



# Selecting and Developing Instrument of Educational Psychology Research in the Context of Higher Institutions in Nigeria

By:

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## Abstract

Educational Psychology is generally seen as application of psychological principles and theories in educational settings. The paper defined psychological testing as an objective and standardised measure of a sample of behaviour. This paper equally identified various types of psychological tests like intelligence tests, personality tests interest, and attitude achievement tests amongst others. The paper identified validity, standardization, reliability among others as characteristics of Psychological tests. The paper also looked at the uses of psychological test which include, identifying student interest, helping students with adjustment problems, guiding students towards educational and vocational goals, conducting researches, among other. The paper describes instrument development as an activity to create new instruments or develop existing instruments following systematic development procedures. The paper also identified financial and time constraints and government policy amongst others as challenges of psychological tests in Nigeria. The paper recommends that researchers should acquaint themselves with the logic and mathematical framework (such as item analysis) provided by test theories for the purpose of test construction and use.

## Keywords:

*Educational Psychology, Psychological Tests, Instrument Development.*

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## 1. INTRODUCTION

Educational Psychology is generally seen as application of Psychological principles and theories in Educational setting. Chosen Educational Research Instrument or development of Educational Research Instrument is a difficult task that needed every concerned researcher attention in Nigeria like any developing country the Context is more difficult and alarming among young and unexperienced researchers. Among the most useful and most frequently employed tools of educational research psychological tests occupy a very significant position. Psychological tests are described to describe and measure a sample of certain aspects of human behaviour or inner qualities. They yield objective descriptions of some psychological aspects of an individual's personality and translate them in quantitative terms.

Creating an instrument or using an existing one: there are many instruments available for commercial use that can be used for evaluative purposes. From the practical point of view, using an existing test saves a lot of time and resources (Center for Assessment and Research, James Madison University, 2014; Cohen, Manion & Morrison, 2000). Other advantages are that they are generally technically solid instruments, i.e. have been piloted and standardized in a population described in detail, they state their validity and reliability, they cover a wide range of content, they tend to be parametric tests and therefore sophisticated analyses can be done, they include detailed instructions for their administration, they are generally easy to administer and score, and in general they include guidelines for the interpretation of the results (Cohen, Manion & Morrison, 2000).

The possible disadvantages include: they are expensive; they are often aimed at a very specific population and may not conform to the required assessment purpose; some have restricted availability so it may be necessary to become a member of a certain institution to use them, which may require compliance with certain requirements; and by definition the available tests are intended for a general population and are not tailored to local needs. To use one of these tests, it is important to be sure that the goals, purposes and content of the test are aligned with the assessment objectives. The Standards for Educational and Psychological Testing state that for a researcher to decide to use an existing instrument, the golden rule is that he or she must be able to demonstrate its suitability for the purpose (Cohen, Manion & Morrison, 2000). However, it is difficult to find an instrument that conforms exactly to the specific objectives of a program (Center for Assessment and Research, James Madison University, 2014). Some common errors that are committed when selecting instruments that affect their validity and therefore should be avoided are: using a certain instrument because it has a good reputation or has been used before; using information because it is available; using unfamiliar methods without proper training; not providing accommodations for special educational needs (SEN) students or students who do not speak the language (Joint Committee on Standards for Educational and Psychological Testing, 1999). If the decision is made to design an instrument, the main advantage is that it is created to be perfectly aligned with the program objectives (Center for Assessment and Research, James Madison University, 2014) and it will be adapted with precision to the local and institutional context (Cohen, Manion & Morrison, 2000). Another factor to consider is that while designing an instrument involves huge investment of resources, the instrument belongs to the one who constructs it, so it can be

a good investment if it will be applied to many students or for a long period of time, while if an existing instrument is used, many times it is necessary to pay for each administration (Center for Assessment and Research, James Madison University, 2014).

However, creating instruments is expensive, slow, and because it will probably be non-parametric, the range of possible analyses will be more limited than in the case of a parametric test (Cohen, Manion & Morrison, 2000). In addition, often one does not have access to specialized staff that can design a technically rigorous instrument (Center for Assessment and Research, James Madison University, 2014). In Nigeria Context there are needs for experts like Nigerian Society for Educational Psychologists (NISEP) and other organizations of experts to provide and simplify possible ways in creating or selecting Educational Research Instrument for young undergraduate and postgraduate researchers. The current paper will contribute to this area of study with the view of looking into challenges and suggesting possible solutions to alarming phenomenon.

