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TOWARDS ACHIEVING A VALID TEACHER'S MARK IN THE CONTINUOUS ASSESSMENT OF SECONDARY SCHOOL STUDENTS

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ABSTRACT

This paper reviews the teacher's mark with an aim of enhancing its validity, vis-a-vis its elevated position in the certification of students in Junior and Senior Secondary Schools. Some of the factors militating against the validity of the teacher's mark and the implications of the resulting non-valid marks are highlighted. The background for emphasising the use of a table of specification and marking scheme in the periodic testing of students are discussed. Practical guides for making the table of specification and marking scheme for both essay and objective tests are presented.

Introduction

The practice of continuous assessment has brought an onerous but worthy task to teachers.One of the various aspects of this practice is regular testing of students which involves the award of marks as a means of quantifying student's achievement. This aspect has elevated the worth of marks awarded by classroom teachers (as internal examiners) since such marks now form part of the overall grade of the student in any subject at the junior secondary school level.

To portray the extent of this contribution, the following weights are suggested for combining school assessment with score on final examinations at the end of the Junior and Senior Secondary School level(FME, 1985):

Junior Secondary School level

First Year	Second Year	Third Year	Final Exam. (State)
10%	20%	30%	40%

Senior Secondary School level

First Year	Second Year	Third Year	Final Exam.(WASCE)
10%	20%	30%	40%

This policy calls for valid or reliable scores from teachers. Consequently several writers (Falayojo (1984), Ezewu and Okoye (1981), Bajah (1984), Nwigwe (1983), and Ohuche (1988), have addressed the issue of continuous assessment with particular reference to preparation of assessment instruments, treatment and recording of marks.

This paper focuses on the practical aspects of testing which will yield valid teacher's mark in both essay and objective aspects of cognitive assessment. A discussion of the importance of a teacher's mark and the factors which affect it are presented.

The Valid Mark

The commonest definition of validity is epitomized by the question -“Are we measuring what we think we are measuring." Relating this to test scores, one could ask -"To what extent are test scores representative of students' actual performance in tests? The aspect of validity which is necessarily considered in an achievement test is content validity. This involves essentially the systematic examination of the test content to determine whether it covers a representative sample of behaviour domain to be measured. A test can be adequately valid as an assessment instrument, but its use could make the resulting scores not valid. Hence Anastasi (1976) stated a further application of content validity, which is to ascertain that test performances are reasonably free from influence of irrelevant variables. The test performance, measured by the raw score given by the teacher, obtained through appropriate procedures of marking students' responses to a valid test, and reasonably free from extraneous variables, constitutes a valid score. If the raw score given by the teacher is not valid, every other treatment based on it does not portray reality. Therefore this raw score which portrays reality is regarded as "the valid teacher's mark."

The teacher's mark is much more than letter grades and numbers which of necessity must be supplied, to fill the records and fulfill the required task of assessment. The classroom teacher faces the difficulty of surmounting the problem of marking in our present educational system. The teaming class population, vis-a-vis, the tight programmes of teachers such as sandwich schooling here and there poses a problem to the assessment practice. However, the value of the teacher's mark hinges on the quality that it is valid, and this makes it useful for the following purposes:

1. Students' knowledge of their academic performance
2. Parents and guardians' knowledge of the achievement of their children and wards.
3. Teacher's assessment of the success of their teaching.
4. Appropriate placement of students for academic and employment pursuits.
5. Identification and provision of guidance or remediation for students.
6. Decision-making at various levels necessary for academic and behavioural growth of the student, and for his/her usefulness in the society.

The cost of a valid teacher's mark is a deliberate attempt and effort coupled with honesty and dignity to produce it. The task of a teacher as an assessor and mender of student's behaviour places him/her as a professional of no less importance and dignity than others. It is therefore worthwhile to discuss the factors which militate against the validity of the teacher's mark in order to identify ways of overcoming them.

