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COURSE GUIDE

SED 211
ASSESSMENT AND EVALUATION IN INTEGRATED SCIENCE

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MAIN COURSE

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MODULE 1 CONCEPTS OF ASSESSMENT AND EVALUATION

UNIT 1 Meaning of Assessment and Evaluation

CONTENTS

1.0 INTRODUCTION

In all educational endavours, human and material resources are used to enhance effective teaching and learning processes that yield permanent and meaningful learning among students for the development of individuals and the betterment of the human society. It is therefore necessary from time-to-time to monitor educational activities in the light of set out objectives. Thus the teaching of Integrated Science has to be assessed and evaluated to ensure cost effectiveness.

In this unit, you will be introduced to the concepts of assessment, measurement and evaluation. You will also learn purposes of evaluation at the end of the unit.

2.0 OBJECTIVES

After studying this unit, you should be able to:

- explain the meaning of assessment
- define the concept measurement
- describe what evaluation is
- enumerate at least 5 purposes of evaluation

3.0 MAIN CONTENT

3.1 Meaning of Assessment

Assessment is a process of finding out the extent to which a learning objective has been achieved after an instruction. It refers to the use of a number of strategies in finding out how proficient a pupil is following a series of instruction.

SELF-ASSESSMENT EXERCISE

What is the focus of assessment?

According to Inyang (2012) the extent of manifestations of traits expected to be brought about in a pupil following a learning process may be expressed in numbers (i.e. quantitative) or it may be expressed in words (i.e. qualitative) or in combination of words and numbers according to situations.

SELF-ASSESSMENT EXERCISE

List 3 ways in which the extent of manifestation of traits after learning process can be expressed.

Assessment serves as a means of providing feedback to students, parents, teachers and the general public. Outcomes of assessment are used in placement, promotion and employment.

3.2 Meaning of Measurement

The term measurement refers to situations in which numbers are assigned to observations such as height of children in metres, their performance in achievement test in scores. On the other hand, the quietness of a pupil or his co-operativeness can merely be assessed using qualitative terms but cannot be measured using numbers (Inyang 2012). Thus when numbers are assigned to observations on traits and behaviours, the process is described as measurements.

SELF-ASSESSMENT EXERCISE

Explain briefly the concept "measurement"

3.3 Meaning of Evaluation

Evaluation is what final judgment is made from considering the results of assessment or measurement. Thus evaluation is the systematic

process of determining the extent to which educational objectives are achieved by learners (Gronlund 1983). It is indeed systematic collection of evidence to determine whether or not changes are taking place and the levels of such changes in the learner.

SELF-ASSESSMENT EXERCISE

Define the concept "Evaluation" in your own words

3.4 Purposes of Evaluation

In educational endeavours, several inputs and commitments are made. Curriculum is designed, buildings are constructed, utilities and services are provided, teachers and non-academic staff are recruited and inspectors of education are employed all these to achieve certain set out objectives. From time to time, it is logical to monitor the activities going on in school to see if they are leading towards the set out objectives. This is the essence of evaluation.

SELF-ASSESSMENT EXERCISE

List any 5 investments or commitments that are made in educational endeavours

The purposes of evaluation are many. The National Teachers Institute (2000) identifies the following purposes:

1. To enable the curriculum planners in Integrated Science see if the designed curriculum is achieving its objectives.
2. To assess teachers' method of instruction to find out its strengths and weaknesses.
3. To assess teacher competence
4. To enable Integrated Science students know their performance. Research findings suggest that knowledge of result enhances and motivates students.
5. To inform parents the progress of their children
6. To supply information to employers and the general public
7. For promotion and placement purposes in schools

4.0 CONCLUSION

Assessment, measurement and evaluation are integral part of the Integrated Science we teach to our students. This unit is an overview of the three concepts that are often interchangeably used to monitor curricular activities going on in schools.

5.0 SUMMARY

In educational enterprise, investments are made. Pupils come to school daily, infrastructures and equipment are provided. Academic and non-academic staff are recruited utilities and services are provided. All these investments are to achieve certain objectives. It is therefore necessary to monitor the activities going on in schools in relation to the set out objectives. This is the essence of assessment, measurement and evaluation. Feedback from evaluation motivates learners, keep the parents informed of their children's progress and is used for promotion and placement.

6.0 TUTOR-MARKED ASSESSMENT

Explain the concept evaluation and its purposes in educational enterprise.

7.0 REFERENCES/FURTHER READINGS

Gronlund, N.E. (1983) Measurement and Evaluation in Teaching. New York, Macmillan

Inyang N. U. (2012) Perspectives of Appropriate Assessment of Cognitive Behaviours in STME: Inaugural Lecture of the University of Uyo, April 5.

National Teachers' Institute (2000) NCE/DLS Course Book on Integrated Science Cycle 3: UNIT 9, MODULE 10

UNIT 2 ASSESSMENT OF INTEGRATED SCIENCE LEARNING

CONTENTS

1.0 INTRODUCTION

As teachers, we are pleased to share student's successes, but we must also be prepared to share their failure (Nelist and Brain 1986) A student's success or failure is rarely his alone and one of the major concerns of education is to identify the causes of success in order to strengthen them, and the causes of failure in order eliminate them. Hence the need for assessment.

In this unit, you will be introduced to the teaching-learning process and the various forms of assessment that the teacher can use to assess students learning in Integrated Science.

2.0 OBJECTIVES

After studying this unit, you should be able to:

- explain briefly the process of teaching
- describe the process of learning
- define formative and summative evaluation
- explain the concept of School-Based Assessment
- explain assessment in the Nigerian educational system

3.0 MAIN CONTENT

3.1 Teaching-Learning Process

Teaching is a process in which the more mature of the human society, (the teacher) tailors the development of the less mature, (the pupil) for all-round development of the pupil and the betterment of the society. Thus the Integrated Science teacher is the more mature of the human society while the Integrated Science students are the less mature of the society. The purposeful interactions between the two is the process of teaching. Fruitful interactions between the Integrated Science teacher and his pupils brings out learning, which is a change in human behavior due to new experiences.

SELF-ASSESSMENT EXERCISE

1) Explain the meaning of "Teaching"
2) Describe the process of learning

3.2 Formative and Summative Assessment

Integrated Science Teaching and Learning process can be assessed in two ways. When assessment is focused on what has been assessment. But when it is in-built into teaching-learning process, it is called formative assessment. Both are important to the teacher. Always remember, in the process of our teaching, we ask questions at various stages to monitor students learning. This is formative assessment. However, there are occasions at the end of term or semester we give students test and examinations. This is summative assessment.

SELF-ASSESSMENT EXERCISE

Explain briefly "formative" and "summative" assessment.

3.3 School-Based Assessment

Several assessment practices are planned and carried out at the school level. Such assessments are called School-Based Assessments (SBA). Many instruments or tools are used to carry out SBA, and it is important that appropriate tools are used to assess all the three domains of our pupils, i.e. the cognitive, the psychomotor and the affective domains. The cognitive domain is best assessed using tools such as achievement tests; the psychomotor domain is best assessed using tools like projects, practicals, dramatization and demonstration (NTI 2014). The Affective domain can be assessed using tools like observation, rating scale and checklists.