## **2. PSYCHOLOGICAL TESTING**

For any experience we had there must be a test. A test can be defined as a critical examination, observation or evaluation of traits, objects, people or events (Alonge, 2004). The branch of psychology concerned with the theory and technique of psychological and educational measurement is called psychometrics; this includes the measurement of intelligence, attitudes, abilities, and traits. Psychometrics primarily entails the task of constructing and validating measurement instruments such as psychological tests and inventories. Apart from direct observation of the behaviour of interest, unobserved constructs (latent variables) are measured through empirically designed instruments called psychological tests. Anastasi and Urbina (1997) defined psychological tests as an objective and standardised measure of a sample of behaviour. According to Mellenbergh (2008), a useful psychological test must both be valid (i.e. there is evidence to support the specific interpretation of the test results) and reliable (i.e. internally consistence or give consistent results over time). Crucial to this definition are the concepts of validity and reliability. A test is said to be valid when it measures what it purports to measure, on the other hand a test is described as reliable when it yields the same or similar results when measured at different times by the same or different observers.

### **2. 1. Types of Psychological Test**

Several categories of psychological tests been developed to measure different types of behaviours, these tests can be standardized and non-standardized or cognitive and non-cognitive tests, some of the common psychological tests that are useful in Educational Psychology Research or Educational Research are: achievement tests, intelligence tests, aptitude tests, personality tests, interest tests, attitudes scales and check list etc. The following are major cognitive test in psychological testing:

**a. Achievement Tests:** are for measuring attainment after exposure to a specific course of study, their objectives include identification and or subject for diagnosis of discrepancies in the learner's and instructional methodology. Achievement tests measure what a person has

atrocities learned. This achievement test is a cognitive ability test which measures how much the individual has been able to learn from what he has been taught formally such as in a classroom situation. Examples of achievement tests are Senior School Certificate (SSCE), West Africa School Certificate (WAEC), Nigeria Certificate in Education (N.C.E) etc.

**b. Intelligence Tests:** the mental ability tests measure intellectual status of an individual. They measure a wide range of cognitive skills such as motor co-ordination, perception, conception, memory, language, reasoning and creativity. Intelligence tests can be administered on individual like the Simon-Binet or Stanford-Binet Intelligence scale or the Wechsler Adult Intelligence Scale (WAIS). It can also be administered to a group (Group Intelligence Test) like the Otis-Lennon Mental Ability Tests.

**c. Aptitude Tests:** According to Anastasi, (1988), an aptitude test is a test designed to measure potential success in learning and performance. It often measures aspects of intelligence and achievement abilities. Thus it is seen to be fairer than achievement test since it depends less on prior knowledge. But it is difficult to construct aptitude test that is free from prior learning. Some of the aptitudes that one can test for include: the Differential Aptitude Tests (DAT), Verbal, Scientific, Numerical, Clerical, Spatial Musical, Mechanical Artistic and Scholastic Aptitudes. Usually, Aptitude Tests appear in batteries group of separate tests which measure various aptitudes. Foreign examples include: the Scholastic Aptitude Tests (SAT), Law School Aptitude Test (LSAT), Armed Services Vocational Aptitude Battery (ASVAB), General Aptitude Test Battery (GATB), The Joint Admission and Matriculation Examination (JAMB). Major Non-Cognitive Tests (Affective Tests) are;

**d. Personality Tests:** these measure non-academic characteristics of testees; they could be aptitude test projective tests, motivational scales or interest inventories. Personality inventories are used to ascertain personality traits, for personal counseling, gives information on personal problems, dimensions, depth and emotional issues. They often measure the more stable and enduring characteristic of a person. They can measure degree e.g. anxiety shyness or need for love. These are tests that are designed to reveal the extent to which an individual is adjusting to the conditions facing him. They are also used to indicate whether the individual is developing normally. Personality test can come in form of Personality Inventories and for projective tests. Other non-cognitive tests include: Interest tests, Attitudes scales and Check list.

## 2. 2. CHARACTERISTICS OR PRINCIPLES OF A GOOD PSYCHOLOGICAL TESTING

Researchers have identified several characteristics or principles of Psychological Testing. A Good Test according to Akinade (2009) should have the following characteristics: Reliability, validity, standardization, ease of administration, usability and culture-fairness. Other characteristics include objectivity, test norms, psychological assessment and psychological evaluation.

