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TEACHERS' UTILIZATION OF AUTHENTIC ASSESSMENT FOR EFFECTIVE TEACHING OF SCIENCES IN PUBLIC SECONDARY SCHOOLS IN ANAMBRA STATE

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ABSTRACT

The importance of sciences education cannot be overstated, as it plays a critical role in preparing students for the complexities of the 21st century. However, the traditional methods of assessment have been criticized for their limitations in promoting deep learning and understanding of scientific concepts. In response to this need, this study examined teachers' utilization of authentic assessment for effective teaching of sciences in public secondary schools in Anambra State, Nigeria. Two research questions and one hypothesis guided the study . The study adopted descriptive research design. The population of the study consisted of 6,598 teachers in all public secondary schools in Anambra State, Nigeria. The sample of the study comprised of 430 teachers as respondents. Stratified and Simple random sampling technique were adopted in drawing teachers from the public secondary schools. The instruments for data collection were structured questionnaire titled "teachers' utilization of authentic assessment Questionnaire (TUAAQ)" and "Effective Teaching of Science Questionnaire (ETSQ)". The instruments were subjected to face and construct validity by three experts. The reliability of the instruments were established using Cronbach's Alpha statistics, the average reliability coefficient showed a value of 0.71 for (TUAAQ) and 0.83 for (ETSQ), therefore the instruments were considered reliable and adequate for the study. The researcher visited the sampled schools with the aid of six briefed research-assistants to administer and retrieve the copies of the questionnaire. The research questions were answered using mean and standard deviation, while the hypotheses were tested at 0.05 level of significance using t-test. The findings indicated that teachers' utilization of authentic assessment is to a low extent and significant for effective teaching of sciences in public secondary schools in Anambra State The study recommended the implementation of authentic assessment in the teaching of sciences, including integration with 21st-century skills, use of technology, and design of real-world applications. The study also recommended the need for professional development opportunities, resources, and policy support for educators to effectively implement authentic assessment in the teaching of sciences.

Keywords: Authentic Assessment, Effective Teaching, Sciences Education, Gender

Introduction

Assessment is very important in teaching and learning process; this is because through assessment, feedback could be provided to both students and teachers. Thus, assessment is a central element in the overall quality of teaching and learning. Teachers through thought implementation of assessment practices create a supportive learning environment that fosters students learning. It is very essential for all educational actions. Information gotten from assessment is a vital tool in the hands of the professional teacher. It directs, guides and protects both the teacher and the learner at every stage of academics. Adinna and Okaforcha (2019) stated that Assessment is the systematic procedure of recording the success, failure, knowledge, attitude and skills to redefine and improve students' academic achievement. It could be

monitoring and recording of students' academic activities and interpreting their actions in order to estimate and judge the result for better students learning and teachers teaching. It is both a formative and summative process used by teachers and students to evaluate student performance, aiding in decision-making for further instruction and grading units (McMillan, 2023). Recent research on student learning and motivation highlights the importance of effective assessment literacy, which includes key teacher competencies, beliefs, and establishing the right assessment environment (McMillan, 2023).

Assessment has become a significant issue in schools and districts nationwide (Witte, 2012; Popham et al., 2017). Teachers analyze students' performance using various techniques to ascertain whether they have met the learning objectives. Classroom assessment is a vital responsibility for teachers, utilizing various methods and tools to evaluate students' performance and achievement of learning outcomes(Witte, 2012; McMillan, 2023; Hamre et al., 2012). Science education deals with sharing of science content and process with individuals who are not considered traditionally to be member of the scientific community; the individuals could be students, farmers, market women or a whole community. Science education in Nigeria concentrates on the teaching of science concepts, method of teaching and addressing misconceptions held by learners regarding science concepts. Despite all the great things science education can accomplished in the national development of a nation, There are many problems militating against it especially in Nigeria In the light of the review of Aina 2023 it is obvious that science education is very important to national development; insecurity and corruption are the major problems militating against its development in Nigeria. However, there are other problems like unstable political system of government, poor economy, poor method of teaching and teachers' attitude to teaching. The researcher also that method of assessment may constitute to the problem. Continuous assessment is an ongoing process of evaluating a student's learning and performance over a period of time, rather relying mainly on one final examination. Continuous assessment according to Adinna et al. (2021) stated that it is systematic and objective process of determining the extent of a student's performance in the expected changes in his/her behavior of all information derived with a view of using them to help the students.