Factors Militating against the Achievement of a Valid Teacher's Mark

Examination cheating: This is one of the prominent factors which affect the validity of the teacher's mark adversely. All forms of successful examination malpractice give rise to the award of grades to the cheat which is not valid.

Professional Misconduct: This abuse of office by a teacher could affect the validity of the teacher's mark adversely, if channeled in the area of scoring of the student's tests. Where a teacher decides to show 'favour' or otherwise to a student by inflating or reducing the test score, such marks obtained are not valid.

Excess Workload: An overworked teacher could find the marking of many scripts cumbersome. This is a possible result of over-populated classes or lack of teachers in schools. In an attempt to meet up with required number of tests, for the numerous students, the teacher cannot be as thorough as required in marking.

Mistakes and systematic error: When these occur in both marking and recording in significant proportions, the validity of the recorded marks is adversely affected.
Wrong method of Marking: Inability to mark accurately due to the use of wrong methods results in scores which are not valid. This can be obtained in situations where a teacher cannot make good marking schemes or does not use marking guides at all.
Spurious approximation of Scores: Spurious approximation of examination scores to the pass-mark, give rise to teacher's marks which are not valid. Examples of such instances are the rounding up of marks above 35% to 40% which had been fixed as pass-mark or arbitrary addition of marks across board (i.e. to all scores of students) to curb down excessive failure in tests.

Achieving Valid Teacher's Mark-Rationale

Hitherto, the certification of students was done using external examinations such as WASCE (West African School Certificate Examination). In this examination, standardised tests are employed. These standardised tests are prepared by experts (in test construction and in the subject areas), using the appropriate procedures. In addition, they are validated so as to calculate some test norms such as average performance, and measures of variation, on them, for interpreting test scores.

One of such appropriate procedures is the content validity. According to Anastasi (1976), content validity involves the systematic examination of the test content to determine whether it covers a representative sample of the behaviour domain to be measured. Content validity is therefore effective in ensuring that test performance (shown by teacher's mark) is reasonably free from the influence of irrelevant variable, thereby being valid. A specific technique which is non-empirical in this procedure is the preparation of a table of specification or test-blue print.

The table of specification represents the number of test items from each syllabus section and for each cognitive objective. With such table, the teacher can construct a test which spans both syllabus sections and the desired intellectual objectives in optimal proportions. It will be effective in reducing the prevalent situation, where students who perform highly in school examinations cannot succeed in external examinations for which they are prepared. If such discrepancy results in imbalance on the testing across content or objective areas in the syllabus in schools, (compared to that of WASCE), the use of table of specification will provide a corrective measure. It is suggested that the test constructor should be guided by the use of Educational objectives given in the Taxonomy of Educational objectives by Bloom et al. (Anastasi, 1976), in making a table of specification in any subject area. Some practical guides are therefore given in the section on the preparation of this table.

In standardised examination (e.g. WASC) answer scripts are systematically marked using marking guide or schemes. Nwana (1982) explained how WASCE Chief examiners, and team leaders treat these marking guides until they can be used by all examiners, to achieve a consistent marking.

The scheme consists of prepared answers to the examination questions with marks allotted to each question to guide the examiner. Marking with a scheme has an advantage of producing consistent results. All students are being marked on the same terms and the same points will most probably score the same marks. Judicious award of marks is therefore achieved using a good marking scheme, which leads to a valid teacher's mark.

Preparation of the table of specification

This has been made easier by the use of performance objectives in writing the secondary school subject curricula. Hence the curriculum provides for the level of intellectual operations required in a specific content area. The following general principles can help the teacher to prepare a table of specification.

(a) Selection of a specific content area for the test.
(b) Listing all the topics taught under the content area.
(c) Classification of the performance objectives (already specified in the curriculum) under the topics and under appropriate levels of educational objectives in a preliminary table. The teacher should use both the curriculum and taxonomy of educational objectives to do this.
(d) Assignment of weights/percentages to the content and objective areas in the preliminary table. A useful principle is to give greater percentage to the objective and content areas where more performance objectives fall, since those areas should accommodate more test questions.
(e) Completion of the table of specification by using the assigned weights/percentages to specify actual number of test questions under each content and objective area, from the total number of questions in the test.