- **Standardization:** All procedures and steps must be conducted with consistency and under the same environment to achieve the same testing performance from those being tested.

- **Objectivity:** Scoring such that subjective judgments and biases are minimized, with results for each test taker obtained in the same way.
- **Test norms:** The average test score within a large group of people where the performance of one individual can be compared to the results of others by establishing a point of comparison or frame of reference.
- **Reliability:** Obtaining the same result after multiple testing (consistently).
- **Validity:** The type of test being administered must measure what it is intended to measure (accurately).
- **Psychological Assessment:** Is similar to psychological testing but usually involves a more comprehensive assessment of the individual. Psychological assessment is a process that involves checking the integration of information from multiple sources, such as test of normal and abnormal personality, tests of ability or intelligence; tests of interests or attitudes, as well as occupational, or medical history, such as from records or from interviews with parents, spouses, teachers or previous therapists or Physicians.
- **Psychological Evaluation:** This is a way of testing people about their behaviour, personality and capabilities to draw conclusion using combinations of techniques (American Psychological Association, 2010). According to Gregory (2010), Psychological evaluation over the years, has developed from unethical methods of locking people up for tests to marry different strategies seen today.
- **Availability:** a test should be easily available in good quantity in order for it to be useful. Those who are qualified to use them should know where and how to find and procure them. If a test is not readily available it will not be used. Good test too should not be too costly otherwise they may not be used with ease.
- **Usability:** This refers to the extent to which an instrument technique (test) can be used, easily used to obtain interpretable information that cannot be of very little value to the school system. Usability of assessment instrument/technique is associated with the following factors, simplicity, time required for instructions, ease of application) ease of scoring, ease of interpretation of its scores and availability of equivalent forms.
- **Ease of Administration:** Each test must have manuals that will assist qualified users in administering the tests. The test should be easy to score, analysis and interpreted. They should not be cumbersome or too lengthy.
- **Culture-Fairness:** - A good test should be culture- fair or unbiased. If is culturally unfair, the result and interpretation may also be biased, unfair and subjective. Its contents should not contain unfamiliar vocabulary or ideas that are strange to student taking the test. Examples of culture-fair test include draw a test and convent's stand and progressive matrices.



## 2. 3. Uses of Psychological Tests

According to Ipaye (1980) in Akinade (2009:88) test could be used for the following purposes: as achievement tests to measure academic attainment and diagnosing academic strength or weakness in curriculum based subject or course; as aptitude tests, intelligent, tests and personality and vocational inventories, attitude scales, personality tests and projective techniques. Olayinka (1980) in Yoffo (2013) added that test, can be used for motivating learners, identifying those who need remedial support or referral, appraising individual skills and placement of student in appropriate programme. Generally, tests yield setting types of information more accurately, meaningfully and economically than subjective techniques e.g. observation or interview or projective techniques.

Traxier (1960) in Yoffo (2013) listed ten (10) ways one can use test result from school testing programme on their summarized below:

- Assessing abilities and aptitude.
- Comparing achievements with scholastic aptitude.
- Judging the level of ability or achievement in a class.
- Improving self-understanding in a counseling or psychotherapeutic encounter.
- Diagnosing strengths and weakness.
- Identifying student interest.
- Helping students with adjustment problems.
- Guiding student towards educational and vocational goals
- Conducting researches
- Discovering specific abilities

## 3. DEVELOPMENTS OF INSTRUMENT

A Research Instrument is a tool used to collect, measure, and analyze data related to your research interests. Instrument development is an activity to create new instruments or develop existing instruments following systematic development procedures (Rahmawan *et al.* 2016). According to Cyril (2019) Data obtained for the purpose of educational research are collected with the help of research instruments. These instruments are either: adopted, adapted or developed by the researcher. **Adopted instruments** are those instruments already developed by other researchers and are employed for use in current research work undertaken without any modification or alteration made on any item of the instrument. **Adapted instrument** on the other hand, are those already developed instruments that another researcher modifies to suit current study. In some other studies in which the researcher is interested in students' academic achievement or performance test, a researcher may be interested in developing a valid and reliable instrument for the collection of information within the content of the study.

However, in some of this type of researcher's self designed test instrument, item analysis, factorial validation and/or test blue-print are seldom carried out, and where table of specification is constructed, percentage weights of content areas are arbitrary assigned without following the procedures for test development.