Despite being an essential component of continuous assessments in Mathematics face numerous challenges, particularly in some public secondary schools in Anambra State which are overloaded teacher workloads, large class size, time constraints, poor feedback practices, lack of resources, manual record keeping, lack of personalize instruction, and limited use of assessment data to inform teaching. Lajane (2020) stated that some of these challenges facing continuous assessment which include time and resource constraints. While according to Cisse (2021) other challenges of continous assessment such as predominance of the grade, class size, students' engagement and differentiation. According to Hopfenbeck (2023) formative assessment implementations are influenced by accountability structures, educational leadership, resources, workload and social pressures within their context. Teachers find it challenging to provide enough feedback to students, particularly at crucial times in the learning process, as well as with the quality of feedback required to further each student's learning, due to time and other resource constraints. productive citizen, an individual must be capable of performing meaningful tasks in the real world. Assessments should be fair (generate faith in the assessment system), reliable (generate confidence that work at an equivalent standard is assessed at the same level), valid (representative of LOs) & authentic (assessing meaningfully)(Villarroel, Boud, Bloxham, Bruna, & Bruna, 2020). Preliminary work on authentic assessment was undertaken by Hart (1994) in which he stated that it is an assessment made through students' presentation or performance in the form of work assignments or various specific activities with straight educational meaning. This is in line with a statement by

Marzano & Kendall (2007) that authentic assessment contains three elements of innovation in the field of assessment. First, it does not measure the achievement of traditional learning goals, but rather emphasizes the real abilities of the learning subject. Second, it is comprehensive, develops all the subjects' learning abilities through learning activities according to constructivism.

Third, it does not use a traditional test system but a variety of ways. Within authentic assessment, the process of it is an inseparable part of the learning process where it must reflect the real world problems and not only academic ones. Again, it must use a variety of measures, methods and criteria that are appropriate to the characteristics and essentials of the learning experience. Assessment must be holistic which covers all aspects of the learning objectives (cognitive, affective and psychomotor contemporary educational reforms dictate the need for teachers to assess learners using authentic approaches (Ching & Wang, 2021). Authentic assessment is a learner-centered approach that evaluates students' abilities through tasks that mirror the complexity and practicality of real-world challenges. It moves beyond traditional testing to encompass a variety of dynamic methods, such as projects and portfolios that require students to apply their knowledge and skills in meaningful way (Dwamena, 2023). This form of assessment aims to prepare learners for professional and personal success by emphasizing practical problem-solving abilities, critical thinking, effective communication and collaboration. Empirical evidence has shown that authentic assessment has significantly improved instructional outcomes for both teachers and learners (Aziz et al., 2020; Huckle et al., 2021). For instance, Aziz et al. (2020) found that authentic assessment practices enhance student engagement and motivation by providing real-world relevance to learning tasks.Similarly, Huckle et al. (2021) reported that teachers who implement authentic assessments are better able to identify and address individual student needs, leading to more personalized and effective instruction.

These findings underscore the importance of utilization of authentic assessment strategies into teaching practices. By doing so, educators can create more meaningful and impactful learning experiences that not only measure student knowledge but also develop critical thinking and problem-solving skills. The review of study on authentic assessment in most countries seems inadequate (Bordoh et al., 2015; Butakor & Ceasar, 2021; Kankam et al., 2014; Mintah, 2017; Osman, 2021). Bordoh et al. (2015) revealed that while social studies teachers possess a foundational understanding of authentic assessment, its classroom application is inconsistent due to such constraints as policy limitations and resource availability. Butakor and Ceasar (2021) found that teachers perceive authentic assessment as beneficial for students' performance, particularly in fostering higher-order thinking skills. However, Kankam et al. (2014) identified a significant gap between teachers' recognition of the value of authentic assessment techniques and their actual implementation in social studies lessons. Mintah (2017) and Osman (2021) reported similar discrepancies in other subject areas, highlighting a systemic issue within the educational framework. This study wanted to fill these gaps by examining the level of utilization of authentic assessment method in teaching of Sciences in public secondary schools in Anambra State.

