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Extent of teachers' implementation of different modes of continuous assessment and challenges in secondary school biology teaching in Nsukka, Enugu State

Innocent Ebere Okereke [1], Grace Ada Ikoroha [1] and Christian Nwachukwu Olori [2,*]

[1] *Department of Science Education, University of Nigeria, Nsukka.*
[2] *Department of Continuing Education & Development Studies, University of Nigeria, Nsukka.*

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Abstract

This study focused on the extent of teachers' implementation of various modes of continuous assessment and challenges in secondary school Biology teaching. It was guided by three research questions and was conducted in Nsukka L.G.A. It adopted a descriptive survey research design. The population was 59 Biology teachers, who also served as the sample. The data collection instrument was researchers-developed rating scale titled "Teachers' Implementation of Different Modes of Continuous Assessment in Biology Scale". It was face-validated, and internal consistency reliability was determined using Cronbach's Alpha. Its overall reliability coefficient index was 0.83. Data were analysed using mean and standard deviation. Findings revealed that multiple-choice questions, essay questions, assignments, classwork, and fieldwork are CA modes used by secondary school Biology teachers to a great extent. Additionally, challenges such as a lack of training, time constraints, limited access to technology, teachers' reliance on traditional assessment modes, and grading workload hinder the effective use of CA modes in Biology teaching. Based on the findings, it was recommended that Biology teachers be trained to integrate technology into various continuous assessment modes to enhance Biology instruction.

Keywords: Teachers' Implementation; Different Modes; Continuous Assessment; Challenges

1. Introduction

Assessment in Education has to do with the process of gathering and analyzing information about students' knowledge, skills or attitude to make value judgement. It is commonly described as a systematic, evidence-based process of collecting, recording, and interpreting information about learners' knowledge, skills, attitudes, and needs (McMillan, 2021; Popham, 2017). It is also a systematic process of gathering data from variety of sources in order to understand, describe and improve learning (Nworgu, 2019). Nworgu (2019) further asserted that assessment in education can be summative assessment when it is done to show the end of a given lesson, unit, programme or period of schooling which is used for selection, placement, certification and employment among others. Conversely, formative assessment does not connote *an end* in its sense but an assessment carried out while a lesson, unit or programme is still in progress which its feedback is to improve learning. Formative assessment, when paired with timely and actionable feedback enhances learning outcomes meaningfully (Bennett, 2018; Organisation for Economic Co-operation and Development [OECD], 2020). Key features such as reliability, validity, fairness, and alignment with learning goals, determine whether an assessment genuinely reflects students' abilities (Wiliam, 2019; Gikandi, Morrow, & Davis, 2011). Assessment plays vital role among which is to promote effective teaching and learning of curriculum contents by serving as the primary means via which educators evaluate students' understanding, track progress, and make informed instructional choices. Thus, methods of carrying out assessment becomes necessary.

* Corresponding author: Christian Nwachukwu Olori

In education, there are diverse methods of conducting assessment. Different assessment methods such as pen-and-paper tests, oral exams, practical tasks, and computer-based assessments, each offer unique chances to evaluate diverse learners' outcomes (Brown, 2020; McMillan, 2021). Traditional approaches remain common because they are simple to administer, but technological advances have led to more dynamic forms like simulations, adaptive testing, and AI-supported evaluation tools (Burdick & Glass, 2019). However, adopting these innovations depends heavily on available digital infrastructure and teacher readiness; conditions often lacking in under-resourced areas (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021; Okebukola & Jegede, 2016). This imbalance raises concerns about the fairness and inclusiveness of assessment practices across different schools.

In addition, a perennial challenge across assessment modes is providing feedback. Although digital systems can automate marking, they often do not produce the qualitative feedback students need to understand and improve in their learning (Sadler, 2020; Taras, 2020). Again, teachers' workloads and large class sizes limit the frequency and quality of feedback received from assessment (Andrade, 2019; Newton, 2018). Thus, many students, especially in under-resourced schools, receive delayed, insufficient, or unclear feedback, thereby reducing the formative effectiveness of assessment (Black & Wiliam, 2018; Okpala & Onocha, 2019). The above issues could become more pronounced in situations where the assessment is meant to be regular as seen in continuous assessment which many schools are not giving the seriousness it deserves as they give to termly examinations.

Continuous assessment (CA) is a process in which learners' performance is measured regularly throughout a course or term instead of relying on a single final examination. It is a mechanism whereby the final grading of a student in cognitive, affective and psychomotor domains of behaviour takes account, in a systematic way, of all his/her performance during a given period of schooling (Nworgu, 2019). It is the systematic collection of marks or grade about a learner in a school subject over a period of time and their aggregation which contributes to the final grade of such a learner in that school subject. Thus, continuous assessment from the definitions is holistic, systematic, cumulative, diagnostic and guidance-oriented.

Furthermore, when considered from the stated characteristics, teachers across schools are expected to take continuous assessment seriously and use the information thereof to guide their students' learning and improve their methods of teaching. This is also necessary as continuous assessment in Nigeria could account for 40% of students' final grades at the basic and senior secondary school levels (Federal Ministry of Education, 2020). Continuous assessment (CA) helps to improve learning through the feedback gotten from regular quizzes, assignments, projects, class participation, and practical activities (Chappuis, 2017; Okpala & Onocha, 2019). Evidence shows that CA improves motivation, reinforces study habits, and boosts performance of students, particularly in science subjects, where active engagement and practice are vital (UNESCO, 2021; Abadie & Bista, 2018; Bennett, 2018). However, despite its importance and contribution to the learner's overall assessment and progression, the implementation of CA varies greatly across schools using different modes.

