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# Assessment Strategies for Promoting Higher Order Thinking Skills in Public Secondary Schools

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## Abstract

*In an increasingly complex and specialized society, it is imperative that individuals think critically and creatively. This kind of thinking is required to achieve the outcomes as stated in the Nigerian National Policy on Education. This study aimed at finding out how teachers in Nigerian public secondary schools use assessment to promote higher order thinking in learners. The study also critically examined the assessment strategies and tools used by secondary school teachers and the questioning methods they adopt in their classrooms. The study looked into how teachers planned and organized tasks that promote critical thinking. Attempts were made to establish relationship among gender, education qualification and teaching experience of teachers in their ability to use assessment to promote higher order thinking in their classroom interaction. The study investigated secondary school teachers' knowledge of assessment strategies that promote higher order thinking in learners. Three hundred teachers randomly selected from twenty public secondary schools within the eleven local government areas in Ibadan metropolis were involved. The sample comprised of 154 male teachers and 146 female teachers. One instrument; Assessment Practice*



*Questionnaire was developed and used by the researchers to derive information from teachers in secondary schools. The results showed that teachers have limited knowledge about alternative assessment strategies that promote higher order thinking. The assessment strategies employed by teachers are mainly traditional assessment strategies. It seemed, that higher order thinking like application, analysis and evaluation were rarely used.*

## Introduction

Some of the earliest (most detailed) efforts humans made to record classroom interactions were focused on communicating, analyzing and detaching how we think.

Effectively, the history of thinking began in Athens Circa 430 BC when Socrates, opposed by the intellectual but arrogant Sophists, introduced a method of inquiry through which examined ideas with probing question designed to challenge their epistemological foundations. What was revealed was that most of what we knew - or rather believed we knew - had no basis and was not more reliable than hearsay, speculation and assumption. Unfortunately, not much has changed in the 2,500 years since Socrates' death. Long after the Greeks, Critical Thinking remained on the minds of western philosophers. Scholastic renaissance and enlightenment thinkers, such as Thomas Aquinas, Francis Bacon and Immanuel Kant dedicated themselves to the pursuit of true and defensive knowledge.

By cutting through the assumption that choke intellectual progress, these men followed the tradition pioneered by Socrates. They devoted themselves to methodically reconsidering common beliefs and explanations, sifting them through the lens of reason in order to distinguish between those that were well established in logic and those which lacked an evidentiary foundation. Among the results of this progressive structured inquiry were democracy, capitalism, and the rise of the middle class. Despite its prestigious beginnings and long history in the West Critical Thinking (CT) is mostly something of relic today. While eighty-nine percent of teacher - preparation instructors in California claim that CT is a primary focus of their instruction, only nine-percent say that they clearly teach critical thinking (Paul, 1993). Students seem to be learning from their instructors through CT. Some ten percent of secondary school teachers teach their own students Critical Thinking.

The simple fact is that the Critical Thinking virtues, emphasized in reasoning by Socrates were clarity, logic and consistency, which remain important in the theory. However, these elements of Critical Thinking are not making their way into the classrooms; they are rarely incorporated into school curriculum. Later,

Sajobi (1985) stated that an education system is incomplete without assessment. Assessment encompasses the general process of collecting, synthesizing and interpreting information. In an attempt to provide solution to problems militating against effective teaching and assessments in Nigerian schools Okpala and Onocha (2001) had stressed the need to improve in-service training and staff development opportunities for teachers. This should be done in order to avoid the situation where the knowledge and skills levels of practicing teachers will grow increasingly out of date and inadequate to meet the current demands for effectiveness.

Central to the success of any effort at improving secondary school teachers' ability to use assessment through in-service training and staff development, there is need for a baseline assessment of the competencies of practicing teachers in our public secondary school in the use of assessment in the development of higher order thinking skills. Assessment provides essential information on students' learning needs, monitoring of students' progress, and for helping students to structure their learning (Stiggins, 2000). Teachers, thus, need to use assessment to improve achievement standards in our schools, by utilizing quality assessment methods in their classroom interactions. Teachers in the Nigerian schools need to be knowledgeable about authentic assessments that promote higher order thinking skills. Education system in Nigeria needs to assist our teachers in the schools in gaining in-depth understanding of assessment methods that promote higher thinking skills.