The issues of gender on students' academic engagement in secondary education has become a global debate. Gender has been defined and described variously by scholars. Okeke in Nnamani and Oyibe (2016), described gender as socially constructed roles and socially learned behaviours and expectations associated with males and females. Gender is the social meaning associated with being a male or a female, including the construction of identities, expectations, behaviours and power relationships that derive from social interactions. Gender is explained according to the social roles and expectation of male and female persons in a given society. Gender is a major factor that influences academic achievement and subject interest of

senior secondary school students while females' may emphasize cooperation and support, male students may establish groups that are hierarchical or competitive.

Purpose of the Study

The main purpose of this study was to examine teachers' utilization of authentic assessment for teaching of sciences in public secondary schools in Anambra State. Specifically sought to ;

1. Determine teachers level of utilization of authentic assessment in teaching of science public secondary schools in Anambra
2. Examine male and female teachers' level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State

Research Questions

The following research questions guided the study:

1. What is teachers level of utilization of authentic assessment in teaching of science public secondary schools in Anambra
2. What is male and female teachers' level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State

Hypotheses

The following null hypotheses guided the study:

1. There is no significant difference in the mean ratings of male and female teachers' on level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State

Methods

The research design for this study was descriptive survey design. Umeh (2017) regarded descriptive survey design as the structure that guides the researcher on the procedure for generating data and provides the basis upon which the generated data is analyzed. The study will make use of descriptive survey design because it enabled the researcher to collect original data from the respondents and described the present conditions as they exist in their natural settings. The study is situated in Anambra State .The population of the study comprised 6185 teachers in all the 267 public secondary schools in Anambra State. The sample of 430 teachers as respondents were used for the study. Proportionate stratified and simple random sampling was used to select the sample of the study. In doing this, proportionate stratified random sampling was used to select five schools each from the six education zones in Anambra State. Simple random sampling technique was further employed to select 3 teachers each from the five schools selected in the education zones in Anambra State. Thus, one selected school for three teachers; five selected schools in each Zone for 15 teachers each. In selecting the respondents, 75 teachers were selected from each of the six education zone making a total of 430 teachers for the study.

The instruments for data collection were two structured questionnaire titled teachers' utilization of authentic assessment Questionnaire and Teaching of Science Questionnaire (TSQ). The instrument was divided into two sections. Section 'A' comprised personal information of the respondents. Section B 'Which is made up of 25-items questionnaire which contains on utilization of authentic assessment with four response options of Very Highly Utilized (VHU), Highly Utilized Lowly Utilized (LU), and Very Lowly Utilized (VLU). Section 'C' which is has 10-item statements with four response options of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

The instrument (questionnaire) was face validated by two experts. One expert in Measurement and Evaluation and one from Psychology all from Department of Educational Foundations, Faculty of Education, Chukwuemeka Odumegwu Ojukwu University, Igbariam campus. The topic, the scope , purpose of the study, research questions and hypothesis were presented to the experts as guide. These experts ascertained the clarity and relevance of items to the research work. They also made some helpful suggestions such as restructuring the instrument from three-point scaling to four point scaling measurement. Thus, all these were considered and affected, which made the instrument fit for the study. The reliability of the instrument was established through internal consistency estimate. Ten (10) teachers each was used from two different schools in Delta State, making a total of 20 teachers, in a trial test to establish the reliability using Cronbach alpha statistics. The result yielded 0.86 and 0.82 which were considered highly reliable and suitable for the study

The researcher made use of three briefed research assistants to assist in the administration and retrieval of the completed instrument. This facilitated data collection given the large geographical area involved. The instruments were administered using the face to face method. This ensured that the instruments meant for the respondents were completed by them and for easy explanation of questions, words or phrases that needed explanation. Thus, the researcher administered 430 copies of questionnaire to teachers. Out of which 410 (95%) copies were correctly filled and returned while 20 (5%) were moreover improperly completed. Data collected for the study was analyzed using mean and standard deviation to answer research questions and independent sample t-test to analyze the hypotheses.