The actual question numbers can be included in the final table for clarity. An illustration of these principles is presented in the appendix using a science subject (Physics).

Preparation of Marking Scheme for essay tests

The form of marking scheme discussed here is the point or factor method of marking essay questions/tests which is used by WAEC especially for science subjects. In this method the teacher prepares the questions beforehand in such a way that the facts the students are required to supply are specified as points or factors. The ability of students to perform the specific task of supplying these points merits the award of marks.

In preparing the marking scheme for marking essay tests, the following general procedures are carried out.

(a) The preparation of model answer to the questions by the teacher:
(i) Since each student provides same answer in peculiar words and forms, the model answer should have provision for similar answers translated in different forms. In other words, all correct forms of the answers to the questions should be included in the model answer sheet as much as possible.
(ii) There should be guidelines for making decisions on the appropriateness of the answers given by the students, especially when the number of points required are not specified in the questions.

As an example, four out of five possible statements which can be used to describe an instrument, can be adequate for a question.

(iii) The model answers should include guidelines for penalty in the cases of incomplete answers, omissions or minor errors. Hence all possible and significant deficiencies in the required answer should be identified and pointed out in the marking scheme.
(b) Assignment of marks to model answers: The following variables should be considered by the teacher in the assignment of marks to the answers.
(i) The total marks assigned to the test. If all the questions are equally weighted, then the total test score should be divided equally among the questions. If the questions are not of equal

weighting, then the following considerations should be made in the assignment of marks to each question.

(ii) The number of variables or factors required in the question (or part of it). The greater the number of factors required in the question (or part of it), the higher the mark assigned to it.

(iii) The difficulty in remembering the required variables or in performing the task involved in the supply of the variables.

The higher the level of performance objective required in a question, the higher the marks assigned to it. A question which requires higher reasoning ability or more time to be answered correctly should be assigned more marks.

Preparation of marking scheme for objective tests

The marking scheme for objective tests strictly employs the point or factor method of marking, since specific answers are required. Marks are awarded on the basis of the ability to supply the required correct answer. The marking scheme for objective test is often referred to as a scoring key, which comprises the answers and the marks. The guidelines discussed under the essay tests are already in-built into the scoring key except that no leeway is allowed for alternative forms of answers in the multiple choice type. In 'completion' or 'supply' objective test items, the marking scheme should include alternative forms of the correct answers.

The marking scheme for classroom objective tests should include correction for guessing as done in standardised marking. The general formulae usually employed to reduce the effect of guessing in multiple choice and true-or-false tests are as follows:

a. Multiple choice objective test.

(i) $S = R - \frac{W}{n-1}$

(ii) $S = R + \frac{O}{n-1}$

S = corrected score;
n = number of alternative answers for each item (i.e. correct answer and distractors);
R = number of questions got right;
O = number of omitted answers.

b. True-False objective test

(i) $S = R - W$

(ii) $S = R + \frac{O}{2}$ (symbols have the same meaning as in (a) above.)

Conclusion

In this paper the preparation and use of table of specification and marking scheme has been presented as valuable means of achieving enhanced validity of the teacher's mark in the continuous assessment of students at JSS and SSS levels. Illustrations drawn from a subject curriculum (for the table of specification and adapted WAEC past questions (for the marking scheme) has been presented in the appendix to elucidate the general principles and guidelines discussed. Teachers are therefore challenged to employ these 'professional tools' of table of specification and marking scheme in making and marking classroom tests. As every teacher takes up this challenge, a high

and positive relationship will exist between classroom assessment scores and WAEC grades, and hopefully, there will be growth in the teaching profession.

Appendix

Since the physics curriculum and some current WAEC marking scheme for physics are available to me, they are used for these illustrations. However the principles illustrated are applicable to other secondary school subject curricula.

Preparation of a table of specification -an illustration.