SELF-ASSESSMENT EXERCISE

Mention one tool each that can be used to assess cognitive, psychomotor and affective domains in School-Based Assessment

3.4 Assessment in Nigerian Educational System

Apart from the School-Based Assessment outlined in section 3.3 above, there are some assessment practices that are conventionally carried out by certain bodies viz:

i. The Primary and JSS Final examinations are conducted by Evaluation and Certification Units of the Ministry of Education
ii. Senior Secondary School Examination (SSCE) conducted by WAEC, NECO & NABTEB
iii. Tertiary institutions, JAMB and Individual Institutions conduct their examinations

SELF-ASSESSMENT EXERCISE

Mention the functions of WAEC & NECO briefly.

4.0 CONCLUSION

Teaching-Learning process in Integrated Science should be accorded high priority. Students' success and failure are also teachers' success and failures. School-Based Assessment are conducted by schools and should focus on all the 3 domains using the right tools.

5.0 SUMMARY

Assessment of Integrated Science Instruction can be formative or summative. The former refers to in-built assessments while the latter is conducted at the end of the term work or end of semester. School-Based Assessment should focus on the 3 domains of the students using appropriate tools.

The Nigerian Educational System conventionally assigns the assessment of different levels of education to appropriate bodies. The Primary and JSS levels are assessed by the Evaluation and Certification Units of the State Ministry of Education, while the Senior Secondary Education is assessed by WAEC, NECO and NABTEB.

6.0 TUTOR-MARKED ASSIGNMENT

i. Briefly explain the teaching-learning process in Integrated Science.
ii. Explain briefly School-Based Assessment

7.0 REFERENCES/FURTHER READING

Nellist, J. and Brain N. (1986). Science Teachers HandBook Hutchinson and Co. Publishers Limited. London

National Teachers Institute, Kaduna (2014) Manual for Re-Training of Primary School Teachers MDG Project.

UNIT 3 ASSESSMENT OF THE THREE DOMAINS

CONTENTS

1.0 INTRODUCTION

Educational activities in school are directed to enhance all-round development of the students we teach. Intellectual activities develop the cognitive domain, physical exercises focus on the psychomotor domain while exercises on beliefs, attitude feelings and interest influence the affective domain. All the three domains are important to the science teacher and should be properly and effectively assessed.

This unit will give you an overview of the three domains and the appropriate tools to be used in assessing them.

2.0 OBJECTIVES

After learning this unit, you should be able to:

- define the cognitive domain
- explain the meaning of psychomotor domain
- describe the affective domain
- mention appropriate tools to assess the 3 domain

3.0 MAIN CONTENT

3.1 Assessing the Cognitive Domain

Bloom *et al* (1971) classified human behavior into cognitive, affective and psychomotor domains. Techniques of assessment employed depend on the domain (Oyarekhua, 2007). The cognitive domain is assessed by

the use of achievement, or performance tests Bloom *et al* further classified cognitive behavior into six level of educational objectives, viz: Knowledge, Comprehension, application, analysis, synthesis is and evaluation. This domain deals with aptitude and achievement.

SELF-ASSESSMENT EXERCISE

Name the 6 levels of cognitive behaviour which tool is appropriate to test cognitive domain?

3.2 Assessing the Psychomotor Domain

This domain is concerned with manipulative and motor skills that can be potentially explored using hand-on activities, such as handling of writing materials, dancing, games, technical drawing, laboratory experiments (NTI 2014) Skills in this domain can be assessed using tools such as projects practicals, dramatization and demonstration. This domain deals with Hand/Eye Hand Co-ordination and manual dexterity.

SELF-ASSESSMENT EXERCISE

Describe the features of the Psychomotor Domain. List 3 tools that can be used to assess this domain

3.3 Assessing the Affective Domain

This domain focuses on learning outcome such as interest, attitude, anxiety and temperament. It also deals with personality, integrity, punctuality and ethics (NTI 2014). These trails can be measured using tools such as interview observation, questionnaire, rating scale, checklist, inventory and anecdotal records (NTI 2014). These tools will be highlighted in module 2.

SELF-ASSESSMENT EXERCISE

Describe the characteristic features of the Affective Domain

3.4 Assessment Instruments Illustrated

The cognitive domain can be assessed using achievement and aptitude tests, illustrated thus

Achievement Tests
This tools measures what pupils have learned after a given instruction. It is based on a prescribed syllabus e.g. term/semester exam, NECO, WAEC, SSCE examinations

Aptitude Tests
Each individual is potentially gifted with some capabilities. Aptitude tests are designed to measure such traits in individuals and the results are often used in selection into professions such as military, artisans, piloting and space science.

SELF-ASSESSMENT EXERCISE

Name the tools that are used to assess cognitive domain

The psychomotor domain can be assessed using tools such as projects and laboratory practicals.

Projects:
A project is an academic exercise which may be collectively carried out by students in groups over a period of time. It may involve constructing an artifact or device which is based certain theories or principles, projects are useful for assessing high level cognitive reasoning and psychomotor traits.

Laboratory Experiments
Scientific experiments carried out in the laboratory are useful in assessing hand/eye, hand/coordination and manual dexterity.

SELF-ASSESSMENT EXERCISE

Describe any two tools that can be used to assess the psychomotor domain

The Affective domain can be assessed using tools such as checklist, assignment and observation

Checklist
This tool contains skills or attributes of the behavior being assessed. The teacher uses the tool to observe and assess skills exhibited by the students and marks/scores are awarded according to the intensity of the trait being assessed.

Assignment
This is giving tasks to students to be done within a time-limit. Assignments should be marked to provide feed back to students and the teacher.

Assignments can be used to assess cognitive, affective and psychomotor behavior.

SELF-ASSESSMENT EXERCISE

Explain what a checklist is and how it can be used to assess affective domain.

4.0 CONCLUSION

The three domains should always be the focus of our teaching. Similarly, efforts should be used to assess behaviours in all the 3 domains. Several tools are available for the teacher to monitor learning in the three domains. It is left for the teacher to carefully select a tool and use it to achieve his objectives.

5.0 SUMMARY

Tools are instruments that can be used by the teacher to assess students learning. All-round development of our pupils means our teaching should focus on the cognitive, affective and psychomotor domains. Several tools are available to assess behaviours in all the 3 domains notably.

- Achievements tests
- Aptitude tests
- Projects
- Experiments
- Checklists and
- Assignments

Teachers should use them wisely to assess students behavior in our teaching

6.0 TUTOR-MARKED ASSIGNMENT

List any 3 instruments that can be used to assess students behavior one in each domain.

7.0 REFERENCE/FURTHER READING

Bloom, B. S, Hastings, J.T. and Maudus G.F. (1971). Handbook on Formative and Summative Evaluation of Student Learning. New York, Mc Graw Book C. Ltd.

National Teachers Institute (2014). Manuel for Re-Training of Primary School Teachers. MDG Project.

Oyarekhua, H. (2007). A training Manual for Teachers: Minna, Gabson Printers Ventures.s.