For Research Question 1and 2
: The researcher made use of mean.
Decision Rule For Research Question 3 and 4: The researcher made use of mean.
Decision Rule:

Very Highly Utilized (VHU)	(5)	4.5 - 5.00
Highly Utilized (HU)	(4)	3.5 - 4.49
Moderately Utilized (MU)	(3)	2.5 - 3.49
Lowly Utilized (LU)	(2)	1.5 - 2.49
Not Utilized (NU)	(1)	0.5 – 1.49

:
For Effective teaching of Science

Strongly Agree (SA)	4 = 3.5 - 4.00
Agree (A)	3 = 2.5 - 3.49
Disagree (D)	2 = 1.5 - 2.49
Strongly Agree (SD)	1= 0.5 – 1.49

Hypotheses
For p-value when
P-value < .05:Reject H0 and Accept H1
P-value > .05: Accept H0 and Reject

Presentation And Analysis Of Data
Presentation of results and the analysis of data collected for the study. The data obtained from the field by the researcher are presented and analyzed in relation to the research questions and hypotheses in the study.

Data Analyses;

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Research Questions 1: What is teachers' level of utilization of authentic assessment in teaching of science public secondary schools in Anambra

Table 1: Mean ratings of teachers on level of utilization of authentic assessment in teaching of science public secondary schools in Anambra

S/n	Item description	N	Mean($\bar{X}$)	Std. Dev.	Decision
1	Authentic assessments provide a more accurate reflection of students' abilities than traditional tests.	410	2.38	0.41	LU
2	I have observed that students engage more actively in learning when authentic assessments are used.	410	2.91	0.32	MU
3	I have observed that students engage more actively in learning when authentic assessments are used.	410	1.87	0.83	LU
4	Students are more motivated to perform well in authentic assessment tasks than in traditional assessments.	410	2.25	0.76	LU
5	Authentic assessment encourages students to take ownership of their learning.	410	1.48	0.98	NU
6	I find it challenging to design authentic assessment tasks that align with curriculum objectives.	410	1.35	0.49	NU
7	Authentic assessment tasks require more time and effort to prepare than traditional assessments.	410	2.75	0.83	MU
8	My school provides sufficient resources to implement authentic assessments effectively.	410	2.83	0.47	MU
9	I receive adequate professional development opportunities related to authentic assessment	410	2.35	0.84	LU
10	There is a supportive environment in my school for teachers who wish to use authentic assessment.	410	1.43	0.98	NU
11	I have access to necessary tools (e.g., technology, instructional materials) to conduct authentic assessments	410	4.72	0.49	VHU
12	I believe that authentic assessment should be integrated more into educational practices	410	3.43	0.76	MU
	Total Mean		29.75	8.16	
	Grand Mean		2.48	0.68	LU

Analysis in table 1 showed the mean ratings of teachers on items 5,6, and 10 on level of utilization of authentic assessment in teaching of science in public secondary schools in Anambra to not utilized with the mean ratings of 1.48,1.35,and 1.43. The findings also showed that teachers agreed to items 1,3,4 and 9 to lowly utilized with mean rantings 2.38,1.87,2.25, and 2.35, While thy agreed on items 2,7,8 and 12 moderately with the mean ratings 2.91, 2.71, 2.83 and 3.43 and item 11 to very highly utilized .

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Research Questions 2: What is male and female teachers' level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State

Table 2: Mean ratings of male and female on level of utilization of authentic assessment in teaching of science in public secondary schools in Anambra

		MALE				FEMALE			
		N	MEAN	SD	RE	N	MEAN	SD	RE
1	Authentic assessments provide a more accurate reflection of students' abilities than traditional tests.	147	2.44	1.06	LU	263	2.16	1.27	LU
2	I have observed that students engage more actively in learning when authentic assessments are used.	147	2.5	1.00	MU	263	2.18	1.26	LU
3	I have observed that students engage more actively in learning when authentic assessments are used	147	2.33	1.13	LU	263	2.21	1.24	LU
4	Students are more motivated to perform well in authentic assessment tasks than in traditional assessments	147	2.34	1.13	LU	263	2.17	1.25	LU
5	Authentic assessment encourages students to take ownership of their 6learning.	410	2.42	1.08	LU	263	1.01	0.21	NU
6	I find it challenging to design authentic assessment tasks that align with curriculum objectives.	147	2.40	1.23	LU	263	1.03	0.30	NU
7	Authentic assessment tasks require more time and effort to prepare than traditional assessments.	147	2.44	1.08	LU	263	2.06	1.22	LU
8	My school provides sufficient resources to implement authentic assessments effectively.	147	2.53	1.00	LU	263	2.13	1.25	LU
9	I receive adequate professional development opportunities related to authentic assessment	147	2.41	1.08	LU	263	2.13	1.25	LU
10	I have access to necessary tools (e.g., technology, instructional materials) to conduct authentic assessments	147	2.21	1.06	LE	263	1.37	0.42	NU
11	I have access to necessary tools (e.g., technology, instructional materials) to conduct authentic assessments	147	2.20	1.27	LU	263	2.31	0.01	LU
12	I believe that authentic assessment should be	147	2.21	1.28	LU	263	1.82	0.98	LU

integrated more into educational practices					
Total mean	26.41	13.5		21.55	11.65
Grand mean	2.20	1.13	LU	1.79	0.97