### **3. 1. Considerations when Selecting an Existing Instrument**

You should be skeptical of the name given to an instrument by other researchers. These names can be misleading. In other words, just because someone labels an instrument a "critical thinking test" does not imply that it is a good measure of critical thinking. You should always read the actual items before adopting an instrument. Students respond to items, not the name of a test. These items should reflect the objectives and curriculum designed to meet each objective. For example, if you are teaching critical thinking skills and the items primarily pertain to deductive logic then you should be teaching deductive logic if you adopt the test. If not, then you should select different instrument. Other considerations are summarized below.

1. Consider the length of an instrument: this should be long enough to cover the breadth of what you want to measure without inducing fatigue.
2. Consider the potential cost of using an instrument. Some instruments are under propriety and cannot be used without special permission.
3. Evaluate reliability and validity evidence before using an existing instrument to assess your program. If you are using an instrument in a new way then you need to collect evidence to justify your proposed use of a test.

### **3. 2. Considerations when Creating or Designing an Instrument**

1. You are strongly recommended to consult with an individual trained in measurement theory prior to creating your own instrument. However, there are circumstances in which this is simply unfeasible.
2. Expect to spend about a year in the instrument development process. Many instruments take longer than a year to develop. Thus instrument development requires one to commit resources and time.
3. You will need to collect validity evidence to support your proposed interpretation of the scores for an intended use of a test. For example, if a test has been used in research to study externalizing problems in children it would need additional evidence to support its use to make placement decisions in school. This evidence can be time consuming to collect and may require you to make multiple modifications to the items before the instrument is ready for "official" administration.

### **3. 3. Advantages and Disadvantages of Selecting versus Designing an Instrument:**

The table below provides a snapshot of some of the advantages and disadvantages of selecting versus creating or designing an instrument.

#### 4. DIFFICULTIES AND CHALLENGES OF DEVELOPING EDUCATIONAL PSYCHOLOGY INSTRUMENT OR PSYCHOLOGICAL TESTS IN NIGERIA

Psychologists in Nigeria have started constructing tests to assess personality in various settings. This became necessary to ensure cultural relevance of personality tests in Nigeria (Ekore 2001). Some procedures used by the western societies are being used to develop local tests in Nigeria. The strong point of these tests is the cultural consideration for test content and context. The deficiency in the foreign tests is necessitating psychologists in Nigeria to delve into test construction in order to meet local demand. However there exists still a need for local tests in NIGERIA (Ekore 2001). The bulk of the tests available to psychologists are foreign and not suitable for African cultural background. The scarcity of local tests in Nigeria may be as a result of the challenges psychologists in Nigeria face in the process of test Construction (Elizabeth, 2011). Some of the challenges as Elizabeth (2011) itemized five (5) challenges which include:

**a. Shortage of manpower in the area of psychometrics in Nigeria:** Most psychological tests in Nigeria were developed by non psychometricians due to the scarcity of psychometricians in the country. Downing & Haladyna (1997) argued that knowing the principles of effective item writing is no guarantee of an item writer's ability to actually produce effective test questions. Although item writers must be experts in their own disciplines, there is no reason to believe that their subject matter expertise generalizes to effective item writing. This explains the need for psychologists to be trained as psychometricians in order to ensure effective test construction. It is interesting to know that the study of psychometrics at the postgraduate level in Nigerian universities is almost nonexistent.

**b. Financial and time constraints:** Test development involves a lot of financial resources which are not readily available to most psychologists in Nigeria. As a result of financial constraint in test development, many of the psychological tests found in Nigeria are adapted from western countries. Time is a major constraint to test development in Nigeria. The basic principles and steps of test construction should be strictly adhered to in order to develop effective tests. These steps are time consuming and require a lot of efforts and commitment. This explains some of the challenges psychologists in Nigeria encounter in the process of test construction.

**c. Work overload:** Characteristic of the job of an average psychologist in the academic milieu is work overload. Lecturers often teach more courses than necessary and are also saddled with administrative responsibilities. It is also important that these lecturers write and publish papers and articles to remain relevant in the profession. There are multiple deadlines to be met as a lecturer in the discharge of duties and the ability to multi task is crucial in this setting. The challenge of the psychologists here will be to meet deadlines and there is hardly room for extra engagements. Test development is not given any consideration as the psychologists already have all of their work hours occupied.