UNIT 4 STATING LEARNING OBJECTIVES BEHAVIOURALLY

CONTENTS

1.0 INTRODUCTION

From time to time, Integrated Science Teachers construct tests items for use in semester of Terminal examinations. To do this properly, test items should come directly from the objectives and focus on the relevant content in the curriculum. This unit will introduce you to the basic steps in writing educational objective behaviourally as a first step towards test construction.

2.0 OBJECTIVES

After studying this unit, you should be able to:

- list the 3 conditions of writing behavioural objectives satisfactorily
- identify measurebale verbs to be used in writing objectives
- identify, non-measurable verbs to be avoided in writing objectives
- construct educational objectives behaviourally

3.0 MAIN CONTENT

3.1 Conditions in writing Behavioural objective

To write educational objectives behaviorally, Bloom *et al* (1971) suggest that three conditions outlined below have to be satisfied:

1. The need for terminal, measurable behavior the student should have at the end of instruction
2. The conditions under which the behavior is expected to be displayed
3. The minimum acceptable level of performance by the student

If all the three conditions are satisfied the behavioural objective(s) become satisfactory and acceptable. See examples that follow:

a. At the end of the lesson, students should be able to identify atleast 3 points of hibiscuss flower using a handlens
b. At the end of the lesson, students should be able to dissect a frog and identify atleast 3 points of the alimentary canal.

SELF-ASSESSMENT EXERCISE

State the 3 conditions of writing objectives behaviourally

3.2 Measurable Verbs to be used in stating objectives

There are many verbs that when used in behavioural objectives, the behavour(s) become distinct and measurable, such verbs should always be used in stating behavioural objectives. Study the following verbs:

At the end of the lesson, students should be able to

i. describe ……
ii. identify ……
iii. advance reasons ……
iv. draw and label ……
v. explain ……
vi. analyse ……
vii. discuss ……
viii. suggest ……

SELF-ASSESSMENT EXERCISE

Mention any 5 verbs that are measurable and can be used in stating objectives

3.3 Non-measurable verbs to be avoided in stating objectives

Certain verbs when used in stating behavour objectives, do not make the terminal behavior easily measurable. Such verbs should be avoided by the Integrated Science teacher in stating educational objectives. Consider the following cases:

At the end of the lesson, students should be able to:

i. know ……
ii. understand ……
iii. appreciate ……
iv. enjoy ……
v. believe in ……
vi. judge ……

SELF-ASSESSMENT EXERCISE

List any 5 verbs that are not easily measurable and should be avoided in stating behaivoural objective

3.4 Samples of Satisfactory Behavioural Objectives

The objectives stated below satisfies all the 3 conditions and are therefore acceptable:

At the end of the lesson, students should be able to:

a. identify atleast 3 constellations in the night sky using a star chart as a guide
b. state the 3 states of matter with one correct example to illustrate
c. draw and label the external features of tilapia fish using a handlens
d. discuss the amorality of science and technology using convincing argument
e. distinguish satisfactorily, the differences between magic, superstition and science.

SELF-ASSESSMENT EXERCISE

Construct 3 behavioural objective one each on the following Integrated Science topics (i) Pollination (ii) Forms of energy (iii) Mammalian Eye

4.0 CONCLUSION

The first step towards test construction it to link test items to educational objective. Educational objectives are stated behaviourally. The three conditions for behavoural objectives are:

- Terminal measurable behavior
- Conditions under which the behavior is to be displayed
- Minimum acceptable level of performance

5.0 SUMMARY

The first step to item construction is link educational objectives to the items. Educational objectives are stated behaviorally. Certain verbs when use in stating objectives lead to measureable terminal behaviours and should always be used. Such verbs are: to identify, to draw, to explain e.t.c. On the other hand, the following verbs do not yield measurable behaviours and should be avoided: to know, to understand, to appreciate. Three criteria or conditions to satisfactory objectives are:

- What is the behavior?
- Under what conditions are the behavour to be displayed?
- What is the minimum acceptable level of performance?

6.0 TUTOR-MARKED ASSIGNMENT

i. State the 3 conditions for writing objectives behaviourally.
ii. Identify 3 measurable and 3 non-measurable verbs.

7.0 REFERENCES/FURTHER READINGS

Bloom, B. S. Hastings J.T & Maudus G.F. (1971). Handbook on formative and Summative Evaluations of Student Learning. New York McGraw Book Co. Ltd.

UNIT 5 CONSTRUCTION OF TABLE OF SPECIFICATION

CONTENTS

1.0 INTRODUCTION

For the Integrated Science teacher to construct test items in such a way that all levels of educational objectives are adequately assessed a blue print or table of specification is necessary. This is a guide to the teacher to ensure that questions from all the topics taught are adequately distributed to assess the six levels of educational objectives.

In this unit, an attempt is made to introduce you to the techniques of constructing a blue print or table of specification.

2.0 OBJECTIVES

After studying this unit, you should be able to:

- list the six levels of objectives in the cognitive domain
- describe the procedure for constructing a blue print or table of specification
- draw a typothetical table of specification in Integrated Science

3.0 MAIN CONTENT

3.1 Six Levels of Objectives in the Cognitive Domain

Bloom *et al* (1971) classified cognitive behavior into six levels of educational objective namely:

- Knowledge
- Comprehension
- Application

- Analysis
- Synthesis and
- Evaluation

These levels are in hierarchical order, knowledge being the simplest and evaluation is the most advanced.

Inyang (2012) came-up with words that are associated with each of the level outlined below:

knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
define	compare	apply	analyse	combine	judge
select	distinguish	solve	separate	create	evaluate
list	Explain	construct	resolve	design	recognize
identify	predict	charge	inter	construct	identify
name	translate	relate	determine	suggest	Apprais

SELF-ASSESSMENT EXERCISE

Mention the 6 levels of objectives in the cognitive domain as postulated by Bloom *et al* (1971).

3.2 Steps in Constructing Blue Print

To construct a blue print in Integrated Science, the following steps suggested by Oyarekhu 2007 may be found useful:

- State the subject e.g. Integrated Science
- State the number of topics or content areas to be tested
- Indicate how many test items will be set in each topic
- Assign items to each cell
- Importance or weighting attached to each topic depends on the amount of content in it

SELF-ASSESSMENT EXERCISE

Outline the five stages/steps

3.3 Constructing the Blue Print

The table of specification is a 2-dimensional table designed to guide you in the distribution of your examination questions. At one side of the table are content areas, covered in the class. At the other side of the table are the six levels of cognitive domain. The small boxes or squares of the table are for you to indicate the number of items to be drawn. See the illustration in Table 1

Table 1: Table of specification for 30 Test Items in Integrated Science

Content	knowledge	Understand	Application	Analysis	synthesis	evaluate	Total
Area	Level	Level	Level	Level	Level	Level	
Pollution	3	2	1	1	1	1	9
ecosystem	2	2	2	1	2	2	11
Energy	3	2	2	2	1	1	11
Total	8	6	5	4	4	4	33

SELF-ASSESSMENT EXERCISE

Draw a Blue Print of 40 objective items in Integrated Science

4.0 CONCLUSION

Table of specification or Blue Print is a guide to proper distribution of test items across the six levels of educational objectives. If it is done properly, it enables even distribution of test items across the levels of educational objectives.

