score of 3.
ix. Assign the next 7% to stanine score of 2.
x. Assign the next 4% to stanine score of 1.

The examination bodies in Nigeria make use of the stanine scores. Such examination bodied as WAEC, NECO, NABTEB etc use the stanine in interpreting the results of their candidate. In their own case instead of top 4% assigned to stanine 9, it is assigned to stanine 1. So they use the revise of what we have here. It means that the last 4% is assigned to 9.

6.0 ACTIVITY

Below are mean standard deviation and scores obtained by Emmanuel in a Mathematics test.

Test	**Mean**	**SD**	**Scores**
1	40	8	69
2	78	44	56
3	60	.98	67
4	78	3	87
5	86	15	77

a. In which test did Emmanuel performance best
b. Why?
c. In which test recorded hisworst performance

7.0 SUMMARY

In this unit, you have learnt that transformed scores are called derived or converted scores. They involve statistical transformation designed to facilitate the process of meaningful interpretation of scores. You also learnt that transformed scores are called standard scores because they are based on standard deviations. The Z-score is a deviation from the mean divided by the standard deviation. The mean is always zero and the standard deviation is one. The formular is Z = $\frac{X - \overline{X}}{S}$ mean of 5. It is used to remove the negative and decimal points in the Z-score. It is given as T = 50 + 10Z. The stanine scored is used for converting raw scores obtained from standardized tests into nine categories. It is mainly used by examination bodies like WAEC, NECO and NABTEB.

8.0 ASSIGNMENT

Given Test	Mean	SD	Scores
1	14	2	75
2	25	4	76
3	10	3	47

Calculate
a. Z score in test 3
b. Emma t-score in test 2 and
c. state any to uses of standard score by teachers

9.0 REFERENCES

Obimba, F. U. (1989). *Fundamentals of Measurement and Evaluation in Education and Psychology*.Owerri: Totan Publishers Ltd.

Ughamadu, K. A. (1994). *Understanding and Implementing Continuous Assessment*. (ed.). Benin City.World of Books Publishers.