The National policy on education in Nigeria was revised in 2004. In this National Policy on education, assessment is seen as a continuous planned process of gathering information about performance of learners, measured against specific learning objectives. If one examines the junior secondary and senior secondary schools' assessment standard in subject areas, it is clear that most of them not do necessarily promote higher order thinking. For example, instructional verbs frequently used in the assessment part of the curriculum indicating what learners should know and be able to understand, use, read, write and interact with.

Nigeria must move toward a technology-based economy of competition where employers demand for workers who can think flexibly and analytically, integrate information from a variety of sources and perspectives on complex problems. Additionally, making sound personal and civil decisions require the ability to interpret accurately information filtered through media that emphasize promotion of essential tools for performing successfully in a complex and rapidly changing world.

Despite widespread expressions of concern about developing critical thinkers, studies have shown that most schools are neither challenging students

to think critically about academic subject such as Mathematics, language and science nor helping them develop the reasoning abilities needed to deal successfully with the complexities of modern life. The education system continues to graduate student who do not reason well. The studies by Perkins, & Bushey (1991) and Kuhn (1992) have documented the faulty everyday reasoning and poor argumentation skill used by most people. Even tertiary education appears to have a limited effect on graduates' critical thinking abilities, including making reasonable interpretation of texts and formulating unbiased and well-reasoned arguments.

The key to improved critical thinking levels in our schools lies in teachers' ability to provide high quality assessment. That is teachers must use authentic assessment tasks to improve on students' achievement. The fact is that if we want to help student develop the skill needed in everyday reasoning tasks, evaluators and policy makers must show interest in classroom assessment practices, which are essential for effective learning. Transformation of education system around the world can be ascribed to various factors. The most prominent factors are global economy, changing demands of the workplace and technological inventions (Dreyer, 2000). The competitive environment has brought challenges with it in the area of education and training. Teachers need to be able to assist learners achieve competencies such as thinking critically and creatively, being able to work with constantly changing data, working cooperatively with other on projects, tolerating differences or ambiguity and persistence when there is a lot of pressure.

The critical thinking of Plato followed the pattern of Socrates' practice. Aristotle and the Greek skeptics emphasized that things are often very different from what they appear to be that only the trained mind can see through the way things look to us on the surface, too the way they really are beneath the surface. From this ancient Greek tradition emerged the need for anyone who aspired to understand the deeper realities, to think systematically, well reasoned, and responsive to objections can see reach beyond the surface. In the medieval ages, the tradition of systematic critical thinking was embodied in the writing and teachings of such thinking as Thomas Aquinas (Summa Theological). To ensure his thinking met the test of critical thought they were always systematically stated, considered, and ensured they all criticisms of his idea. This he did at the stage of developing them. Aquinas heightened our awareness not only of the cultivated and "cross-examined." Aquinas' thinking illustrates that those who think critically do not always reject established beliefs that lack reasonable foundations. In renaissance of 15<sup>th</sup> and 16<sup>th</sup> Centuries, a flood of scholars in Europe began to think critically about religion, art, society, human nature, law,

and freedom. They proceeded with the assumption that most of the domains of human life were in need of searching analysis and critique. Among these scholars were Colet, Erasmus, and more in England. They are following up on the insight of the ancients.

