

# **TEST AS A STETHOSCOPE: THE NEED FOR ADEQUATE TRAINING AND RE-TRAINING IN EDUCATIONAL TEST AND MEASUREMENT FOR ALL TEACHERS**

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## **ABSTRACT**

This paper is a call for the adequate training and re-training of 'teachers' in Educational Test and Measurement in general, and in basic principles of test construction in particular. This notion is informed by the poor knowledge of testing skills exhibited by both qualified teachers and quacks in the Nigerian Education System. In this paper, the authors identified teaching and medicine as two old, well established, very important and distinct professions, and the instruments: stethoscope and teacher-made test, that are employed by doctors and teachers respectively in their jobs; compared them and echoed why these instruments must be faultless and of high standard. The steps involved in the construction of a high standard/good test are elucidated. Recommendations aimed at reducing the inaccurate assessment of children by teachers at all levels and its toxic consequences are made.

## **INTRODUCTION**

Teaching and medicine are two professions that are well known, established and distinct. Both are very old professions, and each give direct services to mankind. In their diagnosis, the practitioners make use of measuring instruments. In the field of medicine, many instruments are employed amongst which is the stethoscope. In the area of teaching, the teacher-made test is often the most important measuring instrument in the hands of teachers, whether at the primary, secondary or tertiary levels.

However, differences exist in the nature of these instruments and in their application. While the stethoscope is manufactured by experts as a standard device and made available to the doctor, who then uses it for his/her measurement, the teacher-made test, as the name implies is often 'manufactured' by the teacher, who uses same for the measurement of his/her students' progress. Another difference is that the stethoscope is applied directly on the patient, and is therefore a kind of physical measurement device; whereas the test is applied indirectly to measure the psychological attribute possessed by a student; and is therefore a psychological measuring device. Of course,

although quacks are found in both medicine and teaching, the medical quacks make use of standard and already manufactured stethoscope as an instrument of measurement, whereas, the quacks in teaching are saddled "with the extra burden of "manufacturing" their own instrument (the test). This is a no easy task and the consequences are obvious and grave.

### **The doctor's stethoscope**

According to Oxford Advanced Learner's Dictionary, a stethoscope is a measuring instrument used by doctors for listening to the beating of the heart, sounds of breathing, etc. it consists of a circular piece placed against the patient's chest with two tubes leading to parts that fit in the doctor's ears. In fact, in medicine, the beating of the heart is almost the last indication of life in a patient. And the stethoscope is used to ascertain if a comatose patient's heart is still beating or not (i.e. if the patient is still alive or dead). It therefore means that, for this very important function of pronouncing a patient dead or living, the instrument (stethoscope) must be highly standardized and faultless. Anything short of this will produce wrong results with disastrous clinical consequences. In other words, a faulty stethoscope is capable of sending a living patient

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to the mortuary and keeping a corpse among the living in the hospital. Medically, these would be a very dangerous and un-ethical scenario. Even when the patient is not at the terminal state, the stethoscope is still needed to determine appropriate therapy or intervention strategy. Thus, its validity, reliability and usability can not be over-emphasized

The implication of the fore-going exposition is that the stethoscope must be manufactured by the experts (scientists) and made available to the doctor faultless, and the doctor must be very proficient in using it, if the doctor is to be effective in this very important responsibility of saving life. Just imagine a situation where doctors who are not trained in the science/technology of manufacturing this instrument were to manufacture it by themselves!

#### **The teacher's test**

A test is a measuring instrument used by teachers (both qualified and quacks) for ascertaining the quantity of an attribute or trait possessed by learners. A test presents a set of questions to be answered and the responses provided are used as a basis for awarding marks, which serve as an indicator of the quantity of the measured attribute (Denga, 2003; Joshua, 2005). According to Ogbonna (1993), a test can be defined as a measuring instrument, which attempts in a systematic way to find the ability of an individual in a certain trait and describes it by means of a numerical scale.