5.0 SUMMARY

Table of specification or Blue Print is a two-deminsional chart that shows behaviours (horizontal dimension) and content (vertical dimension). It is very useful to the Integrated Science teacher as it guides the weighting of test items in relation to course objectives. A good and carefully constructed table of specification is used in developing test items during semester or terminal examination.

6.0 TUTOR-MARKED ASSIGNMENT

i. Draw a table of specification for 20 objective items in Integrated Science using JSS 2 topics.
ii. List the six levels of educational objectives in the cognitive domain.

7.0 REFERENCES/FURTHER READING

Bloom, B. S. Hastings J.T & Maudus G.F. (1971). Handbook on formative and Summative Evaluations of Student Learning. New York McGraw Book Co. Ltd.

Inyang, E. U. (2012). Perspective of Appropriate Assessment of Cognitive Behaviours in STME, 31st Inaugural Lecturer of University of Uyo, Nigeria April 5.

MODULE 2 CONSTRUCTING ASSESSMENT TOOLS

UNIT 1 GUIDELINES TO TEST CONSTRUCTION

CONTENTS

1.0 INTRODUCTION

In unit 5 of the last Module, you have learned the technique of making Blue Print or Table of specification which is pre-requisite to item construction. In this Unit, you will learn the guidelines to test construction that the Integrated Science teacher is expected to follow when making test items. The unit will also introduce you to procedures of constructing test items.

2.0 OBJECTIVES

After learning this unit, you should be able to:

- explain the various types of test
- enumerate atleast 5 guidelines to test construction
- construct some test items in Integrated Science

3.0 MAIN CONTENT

3.1 Types of Tests in the Cognitive Domain

There are two broad groups of tests. Oyarekhua (2007) described them as (i) achievement tests and (ii) aptitude tests.

i. Achievement tests measure what students have learned in form of knowledge and skills after a given instruction. This is the most familiar type of test, administered to students as a terminal examination, NECO/WAEC examination and C.A. tests.
ii. Aptitude Test. This type of test measures the potential ability of candidate with respect to certain traits or aptitude. They are often used to select candidates in special profession such as space science, military, nursing, piloting and engineering.

SELF-ASSESSMENT EXERCISE

Describe the two types of tests in the cognitive domain

3.2 Types of Tests in the Affective Domain

The affective domain deals with measures of personality that are categorized into three broad areas, viz; (i) interest (ii) attitude and (iii) temperament. Researchers in Education have made efforts to construct tools that measure personality traits in the affective domain, such as observation, interviews, questionnaire and sociometry.

SELF-ASSESSMENT EXERCISE

Mention 3 tools that can be used to assess behaviours in psychomotor domain

3.3 Guidelines to Test Construction

While constructing test items, the following guidelines may be found useful:

- Make instructions clear, precise and free from ambiguity
- Avoid the use of double negatives in your test items, as students become confused.
- Use straight forward language, precise and free from ambiguity. Let the vocabulary used in constructing the item be within the level of the target audience.
- Construct more items than you actually need so that you have choice of items to select in the final instrument.

- Specify the marks to be earned for each question to enable the candidate give details relative to the marks to be earned.
- Construct your items wisely such that one question does not give hint or due to the other question unwittingly.
- Remember to give the time frame for the paper, the course code and the credit units to be earned. All these should be reflected on the test

SELF-ASSESSMENT EXERCISE

Enumerate any 5 considerations that the Integrated Science teacher should make while constructing examination items

4.0 CONCLUSION

Achievement tests and aptitude tests are used to assess behaviours in cognitive domain. Observation, interviews and sociometry are tools to assess personality traits in the affective domain, while checklists and observations are tools that are used to assess psychomotor traits.

5.0 SUMMARY

To construct tests items satisfactorily, the Integrated Science teacher has to be guided by many considerations, some of which include the following:

- Language use should be simple, clear, precise and within the vocabulary level of the target audience
- Items should be independent from each other such that one item does not give due or hint on the other unwittingly
- Time frame, course code, level and credit units to be earned should be clearly stated on the paper.

6.0 TUTOR-MARKED ASSIGNMENT

i. Name one tool each that can be sued to assess behaviours in cognitive, affective and psychomotor domains.
ii. Suggest two considerations for the Integrated Science teacher to construct test items.

7.0 REFERENCES/FURTHER READING

Science Teacher's Handbook (19860 London Hutchinson.

UNIT 2 CONSTRUCTING OBJECTIVE ITEMS

CONTENTS

1.0 INTRODUCTION

In unit 1, you have learned the guidelines for constructing test items. you have also learned the types of tools appropriate for assessing behavior in each domain. The focus of this unit is to teach you how to construct objective items as well as the characteristic features of objective items

2.0 OBJECTIVES

After studying this unit, you should be able to:

- Outline features of objective items
- Types or varieties of objective items
- List the advantages and shortcomings of objective items
- Study samples of objective items

3.0 MAIN CONTENT

3.1 Features of Objectives Items

Objective Test sometimes called multiple choice items, it is a test in which response is limited to only one word or phrase. Objective items have the following features:

- The stem
- The options
- The key
- The Distractors

- The stem: This is the initial or introductory part of the question in which the task is set out. It may be a question, direction an incomplete statement or a diagram (Inyang 2012).
- Options. These are the responses usually lettered A – D. they are also called choices or alternatives
- Key: This is the correct answer
- Distractors: These are wrong responses carefully selected to distract or confuse candidates.

SELF-ASSESSMENT EXERCISE

Define objective type of test and give 5 of its characteristics

3.2 Guidelines for constructing objective Test

Several researchers notably Yoloye (1968), Tittle and Millev (1976) and Inyang (2012) have come up with guidelines for constructing objective items. Such guidelines are outlined as follows:

a. The Stem:

i. Must indicate the task being set,
ii. Must be comprehensive enough
iii. Must not use negative statements too often
iv. Test only one central idea

b. The Options:

i. Must contain alternatives in a systematic order
ii. Make alternative responses mutually exclusive
iii. Must be stated in free, precise and clear terms
iv. Options should be comparable in length and mode of expression
v. Be careful in using the response "None of the above" and "All of the above"

c. The Key:

i. Every item must bear only one right answer
ii. The right answers must be distributed evenly among the alternative positions in a random order.