Francis Bacon, in England, was explicitly that the mind couldn't be safely left to its nature's tendencies. In his book: 'The Advancement of Learning', he argued for the importance of studying the world empirically. He emphasized the information-gathering processes in critical thinking he also called attention to the fact that most people, left to their own devices, develop bad habits of thought (which he called "idols") that lead them to believe what is false or misleading. He called attention to "Idols of the tribe", (the ways we misuse words), "Idols of the Theatre", (our tendency to become trapped in conventional system of thought) and "Idols of the schools", (the problems in thinking when based on blind rules and poor instruction). His book could be considered as one of the earliest text in critical thinking, for his agenda was very much the traditional agenda of critical thinking. The issue of critical thinking in assessment and evaluation became more elaborate with Bloom's Taxonomy. Benjamin Bloom created this taxonomy for categorizing level of abstraction of question that commonly occur in education settings. The taxonomy provides a useful structure which categorizes test questions, since teacher will characteristically ask questions within particular levels, and if you can determine the levels of question that will appear in your exams, you will be able to study using appropriate strategies.

**Table 1: Competence and Skill Demonstration.**

COMPETENCE	SKILLS DEMONSTRATED
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• Observation and recall of information</li> <li>• Knowledge of dates, events, place</li> <li>• Knowledge of major ideas</li> <li>• Mastery of subject matter</li> <li>• Question Cues: Lists, define, tell, describe, identify, show, label, where, etc.</li> </ul>
<b>Comprehension</b>	<ul style="list-style-type: none"> <li>• Understanding information</li> <li>• Grasp meaning</li> <li>• Translate knowledge into new context</li> <li>• Interpret fact, compare, contrast</li> <li>• Order, group, infer causes</li> <li>• Predict consequences</li> <li>• Question Cues: Summarizes, estimate, differentiate, discuss, extend.</li> </ul>

<b>Application</b>	<ul style="list-style-type: none"> <li>• Use information</li> <li>• Use methods, concepts, theories in new context</li> <li>• Solve problem using required skill or knowledge</li> <li>• Question Cues:</li> <li>• Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, classify, experiment, discover.</li> </ul>
<b>Analysis</b>	<ul style="list-style-type: none"> <li>• Seeing pattern</li> <li>• Organization of parts</li> <li>• Recognition of hidden meanings</li> <li>• Identification of components</li> <li>• Question Cues</li> <li>• Analyze, separate, order, explain, connect, arrange, divide, compare, select, explain, infer.</li> </ul>
<b>Synthesis</b>	<ul style="list-style-type: none"> <li>• Use old ideas to create new ones</li> <li>• Generalize from fro given facts</li> <li>• Predict, draw conclusion</li> <li>• Relate knowledge from several areas</li> <li>• Question Cues:</li> <li>• Combine, integrate, modify, rearrange, substitute, plan, create</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Compare and discriminate between ideas</li> <li>• Assess value of theories, presentations</li> <li>• Make choices based on reasoned argument</li> <li>• Verify value of evidence</li> <li>• Recognize subjectivity</li> <li>• Question Cues:</li> <li>• Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.</li> </ul>

**Source:** Benjamin S. Bloom's (*Taxonomy of education/ objectives*. Published by Allyn and Bacon, Boston, M.A. Copyright © 1984 by Pearson Education.

Bloom's Taxonomy has more than one type of learning:

1. Cognitive: mental skills (knowledge)
2. Affective: growth in feelings or emotional areas (Attitude)
3. Psychomotor: manual or physical

This taxonomy of learning behaviours can thought of as "the goals of the training process." That is, after the training session, the learner should have

acquired new skills, knowledge, and/or attitudes. This compilation divides the three domains into subdivisions, starting from the simplest behaviour to the most complex. The divisions outlined are not absolutes and three are other systems or hierarchies that have been devised in the education and training world. However, Blooms taxonomy is easily understood and is probably the most widely applied today.

The following variables: Assessment, Teaching qualification, Teaching subject, Gender which occurs at two levels: male and female, teaching experience at five levels: 0-4 years, and 20 above. Teaching qualification at five: First degree/HND, Master degree, Ph.D and others. Dependent variable: Higher order thinking skills were used in this study.

## Research Hypothesis

**Hypothesis 1:** There is no significant relationship between Higher Order Thinking assessment strategy used and gender, teaching experience and educational qualification of the respondents.