A. Content area is "Conservation Principles" for SSS I.

B. Topics (As listed in the curriculum).

C. The topics and performance objectives under this section of the curriculum are classified in the preliminary table shown below.

Table 1: Preliminary table showing topics and weights for a classroom test

S/No	Topics	(30%) Knowledge	(50%) Comprehension	(20%) Application
1	Work Energy Power (40%)	1(i) b 1(i), (vii) B(vi), (iv) 1(i), b	1(i) a 1(i) a, v	1((ii) a 1(ii) b 1(iii)
2	Temperature Expansion Change of State Vaporisation Conduction Convection Radiation (40%)		2(i) a 2(i) b 2(i) c 2(i) d 2(ii) a 2(ii) b 2(ii) c	
3	Charging of a body Use of Electroscope Electric force (20%)			

* The numbers (e.g. 1(i) b) in the table denotes the number of the performance objectives as it appeared in the physics curriculum for Senior Secondary Schools.

D. Table 1 shows also the weightings by percentage of the content and objective area. The comprehension level has the greatest weight (50%) since most of the performance objectives fall under it, followed by knowledge (30%) and then application (20%). Similarly the section 1 and 2 for the content area are equally weighted (40%) but section 3 where less performance objectives occurred had the least weight (20%).

E. Assuming a total of ten questions are in the test, they are divided to span the content and objective areas as shown in the complete table of specification in Table 2.

Table 2: Table of specification showing the position of the questions

S/No.	Objective/Content	Knowledge 30% (3)	Comprehension 50% (5)	Application 20% (2)	100% (10)
1	40% (4)	1	2, 3, 4		

2	40% (4)	5	6, 7, 8		
3	20% (2)	9	10		
TOTAL	100% (10)				

( ) = number of questions assigned.

Preparation of marking scheme -an illustration

The following three examples are adapted from WASCE questions to illustrate the guidelines for presentation of model answers, assignment of marks and the award of penalty.

Example 1: What factors determine the quantity of heat possessed by a body? Model answer: Mass, specific heat capacity, and temperature, OR Q = m c t (with) symbols defined, OR Therminal/heat capacity and temperature of the body. Three correct forms of the answer are given in the marking scheme.

Example 2: Using the Kinetic theory of matter explain why evaporation causes cooling. Model answer and marks: The molecules of a liquid have average Kinetic energy/average velocity which increases with temperature -1 mark; molecules near the surface which happen to be moving faster than average escape from the attraction of their neighbours and out of the liquid-1 mark; Thus, the liquid behind-1/2 mark; The average kinetic energy of the remaining molecules is therefore reduced-1 mark; This results in temperature fall-1/2 mark;
(Total 5 marks). The points which are more difficult to remember/supply are assigned 1 mark but the less difficult points are assigned 1/2 mark.

Example 3: Draw the vector diagram for a circuit consisting of a resistance a capacitor and an inductor showing the potential difference across them.

Model answer, marks assigned and penalty:

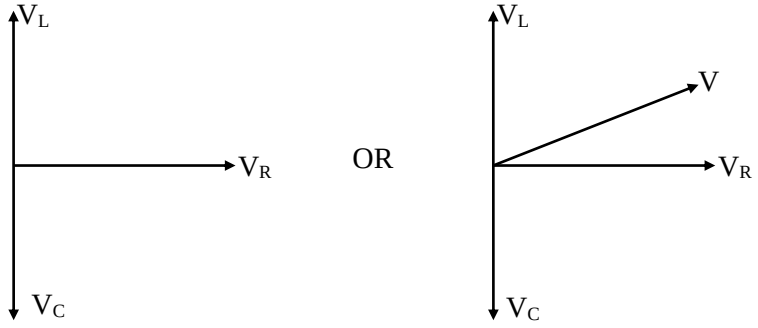

Fig.1: Vector diagram for an RCL series circuit

V_R, V_C and V_L with arrow – 1 mark each. Penalty – award ½ mark for each one where arrow is missing. (Total 3 marks)

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