**d. Lack of mentoring and training programs for new test developers in Nigeria:** As a result of scarcity of psychometricians, young psychologists lack mentors to coach them in the art and science of test construction. According to Haladyna (2004) for new item writers is often helpful and important to provide specific instruction using an item writer's guide, paired with hands on training workshop. Effective item writing skills must be learned and practiced.

**e. Lack of attraction to psychometrics as a field in psychology:** Lack of attraction to psychometrics as a field in psychology is another reason for the challenges psychologists in Nigeria encounter in the development of local tests. As a result of psychometrics' involvement in the theory and technique of educational and psychological measurement including the measurement of knowledge, abilities, attitudes, and personality traits, many young psychologists avoid it in an attempt to escape figures. A good number of students in Nigeria have phobia for mathematics and therefore avoid it every way possible. Other challenges encountered by psychological testing or Psychological Researchers findings include:

**f. Government policies:** In Nigeria, the use of psychological tests for selection and placement in Institutions, public service is viewed with limitations. This is as result of fact that the policy makers view testing as negating the principles of quota system. The principle of quota system or federal character stipulates that any employment in the federal civil service should reflect federal character. To this effect, sole reliance on tests scores for making decision to hire or not to hire becomes a mirage. The quota policy discouraged the use of tests in selection and placement in public service on the consideration that tests are barriers to jobs opportunities for the educational disadvantaged states. Such government policy has affected the development of tests in Nigeria, since such test measures cannot be relied on.

**g. Tests are faked at times:** This is because some individuals give society desirable responses to test items in an attempt to sound "holly" or normal affective tests are mostly abused. Testing can be misleading and erroneous especially when the measuring devices are wrongly worded or interpreted.

**h. Scarcity of the professional bodies:** The situation in Nigeria falls short of the regulating bodies like American Psychological Association (APA). Professionals like Nigerian Society for Educational Psychology (NISEP) are scarce as such organizations of conferences, workshops and seminars as to enlight members on how to create quality research instrument is also scarce.

#### **4. 1. Solutions to the Challenges as Suggested by many Psychologists, Educationist and Educational Psychologist**

Elizabeth (2011) suggested that Psychological tests serve a whole lot of purposes in both applied and research settings. Therefore;

(1) Efforts should be made to ensure the construction of local tests in Nigeria Universities in Nigeria should offer psychometrics as an area of specialization in psychology, as this will promote psychometrics and increase the number of psychometricians within the country.

(2) Psychometricians in Nigeria should rise to this challenge and encourage young psychologists in the field through mentoring and coaching .

(3) Research clusters should be formed and financed towards the development of psychological tests.

(4) The government, educational institutions, and professional bodies should give grants to psychologists in the pursuit of test construction ; sabbatical leave should also be given to psychologists for the purpose of test development.

In view of the myriad of problems facing the use of psychological tests in the Nigerian world of work. Ugwu (2007) also suggested that:

i) Tests developed with Nigerian sample in mind should be laboriously validated so that it measures what it purports to measure.

ii) Newly constructed and validated tests should take into account the multidimensional nature of job performance and consequently incorporate indices of performance-related behaviours into battery of tests.

iii) Psychological tests should be responsive to new research findings.

iv) Government should enact laws empowering only qualified personnel to use psychological tests.

v) Testers should provide applicants with feedback so that they become knowledgeable of how the cutting scores were obtained and how they were interpreted.

vi) Government should make grants available to the researcher. Above all researchers should acquaint themselves with the logic and mathematical framework (such as item analysis) provided by test theories for the purpose of test construction and use.

#### **4. 2. Test Administration Guidelines**

According to Akinade (2009:89) test administration guideline includes the following:

1. The testees should be adequately trained to do so.

2. The testees must know and understand several local and international tests.

3. The testees must follow meticulously the manuals (guidelines) of test constructor e.g. style of administration, timing, location, space and light.

4. Employ proctor when it is group test e.g. a class or group of 25 or more testees.

5. The order of test administration should be establishment of rapport, presentation of answer sheet the test(s) collect the test(s) collect the answer sheets. Ensure the number of copies of test retained is the same as the number given out especially in aptitude test.

6. Collect and store the test scores very properly.

## Conclusion

Test development is an integral part of educational research. The development of research instrument, which is to be characterized by sound psychometric property depend on researcher's ability to employ the processes provided in the instrument development procedures. This would help in designing test instruments that are valid and reliable for intended user.

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