SELF-ASSESSMENT EXERCISE

Suggest any 3 guidelines for the Integrated Science teacher to construct objective items

3.3 Merits and Shortcomings of Objective Tests

Objective items have the following merits

- They are easy to mark
- They have wide scope of application
- It enable students build broad background knowledge
- Measures knowledge/facts efficiently

On the other hand, objective tests have the following disadvantages

- Difficult to construct
- Candidate cannot express their answers freely
- Gives room for guess work among candidates

SELF-ASSESSMENT EVALUATION

Mention two merits and two shortcomings of objective Tests

3.4 Varieties of Objective Tests

a. Completion Items

This is characterized by the presence of a blank space either at the beginning, at the middle or at the end of the statement, and the candidate is expected to complete the space with a right response. See sample below:

i. The planet Jupiter has …….. moons going round it
ii. …….. it the ultimate source of energy in any ecosystem
iii. Present day human being is called …….

b. True or False Items

i. Wind energy can be converted to electrical _____
ii. Arthropods have 6 legs and compound eyes _____
iii. Acid turns blue litmus paper red _____

c. Multiple choice Items

i. Which of the following statements best define matter
   a. It occupies space and energy
   b. It has energy and matter
   c. It is found every where
   d. It has weight and occupies space

ii. Which of the following organisms is not a reptile?
   a. Snake
   b. Dolphin

c. Lizard
d. Crocodile

iii. Identify the odd man out from the following:
a. Respiration
b. Digestion
c. Circulation
d. Hibernation

d. Matching Type

Study the concepts in Group A and Match them appropriately with those in Group B

A	B
Acid	Sinking
Thermometer	Snail
Annelida	Base
Floating	Temperature
Taenia saginata	Beef

e. Arrange the following animals in their ascending order of evolutionary trends

1 Dog, II Fish, III Bird, IV Lizard
A. IV, III, II, I
B. III, II, V, IV
C. II, I, III, IV
D. I, IV, II, III

4.0 CONCLUSION

Objective Tests are limited to only one word or phase and the responses are similarly restricted. They are generally used to measure knowledge and facts in the cognitive domain. They have many merits and demerits. The Science Teacher should carefully select and use them wisely.

5.0 SUMMARY

There are many guidelines for constructing objective items. the stem, the options and the key are the components of objective items. the Integrated Science teacher should wisely construct objective tests and use them to assess the behavior of his students.

6.0 TUTOR-MARKED ASSIGNMENT

Construct any 3 types of objective items to assess your students using the topics (i) Pollution (ii) 3 states of matter (iii) metals

7.0 REFERENCES/FURTHER READING

Inyang E. U. (2012) Perspectives of Appropriate Assessment of cognitive behaviours in STME. The 31st Inaugural lecture of the University of Uyo, April 5.

Tittle, C. K. and Miller K. M. (1976) Assessing Attainment Independent Assessment Centre, London.

Yoloye, E. A. (1968) Objective Testing, Journal of STAN, Vol. 7. No. 3

UNIT 3 CONSTRUCTING ESSAY ITEMS

CONTENTS

1.0 INTRODUCTION

In the last unit, you learned about objective tests, their features, their merits and demerits as well as they can be constructed satisfactorily by the Integrated Science teacher. In this unit, you will be introduced to Essay Tests, their features, merits and demerits and how you can construct them satisfactorily. You will also see varieties of Essay items for you to reflect.

2.0 OBJECTIVES

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

- list the features of Essay questions
- identify 3 merits and 3 demerits of Essay item
- construct Essay items and IJMB freely

3.0 MAIN CONTENT

3.1 Features of Essay Tests

Essay test is a tool or an instrument in which candidates freely respond to question and organize their answers in their own styles. They are frequently used by the Integrated Science teacher to assess behaviours in cognitive domain.

Essay Tests have the following features.

1. They are easy to construct by the teacher
2. Candidates express themselves freely

3. Has narrow coverage, covers only a small field of knowledge
4. Encourages to organize and express their ideas
5. Needs high level of reasoning that may lead to inference
6. It is time consuming and very subjective
7. Essay are easy to set by difficult to assess

SELF-ASSESSMENT EXERCISE

1) What are features of Essay examination?
2) List any 3 merits of Essay Tests

3.2 Guidelines to constructing Essay Tests

i. Construct a Blue print carefully as a guide
ii. Try to aim at high level of reasoning
iii. Advanced students would like free Essay item to develop their ideology/tradition
iv. Prepare a good marking scheme
v. Provide sufficient time for the test
vi. Give clear information/instructions to candidates
vii. Provide ample time for writing and thinking processes
viii. No ambiguous questions

SELF-ASSESSMENT EXERCISE

Name any 3 merits and 3 demerits of Essay tests

3.3 Merits and Shortcomings of Essay Tests

Essay tests have several advantages and shortcomings. The advantages are:

1. It is easy to construct by the Integrated Science teacher
2. It is very familiar to students
3. Candidates are not restricted in giving their answers
4. It enhances high level of reasoning and organization of answers in a logical sequence
5. It is applicable for both infant and advanced students
6. It gives no room for guess work

SELF-ASSESSMENT EXERCISE

List any 3 merits of essay tests

The shortcomings of the essay test are:

- It is time-consuming in marking
- It is more suitable to advanced students
- It is very subjective
- Does not measure factual information efficiently

SELF-ASSESSMENT EXERCISE

Enumerate any 3 shortcomings of Essay tests

3.4 Guidelines for constructing Essay Tests

The following guidelines are suggested for the Integrated Science teacher while constructing Essay Tests (Oyarekhua 2007)

1. Construct a Blue Print to guide distribution of test items to the 6 levels of cognitive domain
2. Use essay questions to test higher levels of cognitive behavior such as Synthesis, Analysis and Application
3. Questions should precise, clear and free from ambiguity
4. Prepare a good marking scheme as you are setting the essay questions
5. Give precise and clear instructions to the candidates

SELF-ASSESSMENT EXERCISE

Give any 3 guidelines to constructing essay question

3.5 Preparation of Marking Scheme

When constructing essay tests, marking scheme should also be prepared at the sometime.

a. Stick to the instruction and rubrics of the examination to ensure
b. Points must be factual, in relation to the question being answered
c. Marking scheme should be comprehensive enough
d. Use the marking scheme strictly to mark the students answers

SELF-ASSESSMENT EXERCISE

Explain the importance of marking scheme

4.0 CONCLUSION

Essay questions give candidates freedom to express themselves and organize their answers logically. They are easy to construct but difficult to mark. Essay Tests are more familiar to students.

5.0 SUMMARY

In this unit, you have learned that Essay Tests are the familiar tools used in assessing cognitive behavior. It has many merits and shortcomings. It is easy to construct but time-consuming in marking. At the time of preparing the items, marking scheme should also be prepared to enhance objective marking. The Integrated Science teacher is advised to use the marking scheme strictly to enhance objective assessment.

6.0 TUTOR-MARKED ASSIGNMENT

7.0 REFERENCES/FURTHER READING

Oyarekhua, H. (2007). A Training Manuals for Teachers. Gabson printers Ventures, Minna.

UNIT 4 MAKING TEACHER-MADE TESTS VALID AND RELIABLE

CONTENTS

1.0 INTRODUCTION

It is one thing for the Integrated Science teacher to construct assessment tools to assess his students. It is quite another thing to make the teacher-made tests valid, reliable, fair and accurate to enhance objective assessment of students learning.

This unit will introduce you to the measures or techniques of improving the quality and accuracy of teacher-made assessment tools.

2.0 OBJECTIVES

After learning the contents of this unit, you should be able to:

- explain the meaning of validity of instrument
- define the concept reliability of instrument
- explain the concept fairness of instrument
- describe how test items can be made reliable

3.0 MAIN CONTENT

3.1 Validity of Test Instruments

Teacher-made tests are not valid and acceptable unless some effort is made on them to enhance their quality. One of such efforts is validating the instrument. By validating, it means the instrument is taken to experts or specialists in language, methodology, content and statistics

and request them to vet the instrument under the terms of reference served to them. When this done, the tool or instrument is re-written in the light of the corrections by the experts. The instrument is now valid.