**Hypothesis 2:** There is no significant relationship between Higher Order Thinking assessment tool and gender, teaching experience and educational qualification of public Secondary School Teachers.

**Hypothesis 3:** There is no significant relationship between Higher Order Thinking questioning methods and gender, teaching experience and educational qualification of the sampled teaches.

## Population

The target population comprised of school teachers in public schools in the eleven local government areas within the Ibadan metropolis.

## Sample

Ten Local Government Areas were randomly selected out of the eleven Local Government Areas in Ibadan land. Two secondary schools in each of the ten selected Local Government Areas were randomly selected. Thus, the twenty schools were used in the study as the sample for the study. Random sampling was adopted to select three hundred teachers at 15 per school.

## Instrumentation

One instrument: Assessment Practice Questionnaire (APQ) was used to elicit necessary responses from the respondents. The first part of the instrument was designed to elicit demographic information such as sex, teaching experience, teaching qualification and teaching subject. The second part of the instrument

was made up of twenty-five Likert type items that elicit information on assessment of Higher Order Thinking Skills. The items were developed after intensively going through literature.

### Reliability and Validity of the Research Instruments

To establish the reliability and validity of the instruments, it was pre-tested on 50 respondents. The instrument was administered to a representative sample of randomly selected secondary school teachers outside the area covered by the real study in Ibadan. It was administered in six public secondary schools.

The reliability coefficient of the instrument was computed using coefficient alpha analysis from SPSS package (which is a reflection of the internal consistency and construct validity of instruments) which is 0.8131. This shows that the instrument is valid and reliable.

### Procedure for Data Collection

The researchers personally went round the selected schools to administer the instrument to the respondents. It took the researchers five weeks to administer and collect the instruments from the respondents.

### Results

**Hypothesis 1:** There is no significant difference between Higher Order Thinking assessment strategy used and gender, teaching experience and educational qualification of the respondents.

**Table 2: Difference between Assessment Strategy Used and Gender, Teaching Experience and Educational Qualification of the Respondents.**

	$\chi^{2obs}$	Df	P-value	Decision
Gender	6.557%	3	.087	Not Significant
Experience	23.034	12	.027	Significant
Qualification	12.227	6	.016	Significant

The data collected was analyzed with the aid of Chi-square ( $\chi^2$ ). The null hypothesis tested at 0.05 level of significant stated that there is no significant relationship between Higher Order Thinking assessment strategy and gender, teaching experience and educational qualification of the teachers in Ibadan Secondary Schools. The  $\chi^2$  observed value(s) obtained are 6.557, 23.034, and 12.227 degree of freedom is 3, 12 and 6 respectively. Both teaching experience

and educational qualification are significant, since their probability values less than 0.05 ( $P < 0.05$ ) while gender does not reflect any significant difference since its probability value is greater than 0.05.

**Hypothesis 2:** There is no significant difference between Higher Order Thinking assessment tool and gender, teaching experience and educational qualification of public Secondary School Teachers.

**Table 3: Difference between Assessment Tool and Gender, Teaching Experience and Educational Qualification of Public Secondary School Teachers.**

	$\chi^{2obs}$	Df	P-value	Decision
Gender	2.688	3	.442	Not Significant
Experience	9.890	12	.626	Not Significant
Qualification	9.333	6	.156	Not Significant

The data was analyzed using Chi-Square ( $\chi^2$ ) and the null hypothesis tested at 0.05 level of significance stated that there is no significant relationship between Higher Order Thinking assessment tools used and gender, teaching experience and educational qualification of the teacher in Ibadan Secondary Schools. The  $\chi^2$  observed value(s) are 2.668, 9.990 and 9.333 degree of freedom is 3, 12 and 6 respectively. None of the variables is significantly different, since their probability values are greater than 0.05 each, so we fail to reject the null hypothesis.

**Hypothesis 3:** There is no significant difference between Higher Order Thinking questioning methods and gender, teaching experience and educational qualification of the sampled.