Analysis in table 2 showed the mean ratings of male and female on level of utilization of authentic assessment in teaching of science in public secondary schools in Anambra .The findings showed that male teachers ranting to items 1,3,4,5,6,7,9,10,11 with mean ratings 2.44, 2.51, 2.33, 2.34, 2.42, 2.40, 2.44, 2.41,2.22,2.20 and 2.21 .They agree to items 2 and 8 to moderately utilized with the man rantings of 2.51 and 2.53. On the other, female teachers agreed to items 5,6,and 10 to not utilized with mean ratings 1.01, 1.03, 1.37 ,while they agreed to items 1,2,3,4,7,8,9,11,and 12 to lowly utilized with mean ratings of 1.27,
Furthermore, the grand mean for male and female teachers is 2.20 and 1. 79 respectively indicated that there is a lowly level of utilization of authentic assessment in teaching of science in public secondary schools in Anambra by male and female teachers.

Test of Hypothesis

Hypothesis One: There is no significant difference in the mean ratings of male and female teachers' on level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State.

Table 1: Independent sample t-test of male and female teachers' on level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State.

Variables	Respondents Teachers	N	Mean	Std. Dev	Df	Sig. (2-tailed)
of utilization of authentic assessment	Male		147	0.20	398	0.07
	Female		263	0.17		

*Significant at p <0 .05

Analysis in Table 3 showed the independent sample t-test of male and female teachers on level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State.

The result showed that P-value of 0.08 ≥ 0.05 level of significance which resulted in the decision not to reject the null hypothesis. The study therefore concluded that there is no significant difference in the mean ratings of male and female teachers on level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State.

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Discussion

Teachers' level of utilization of authentic assessment in teaching of science public secondary schools in Anambra

The study revealed a low utilization of authentic assessment in teaching sciences in public secondary schools in Anambra State. This finding is in accordance with that of Kankam et al. (2014) that identified a significant gap between teachers' recognition of the value of authentic assessment techniques and their actual implementation in social studies lessons. This finding showed that teachers are not adequately incorporating real-world applications, practical tasks, and performance-based evaluations in their assessment practices. Teachers may not have received sufficient professional development on authentic assessment strategies. Schools may lack the necessary resources, such as technology or equipment, to implement authentic

assessments Also, Eze & Okoye Found that 78% of Science teachers in South-East Nigeria used only objective tests and teacher-made quizzes. Authentic strategies like portfolios, peer assessment, and exhibitions were "rarely" or "never" used due to time pressure and large classes. Supports your finding of low utilization.

Male and Female teachers' level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State

Findings indicated that there is male and female teachers' low level of utilization of authentic assessment in teaching of science in public secondary schools in Anambra, Also,there is no significant difference in the mean ratings of male and female teachers on level of utilization of authentic assessment in teaching of science public secondary schools in Anambra State.. These findings are in consistent with that of Sutadji, (2021) which showed that real difference seen in these two fields of science is that the use of written tests is mostly carried out by lecturers in the natural field, in contrast to lecturers in the social field who do more performance tests. Despite the emphasis of the Senior Secondary Science Curriculum on inquiry, practical skills, and real-life application, Science teachers still rely predominantly on conventional paper-and-pencil tests and end-of-term examinations. This low utilization limits students' opportunity to develop critical thinking, problem-solving, and other 21st-century competencies expected of scientifically literate citizens.

Recommendations

1. The Ministry of Education should lead educational reforms and policies that emphasize authentic assessments, and should review and revise the education system's assessment policies**.**
2. The Ministry of Education should organize timely and regular training and workshops for science teachers on the design, development, and implementation of authentic assessments.
3. Ministry should provide necessary resources and infrastructure to support the implementation of authentic assessments in public secondary schools. This could include provision of technology, equipment, and other materials needed to facilitate practical assessments and projects.

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