SELF-ASSESSMENT EXERCISE

1) Explain the meaning of validity of an instrument
2) Discuss how an instrument is made valid

3.2 Reliability of Teacher-made-Tests

A reliable instrument repeatedly measures traits with the same accuracy. To achieve this, the test is administered twice and the two results are correlated. The degree of the correlation coefficient (r-value) determines the reliability of the tool.

SELF-ASSESSMENT EXERCISE

1) Explain the meaning of reliability of a tool
2) Explain how reliability of an instrument is determined

3.3 Enhancing the fairness of an Instrument

Assessments should not only be reliable and valid, but also fair (NTI Kaduna 2014). Assessment is fair when all testees have equal chance to learn and demonstrate their knowledge and skill. An instrument is fair when appropriate learning goals are developed, appropriate content taught to the students and appropriate instrument used to measure achievement.

SELF-ASSESSMENT EXERCISE

Explain the meaning of fairness of an instrument tool

3.4 Accuracy of Test Instrument

A true tests should give a true picture of the ability of the learner. Good pupils should pass and weak students should fail (NTI 2014). Thus a good test must represent the objectives of the lesson. Tests should be based on the stated objectives for the lesson. If the objective is mastery of some skills, the tests should not be testing only knowledge (NTI 2014).

SELF-ASSESSMENT EXERCISE

Explain the concept “Accuracy of a tool”

4.0 CONCLUSION

Fruitful academic activities in schools lead to permanent and meaningful learning. Meaningful learning is measured using good and reliable instruments. When efforts are made on teacher-made instruments, they become valid, reliable accurate and fair.

5.0 SUMMARY

In this unit, an attempt is made to explain certain efforts that are made to make teacher-made tests valid, reliable, accurate and fair. Validity of a test is established by sending the instrument to experts or specialists to vet the instrument with regard to language, content, methodology and statistics. The instrument is further pilotested to calculate its reliability coefficient i.e. its r-value. All these interventions are to make the instrument accurate and dependable.

6.0 TUTOR-MARKED ASSIGNMENT

Briefly explain the concepts validity, reliability and fairness of an instrument.

7.0 REFERENCES/FURTHER READING

National Teachers Institute, (2014) Effective Classroom Management Skills: Manual for the Re-training of Primary School Teachers MDGs Project, Kaduna.

MODULE 3 CONTINUOUS ASSESSMENT AND RECORD KEEPING

UNIT 1 RETIONALE FOR CONTINUOUS ASSESSMENT

CONTENTS

1.0 INTRODUCTION

In the last unit of Module 2, you have learned several ways teacher-made tests can be enhanced and improved to become valid and reliable. In this unit our focus is on continuous assessment. Specifically, you will learn the shortcomings of one-shot system of assessment and the rationale of continuous assessment.

2.0 OBJECTIVES

After studying this unit, you should be able to:

- explain the weaknesses of one-shot system of assessment
- define the concept of continuous assessment
- outline the rationale of continuous assessment

3.0 MAIN CONTENT

3.1 One-shot System of Assessment

In the recent past, the system of assessment in Education in Nigeria was the one-shot assessment, known as the "examination only" method. In this system student's assessment was determined by one sectional examination. In this system, if a student fails the only sectional exam at the end of the session, he takes a resit. If he fails the resit exam he repeats the session, and finally is withdrawn from the school.
This "examination only" method had the following weaknesses.

1. The system encouraged exam malpractice
2. School dropout was very rampant
3. Massive failure at end of each session
4. It was threatening to students
5. Best candidates may not perform well due to one obstacle or another

Against this background, the continuous assessment system was introduced to replaced the one-shot, or the examination only system.

SELF-ASSESSMENT EXERCISE

Described the "Examination only" method of Educational assessment in Nigeria

3.2 Continuous Assessment Define

Continuous assessment is defined by Inyang (2012) as "a system of assessment which advocates a properly monitored educational progress of an individual through his school career and which bases his final result on aggregate of the separate assessments made during the course. Such assessment involves the use of a great variety or modes of evaluationfor the purpose of guiding and improving the learning and performances of the student.

SELF-ASSESSMENT EXERCISE

1) What is continuous assessment?
2) Compare continuous assessment with the one-shot examination system.

3.3 Rationale for Continuous Assessment

The following reasons or rationale are in favour of continuous assessment, according to Oyanekhua (2007):

i. Continuous assessment motivates pupils and encouraged students to perform better
ii. Data from CA is formative for both the pupil and the learner
iii. CA is learner-friendly, not threatening to students
iv. The teacher can modify his teaching habits. Pupils interact more with the teacher in CA system
v. The teacher may become more innovative and scientific in writing test items very frequently under the CA system
vi. CA gives an indication of a pupils readiness to learn new material
vii. The school and the teacher have the opportunity of contributing to the final examination for the award of a certificate at all levels.

SELF-ASSESSMENT EXERCISE

Give 5 reasons why CA system is better than one-shot examination system

4.0 CONCLUSION

Assessment and evaluation is an integral part of the Integrated Science we teach. Modes of assessment differ in effectiveness, some are more effective than others. Continuous assessment appears better and more effective than examination only mode of assessment.

5.0 SUMMARY

In this unit you have learned that in the recent past, one-shot examination was the mode of assessing students academic activities in Nigeria. This system had many shortcomings such as examination malpractice, students dropout of school and threatening to students. Later, the continuous assessment was introduced to replace the former system. The CA is student-friendly, more comprehensive and cumulative assessment and generally more accurate and reliable assessment of the students we teach.

6.0 TUTOR-MARKED ASSIGNMENT

Compare and contrast the one-shot examination system and the continuous system of assessment.

7.0 REFERENCES/FURTHER READINGS

Inyang, E. U. (2012) Perspective of Appropriate Assessment of Cognitive Behaviour in STME: The 31st Inaugural Lecture of the University of Uyo, 5th April.

Oyrekhua H. (2007) A Training Manual for Teachers. Gabson printers Ventures, Minna, Nigeria.

UNIT 2 CONTINUOUS ASSESSMENT AT A GLANCE

CONTENTS

1.0 INTRODUCTION

In nut 5 of Module 2, you have been introduced to steps that are taken to make teacher-made tests valid, reliable and accurate to enhance the quality of assessment. The focus of this unit is to introduce you to continuous assessment, a process that is pivotal to pupils assessment in the Nigerian Educational System. The unit will discuss features of continuous assessment and the challenges that faces the scheme.

2.0 OBJECTIVES

After studying this unit, you should be able to:

- explain the rationale of continuous assessment
- explain the features of continuous assessment
- outline the challenges facing continuous assessment

3.0 MAIN CONTENT

3.1 Meaning of Continuous Assessment

The Concept continuous assessment has been defined by the Federal Ministry of Education, Science and Technology as a mechanism whereby final grading of a pupil in the cognitive affective and psychomotor domains of behavior systematically takes account of all his performances during a given period of schooling (FMEST 1985). It includes any activity used to appraise pupils' performance. It refers to techniques one can use to monitor progress in terms of specific learning outcomes (Oyarekhua 2007).