**Table 3: Difference between Questioning Methods and Gender, Teaching Experience and Educational Qualification**

	$\chi^{2obs}$	Df	P-value	Decision
Gender	1.750	3	.626	Not Significant
Experience	7.799	12	.801	Not Significant
Qualification	105.256	6	.000	Significant



The result of the data collected was analyzed with Chi-Square ( $\chi^2$ ). Null hypothesis tested at 0.05 level of significance stated that there is no significant relationship between Higher Order Thinking questioning methods and gender, teaching experience and educational qualification of the teachers in Ibadan Secondary Schools. The  $\chi^2$  observed value(s) are 1.750, 7.799 and 105.256 degree of freedom is 3, 12 and 6 respectively. It is only educational qualification that is significant, since only its probability value is less than 0.05 ( $P < 0.05$ ) while others are not significant since their probability values are greater than 0.05 each.

## Discussion

In linking the qualification of teachers to their use of varied assessment tools, it was discovered that only few teachers with B.Sc/HND stated that they were very much involved in using some other Higher Order Thinking assessment tools apart from paper and pencil test while few of teachers with M.Sc qualification use varied Higher Order Thinking assessment tools. Insignificant few of teachers with other qualifications use varied Higher Order Thinking assessment tools too. The minority of the teachers sampled use Higher Order Thinking assessment tools in their classrooms, this confirming the finding of (Onuka and Oludipe, 2004) that most teachers do use varied w assessment tools/strategy.

It can thus be inferred from the findings that teacher with tertiary education qualification use better approaches that promote the development of higher order thinking skills than those with lower qualification majority of teachers with B.Sc/HND and M.Sc qualification stated that it was quite true of some of the teachers to use thinking approaches such as inquiry approaches. A good number of teachers with B.Sc/HND clearly stated that they use higher order question while only few of them stated that they seldom do.

## Educational Implication

The findings of this study show that:

- (i) Both teaching experience and educational qualification have significant differential effects on assessment strategies usage of Secondary School teachers while gender does not.
- (ii) Different assessment tools used by the Secondary School teachers are not influenced by their gender, teaching experience and educational qualification.
- (iii) Educational qualification has significant influence on the questioning method used by the Secondary School teachers but gender and teaching experience do not.

A lot of teachers in public schools are not aware of thinking models that can be used to promote the development of higher order skills. Therefore alternative assessment strategies such as assessment observation technique and checklist among others should be introduced.

## **Conclusion and Recommendations**

The study examined the assessment methods tools adopted by teachers in our public secondary schools. In the Nigerian public secondary school, students are assessed mostly using paper and pencil test and end of term examinations. The study also shows that the content continuous assessment test and end of term examination papers contained only few questions that promoted higher order thinking in learners. Furthermore, the investigation also revealed extent to which teacher set clear criteria when giving assessment tasks and the level of planning and organization undertaken by teacher in public secondary schools for learning experiences, which can still be improved upon given the low level of their usage.

It was found that although assessment as stated in The Nigerian National Policy on Education in possess very rich potentials to develop learners higher order thinking skills, teacher, in our public secondary schools need to consistently plan and organize learning activities, set clear criteria for learners when giving assessment tasks and small frequently use higher order question such as application analysis and evaluation.

Based on the findings as highlighted above the following recommendations are made: Teachers in public school should undergo regular training and retraining programmes. Seminar and workshops and in-service programmes would be also mounted for teachers in assessment teachings and be also sponsored to training programmes.

Teaches in our public secondary schools need to make higher order questioning and technique balance both traditional and modern assessment techniques as integral aspect of the teaching and assessment process in classroom interaction in order to promote the development of higher order thinking classroom environment in public secondary schools.

Lecturers in teacher training programmes and organizers of teacher workshops and seminars need to incorporate assessment techniques for developing higher order thinking skills into their programmes.

Teacher training programmes in higher institutions in Nigeria should revisit their course content and include mandatory courses on assessment that focus on alternative/modern assessment techniques aside from traditional assessment methods.

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