It follows that test results must be true reflections of the attributes possessed by the learners. Of course, a good test does not just exist on its own, it must be planned, and planned adequately and extensively, and by a competent personnel. Anything short of a good test will definitely produce a very grave consequence on the educational system.

In fact, "manufacturing" a good test is one herculean task confronting unqualified and most qualified teachers. Unlike the doctor, the teacher is the one to construct his/her measuring instrument for use in his/her class, and yet he/she is expected to ensure that his/her assessment is efficient, effective, valid and reliable. Unfortunately, most personnel who find themselves in the teaching profession, are illiterates when it comes to the extra burden of constructing a good test. Certain questions might become necessary at this point, for example, Why a good test? A good test will ensure accurate assessment, and accurate assessment

has the potential of providing us (teachers and the Education system) with the true picture of the ability possessed by learners in the attribute under measurement.

The next necessary question that follows is – How can a teacher 'manufacture' a good test OR How do teachers ensure that tests they construct are comparable to the high standard and faultless stethoscope in the hands of doctors? For a test to be considered good, such a test must be constructed following certain steps or skills of testing.

#### **Guidelines for the construction of a good test**

Test construction or "manufacturing" must follow certain basic principles or testing skills, these include:-

##### **(a) Planning**

Many teacher-made tests often suffer from inadequate or at best improper planning. This is so because many teachers often jump into the classroom to announce that they are having a test (impromptu test). Let us emphasize here that planning is one and the first very important step in preparing a good test. This is because planning provides answers to the following questions:-

- (i) What is the purpose of the test?
- (ii) Is it to test the effectiveness of teaching strategies, level of competence of the students or to diagnose areas of difficulties before going into other topic?
- (iii) What are the specific objectives of the content area to be taught?
- (iv) What content areas are to be taught?
- (v) How much emphasis is to be given to each content or topics?
- (vi) What type of test will be most suitable? (in terms of effectiveness, cost and logistics).

Providing answers to these questions will then take the teacher to the next level of test construction, which is preparation of test items. (Joe, 2004).

##### **(b) Preparation**

This involves the actual writing of the test items, the number of items per content (topic), the number of items per cognitive process area, total number of test items and the instructions for answering the items. These bring us to what is often referred to as the test blue-print or table of specification. This test blueprint is a table showing the number of items that will be set

under each topic taught and the level of cognitive process (process objectives) that each item will reflect. We can appreciate why it is called table of specification. It is a 2-dimensional matrix showing the topics to be covered in the test on the left hand side, and the process objectives on the top right hand side of the table. The process objectives or mental processes or cognitive objectives are usually derived from the behavioral objective stated for the subject initially. Under the cognitive domain there are 6 mental processes involved in achieving each objective. These processes are: knowledge (memory), comprehension, analysis, synthesis, application and evaluation. Weights are then given to the contents and process objectives. These weights reflect the relative importance of or the emphases placed on the various topics taught. The weights

are assigned in percentages. The same is applicable to the process objectives.

It is important to mention that although the assignment of weights is subjective, if carefully and honestly done, it will reflect the emphasis given to each topic taught as well as the process objectives (Denga; 2003, Joshua, 2005). In this assignment of weight, each dimension must add to 100% and the number of items, which is fixed by the percentages, are used to determine the numbers of item per topic and per objective. For more information on the preparation of test blue-print, we refer the reader to Denga (2003) and Joshua (2005). However, an example of a table of specification for a biology test of 50 items is presented here as Table 1.

**Table 1: Table of specification for 50 items Biology Test.**

Content (topics)	Process Objectives			Total number of Items
	Knowledge 60%	Comprehension 20%	Application 20%	
Unicellular organisms (20%)	6	2	2	10
Characteristics of living things (10%)	3	1	1	5
Photosynthesis (40%)	12	4	4	20
Genetics (30%)	9	3	3	15
<b>Total</b>	<b>30</b>	<b>10</b>	<b>10</b>	<b>50</b>

Having done with the table of specification, the items are arranged and written out or typed on the test paper. Of course, this will carry the test instruction, such as, the duration of the test and the number of items to be attempted. In fact, the table of specification serves to improve the content validity of the test, thereby, avoiding the complain of unfair distribution of test items by the testees.