SELF- ASSESSMENT EXERCISE

Explain in your own words the meaning of continuous assessment

3.2 Features of Continuous Assessment

Oyarekhua (2007) described continuous assessment as systematic, comprehensive, cumulative and guidance-oriented.

- Systematic nature of CA makes it uniform across the country. The Federal Ministry of Education Guidelines on Uniform Standards in Education provides for a committee on CA in every school. The committee is to monitor the method of assessment and ensure that all-round assessment is carried out in a laid down procedures and rules.
- Comprehensive nature of CA means that pupils' performance in cognitive, affective and psychomotor domains are adequately recorded using tests, projects, assignments, notebook and observation.
- Cumulative nature of CA means all assessments made by the class teacher are adequately and cumulatively recorded for each pupil.
- Guidance oriented nature of CA means information generated on each pupil will be used to guide the pupils' development. This includes placement, promotion, remedial work, subject combination for later studies and records on personality traits and psychomotor capability.

SELF-ASSESSMENT EXERCISE

1) Mention the four features of continuous assessment.
2) Explain in you won words the meaning of guidance-oriented nature of continuous assessment.

3.3 Challenges Facing Continuous Assessment

Needless to say, continuous assessment process is a good innovation in Nigeria. It is a very good policy which is properly implemented will be a giant stride, a milestone in Nigerian educational system. However, the policy is not hitch-free. There are obvious challenges that include the following:

- Lack of adequate record keeping in schools
- Lack of sufficient funds for schools to keep the system going
- Supervision by such functionaries as Head of Department, Vice-Principals, Guidance and Counsellors are not adequate.

- Accuracy and uniformity of records and procedures vary from school to school
- Record storage facilities are not adequate in schools
- Teachers are not properly trained in conducting CA, this may lead to subjective assessment of traits
- The CA scheme need ample supply to stationery to schools, but this is hardly provided.

These are some of the major challenges facing C.A. scheme in Nigeria. All hands must be on deck to remove the obstacles. The Federal Ministry of Education, The State Ministry of Education, The Local Educational Authority (LEA), The Parents Teachers Association, The NGO, the wealthy Nigerian and the common man, all stakeholders in Education must contribute to make the CA scheme a success.

4.0 CONCLUSION

The continuous Assessment Scheme is a loudable innovation in Education. It is designed to give overall, all-round assessment of pupils not only comprehensively but also cumulatively. It is however not hitch-free, there are challenges.

5.0 SUMMARY

In this unit, an attempt is made to introduce you to the concept of continuous assessment, an activity used to appraise pupils' performance in cognitive, affective and psychomotor domains not only comprehensively but also cumulatively. The innovation is worthwhile but has many challenges. Inadequate supplies of stationery, lack of funds, ill-trained teachers, lack of record keeping culture and inadequate supervision are among the challenges. All hands must be on deck to make the scheme a success.

6.0 TUTOR-MARKED ASSIGNMENT

7.0 REFERENCES/FURTHER READING

Inyang, E. U. (2012) Perspective of Appropriate Assessment of Cognitive Behaviour in STME: The 31st Inaugural Lecture of the University of Uyo, 5th April.

Oyrekhua H. (2007) A Training Manual for Teachers. Gabson printers Ventures, Minna, Nigeria.

UNIT 3 SCHOOL RECORDS AT A GLANCE

CONTENTS

1.0 INTRODUCTION

In unit, you have learned the concept of continuous assessment, its features and challenges. In this unit, you will learn what conventional school records are, purposes of keeping them and their maintenance. School records are essential and central to successful continuous assessment system expected of good Integrated Science teacher.

2.0 OBJECTIVES

After learning this unit, you should be able to:

- define school records
- name some assorted types of school record
- mention purposes of record keeping
- explain how to maintain school records

3.0 MAIN CONTENT

3.1 School Record Defined

Records are those documents carrying essential data or information for effective palling and administration of education and effective resource management. The Integrated Science teacher is expected to know what records are, purpose of keeping them, how to keep them, how to retrieve them and how to maintain them (NTI 2014).

3.2 Assorted Types Of School Records

It is necessary for the Integrated Science teacher to keep and be familiar with the following school records:

- Term Continuous Assessment Report
- Weekly Monitoring CA record
- Class Attendance Register
- Scheme of Work Diary
- Students Report Booklet
- The Calss Notebook
- Guidance and Counselling Register
- Visitors' Book (Principal)
- Weedly Report Form
- Daily Lesson Plan Book
- Students' Academic Records
- Anecolotal Record Book
- School PTA File
- School laboratory Record/Inventory
- Students' Confidential Records

SELF-ASSESSMENT EXERCISE

1) What are records?
2) Name any 5 records that are kept in Schools

3.3 Purposes of Keeping Records

Records are kept in the school to serve many purposes. The NTI Kaduna (2014) enumerated the following 8 purposes or functions of School Records

- Provide necessary information or date for decision and policy making, for researchers, for employers of labour, for guidance and counselling purposes.
- Enable teachers to have the necessary information to guide the pupils, morally socially and academically
- Save the school from unnecessary embarrassment and legal threats
- Give direction to the overall development of the school
- Are used to measure the progress of individual children in literacy, numeracy and life skills and to provide further assistance to the child'
- help in assessing the influence of family history on the general behavior and performance of the child

- help in case of transfer of children from one school to another
- meet or comply with the requirement of the law

SELF-ASSESSMENT EXERCISE

1) What are the conventional school records?
2) Enumerate any five purposes or functions of school records.

3.4 Maintenance of School Records

It is one thing for the school to have records, it is quite another thing for the school to maintain such records and derive benefits from them. School record should be properly kept and maintained in such a way that they are readily available on demand. Maintenance of school records can be done through the following ways:

- File the records in cabinets, carefully arranged
- Use drawers and shelves
- A lot of records nowadays can be stored in computers
- School records can also be stored in audio and video cassettes
- Do not mutilate records
- Keep confidential records secret
- Periodically clean or dust records to keep them clean and prevent them from being damaged by termites, insects and rats (NTI, 2014)

SELF-ASSESSMENT EXERCISE

Explain briefly 5 ways of maintaining school records

4.0 CONCLUSION

School records are vital documents containing essential information or date that are useful to school and the larger society. Such records are many, some are kept by the science teacher others by the principal. Either way, they should be properly kept in cabinets, shelves and computers. The more accurate our records are, the more successful our continuous assessment become.

5.0 SUMMARY

School records are those documents kept by the school. They carry essential information or data that are useful to policy and decision makers, the researcher the staff and students of the school. Good record

keeping enhances academic activity in schools and facilitates continuous assessment practice.

School records should be properly maintained through proper filing in cabinet, dusting them periodically and made readily available on request.

6.0 TUTOR-MARKED ASSIGNMENT

i. Name any 5 School records that you know.
ii. Explain briefly the purposes of school records.

7.0 REFERENCES/FURTHER READING

National Teachers' Institute, Kaduna (2014) Manual for Re-Training of Primary School Teachers. MDGs project.