#### (c) Test Administration

This is the actual presentation of the test to the testees, under the effective supervision of the teacher. Of course, a poorly administered test, no matter how well planned, may fall short of the expected objectives. It is therefore important that students are:

- (i) Informed in advance about the test;
- (ii) Comfortably seated;
- (iii) Well supervised to avoid the tendency toward cheating during the test;

- (iv) Made to work independently. On the part of the examiners, it is important, that they exhibit warmth, friendliness, understanding and encourage learners to do their best when writing test (Denga, 2003). Furthermore, the time allocated for a given test should be used in actually writing that test.

#### (d) Scoring the test

This entails allocating numerical values (scores) to students' responses to the test items. For this to be objectively and reliably done, the teacher must prepare before hand, a marking scheme or guide. Its availability and use eliminate bias, favoritism or vindictiveness on the part in the scorer. The marking guide, in other words, ensures that the mood of the teacher does not affect the marks he/she awards to students. It is necessary to emphasize that

scoring the test means scoring the test by the teacher, and not by an assistant.

**(e) Interpretation of test scores**

The analysis and interpretation of test scores is very necessary and should be done by qualified teachers; and in a manner that does not cause injury to the student's self-esteem (Denga, 2003). In fact, a student result should not be disclosed to unauthorized persons.

**(f) Item analysis**

This comes at the end of the testing exercise i.e, after the results must have been reported. Finally, there is need for the teacher to know how good the test items were. And Nunnally (1972); Nenty and Imoinyang (2003), separately asserted that, Item analysis is also called testing the test.

**(a)** The computation of the difficulty level of the items

**(b)** The computation of the discrimination level of the items.

The computation of these indices will then provide answers to two basic questions:

- How difficult was each item for the students
- To what extent did each discriminate between good and poor students.

Of course, this analysis will enable the teacher to discard or modify some items for future usage, improve his/her test construction ability as well as instructional delivery strategies.

**The need for training and re-training**

Having underscored the importance and centrality of teacher-made tests in the school system, particularly for gauging and monitoring the progress made by learners, it is important that teachers and would-be teachers are constantly helped and equipped with skills in testing. This could be done during their training periods in school and after graduation. Each of these is further elaborated here.

**Pre-service training enhancement**

Test and measurement is the basic course offered the 3 teacher training institutions (i.e. Faculties of Education, Colleges of Education and Teacher Training Colleges) to equip would-be teachers with the knowledge and skills necessary for efficient and effective

classroom assessment or testing. The abysmal performance of most teachers in their assessment practices may be an indication that the once-shot-offer of this course is inadequate. There is need therefore to increase the credit hour devoted for test and measurement from the present 3-credit to 6-credit hours. In other words, the course should be offered both in second and third years.

Perhaps, the teaching of Educational Test and Measurement which is presently examination-focused, if replaced with an approach that is geared towards mastery learning, may reverse the present trend.

**Post - service re-training**

For the practicing teacher to be effective in the area of assessment, particularly in the era of modified School based Assessment (SBA), the government should put in place a deliberate training and re-training programmes aimed at constantly keeping the teacher abreast of innovations and to refresh their memory. This could be done in the form of workshops, seminars and refresher courses, and on a more frequent basis. Non professionals who intend to remain in the system should be encouraged to acquire certificate in education.

**Summary and Conclusion**

This paper identifies teaching and medicine as two old professions with their respective instruments: the teacher-made test and the stethoscope; compared these instruments and emphasized the need for them to be of high standard for efficient and effective service delivery. Since the teacher must necessarily prepare his/her instrument, certain training strategies have been recommended for both would-be and serving teachers in order to ensure a valid and reliable instrument for the assessment of the learners.

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