UNIT 4 LEGAL BASIS OF SCHOOL RECORDS

CONTENTS

1.0 INTRODUCTION

In unit 3, you have learned what the school records are, purposes of keeping them and how they should be properly maintained by the Integrated Science teacher. The focus of this unit is to examine the legal basis or implications of School Records Keeping. The unit also introduces you to the challenges associated with record keeping for the Integrated Science teacher to note.

2.0 OBJECTIVES

After studying this unit, you should be able to:

- mention types of school records
- enumerate 5 qualities of school records
- discuss the legal implications of School Records
- outline the challenges of Record Keeping

3.0 MAIN CONTENT

3.1 Types of School Records

In the last unit, 15 different types of school records have been outlined. These school records are broadly categorized into two groups, by NTI (2014) as follows:

- Statutory, mandatory or obligatory record. These are records that are required kept by the law.

- Non-statutory, non-mandatory and non-obligatory. These are records that are not necessarily required by law but are kept for effective and efficient operation of the school system.

SELF-ASSESSMENT EXERCISE

Distinguish between statutory and non-statutory records.

3.2 Qualities of a Good Record

Good records are characterized by several attributes or qualities. According to NTI (2014) such attributes include the following:

- Good records must:
  a) provide easy storage and retrieval
  b) be easily understood based on common knowledge
  c) be easy to locate and available for reference at any time it is required
  d) give detailed information about events or activities
  e) be able to generate further information
  f) be used to take appropriate action on what it is collected

3.3 Legal Basis of School Records

There are Several Education Laws which enforce and regulate keeping school records Failure to keep such records leads to legal implications of which NTI (2014) reported seven, outlined below:

- Education law demands that certain school records be kept in schools, if such records are not kept by schools, the school is violating the education law.
- Every child in the school has the legal right to have his personal records in the school as a mark of having passes out or having attended that school.
- The constitution of the Federal Republic of Nigeria states that the keeping of school records is one of the multi-various activities of the school, therefore, it has to be maintained.
- The academic records of pupils must be completed and kept thoroughly. Accuracy is important as detected mistakes can be taken up by the pupils and litigation may follow incases which are serious.
- Keeping of such records as the attendance register can save the school from the law of liability which connotes that the school can be held liable for any injury sustained inflicted or otherwise experienced by the learner during the school hours.

- Proper record keeping in schools help in challenging cases of forged certificates by learners or schools before the law courts.
- It is mandatory for teachers to have copies of the National Policy on Education with them since ignorance is no excuse in law.

SELF-ASSESSMENT EXERCISE

1) Why is it mandatory for all teachers to have copies of National Policy on Education?
2) State any 3 legal implications of record keeping by the school.

3.4 Difficulties in Keeping Records

Current and accurate records are not always available in some schools. There are many difficulties that hinder record keeping in school both by the Integrated Science teacher or the principal. Such difficulties include the following:

- No adequate storage facilities in many schools
- Inadequate supplies of School Records by the government
- Staff not properly trained in record keeping and retrieval
- False data from unreliable sources
- Wrong entries of data in documents

SELF-ASSESSMENT EXERCISE

State any 3 difficulties in keeping records in Schools?

4.0 CONCLUSION

School Records are very important source of information and data for policy and decision making. Government enacts several laws enforcing accurate record keeping in Schools. Failure by the school to keep mandatory records has legal implications that may lead to legal case.

5.0 SUMMARY

Education laws in Nigeria demand that certain School records must be kept in schools. Academic records of pupils must be accurately recorded and kept as each child has a legal right to his personal record in the school he attended. Confidential records on all students who attended schools should be kept handy and made available to students on request.

Several challenges or difficulties hinder accurate record keeping in schools. These include: false data from unreliable sources, lack of

adequate storage facilities and untrained personnel handling school records.

6.0 TUTOR-MARKED ASSIGNMENT

Write any 5 difficulties or challenges in keeping records accurately by the schools.

7.0 REFERENCES/FURTHER READINGS

National Teachers Institute (2014) Manual for the Re-Training of Primary School Teachers. MDGs project.

UNIT 5 EVALUATION OF OTHER COMPONENTS OF THE INTEGRATED SCIENCE CURRICULUM

CONTENTS

1.0 INTRODUCTION

In virtually all the units outlined above, the emphasis is on assessing the students' performance in cognitive, affective and psychomotor domains, assessment tools and continuous assessment. The focus of this unit is to examine other components of the curriculum, notably the content, the teacher, the instructional method and materials. All these components are equally important to us.

2.0 OBJECTIVES

After learning this unit, you should be able to:

- give reasons for evaluating the curriculum
- explain ways to evaluate teacher competence
- explain the need to evaluate teaching method
- suggest ways to evaluate instructional materials

3.0 MAIN CONTENT

3.1 Evaluating the Curriculum

The curriculum is the total learning experiences that are given to students via the agency of the school. Thus the Integrated Science Curriculum consists of all educational activities from the Registration of student to his graduation. The content of the curriculum i.e. the knowledge and skill components have to be evaluated after every 5

years. This is because knowledge becomes absolute with time. Thus after every 5 years, the curriculum should be reviewed and up-dated.

SELF-ASSESSMENT EXERCISE

1) Define the concept curriculum.
2) Why is it necessary to evaluate content?

3.2 Evaluating Teacher Competence

Of all the factors that influence the quality of an educational programme, the teacher factor is perhaps the most important. This is so because a well-trained and competent teacher can manage and make use of a poor curriculum to benefit his students. It is therefore pertinent that teacher competence should also be evaluated. This can be done through Re-Training workshops, seminars, and refresher courses. Feedback from the students taught can be used to evaluate the teacher

SELF-ASSESSMENT EXERCISE

Discuss the rationale for evaluating teacher competence.

3.3 Evaluating Instructional Methods

Instructional strategies used by teachers have different effects on students' achievement. Those teaching strategies that are learner-centred and constructivist in nature tend to bring more fruitful learning among students. It is therefore pertinent that those teaching strategies that bring better students performance should be emphasized in our daily teaching.

SELF-ASSESSMENT EXERCISE

Explain the rationale of evaluating the teaching strategies teachers use to teach their students.

3.4 Evaluating Instructional Materials

Instructional materials are also shown empirically to influence students' performance. And educational innovations result in more concrete, fruitful and effective facilities that enhance better learning among students. It is therefore necessary to also evaluate the instructional materials teachers use with a view to modifying them.

SELF-ASSESSMENT EXERCISE

Give reasons for evaluating instructional materials.

4.0 CONCLUSION

It is one thing to assess and evaluate students' performance in Integrated Science. It is quite another thing to evaluate all other components of the curriculum, notably the contents, the skills, teachers and materials.

5.0 SUMMARY

Evaluation of educational endeavour should be a routine process involving all aspects or components of the curriculum. A period or interval of about 5 years should be used to review educational programmes. This to accommodate new knowledge, new skills, new processes and new thinking. Thus, the teacher, the methodology and the instructional materials all should be evaluated regularly.

6.0 TUTOR-MARKED ASSIGNMENT

Explain the rationale behind total evaluation of curriculum after every 5 years.

7.0 REFERENCES/FURTHER READINGS

Bichi, S. S. (1989) Teaching Primary Science through Problem Solving in Nigeria Unpublished AKC Thesis, University of London, UK.