Continuous assessment modes are diverse techniques or tools used in a school subject or course to regularly monitor progress, provide feedback and improve students' learning outcomes. In science subjects such as biology, ongoing assessment is expected to evaluate not only cognition but also practical skills as well as scientific attitudes (McMillan, 2021; Federal Ministry of Education, 2020). Practical tasks like laboratory work/experiment, field investigations, and specimen identification among others are essential for assessing students' hands-on scientific abilities (Okpala & Onocha, 2019). These activities require adequate laboratory facilities, instructional materials, and skilled teachers, which may often be lacking in many Nigerian secondary schools especially in rural areas. As a result, CA usually done using written test could undermine its comprehensive intent. Reports show that teachers face numerous obstacles that limit their use of diverse CA modes. Among such obstacles are large class sizes, inadequate laboratory resources, insufficient training, and heavy workloads (Okebukola & Jegede, 2016; Obioma & Salau, 2017). It has been observed that many biology teachers in sub-Saharan Africa lack sufficient resources for practical assessments (Cossa & Uamusse, 2015; Mwangu & Sibanda, 2017). Additionally, many teachers have limited expertise in designing valid CA tools or providing constructive feedback, leading to inconsistent and sometimes unreliable assessment outcomes (Carless, 2016; Gikandi, Morrow & Davis, 2011). These challenges are indication that despite the need for promoting CA across schools, actual implementation using different modes needs to be explored as supported by multiple intelligence theory.

Multiple Intelligence Theory as proposed by Gardner (1983) suggests that learners have different types of intelligence: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic. As such, no single type of assessment mode can capture all intelligences; supporting the use of variety of continuous assessment modes to ensure comprehensiveness and fairness. While continuous assessment is widely advocated across all levels of education, there is need to find out in practice, the extent teachers use different continuous assessment modes in biology teaching which has little empirical attention, the challenges militating against the effective use of

continuous assessment modes in biology teaching and their solutions in specific local contexts such as Nsukka Local Government Area of Enugu State. Addressing these gaps are crucial in understanding how assessment practices influence instructional effectiveness in biology. This study therefore explores the extent of teachers' implementation of different modes of continuous assessment in secondary school Biology teaching in Nsukka Local Government Area of Enugu State.

Specifically, the study sought to find out the:

- Extent teachers use different continuous assessment (CA) modes in secondary school biology teaching.
- Challenges affecting the effective use of CA modes in secondary school biology teaching.

1.1. Research Questions

The following research questions were raised to guide the study:

- To what extent do teachers use different continuous assessment (CA) modes in secondary school biology teaching?
- What are the challenges affecting the effective use of CA modes in secondary school biology teaching?

2. Methodology

2.1. Design of the Study

The study adopted a descriptive survey research design. This design is considered appropriate because this study aims at collecting data on the extent of implementation of different modes of continuous assessment in secondary school Biology teaching in Nsukka Local Government Area and describes in a systematic manner: the characteristics, features or facts about a given population (Nworgu,2015).

2.2. Area of the Study

The study was carried out in the Nsukka Local Government Area of Enugu State. The choice of this area was because of the problem of poor achievement of students in Biology external examinations, such as the West African Senior School Certificate Examination (WASSCE), for some schools in the locality. The population consisted of 59 Biology teachers in the 32 public secondary schools in the area. They served as participants for the study because the population was manageable. This consensus sampling approach eliminates sampling error and provides comprehensive data from the entire target population (Creswell & Creswell, 2018)

The instrument for data collection was a rating scale titled "Teachers' Implementation of Different Modes of Continuous Assessment in Biology Scale" (TIDMCABS). The scale comprised 16 items, which were subdivided into three clusters. Cluster A was on the extent to which teachers use different continuous assessment modes in secondary school Biology teaching, which has 10 items. Cluster B consisted of challenges affecting the effective use of continuous assessment modes in secondary school Biology teaching. It has 6 items. The response options were in four rating scale. Cluster A, for instance, has response options: Very High Extent (VHE) - 4 points, High Extent (HE) - 3 points, Low Extent (LE) - 2 points, Very Low Extent (VLE) - 1 point. Clusters B and C have response options such as Strongly Agree (SA) -4 points, Agree (A) -3 points, Disagree (D)-2 points, Strongly Disagree (SD) -1 point.

Three specialists in the fields of measurement and evaluation and biology education validated the instrument. The validated instrument was trial tested using 20 Biology teachers in senior secondary schools in Udenu Local Government, outside the study area. The instrument was subjected to a reliability test using the Cronbach alpha statistic. It gave the reliability indices of 0.87 and 0.79 for clusters A-B, respectively, and the overall reliability value of 0.84, which showed that the instrument is reliable (Nworgu, 2015).

The researchers made use of two (2) research assistants to collect the data. The instrument was distributed using the "on-the-spot method" after getting approval from the school authority. This ensured a high percentage return of the responding instrument. The data collated were analysed using mean and standard deviation to answer the research questions. The real limit of numbers was used for decision making in cluster A. This was presented as follows: 1.00 – 1.49. (VLE), 1.50 – 2.49 (LE), 2.50 – 3.49 (HE) and 3.50 – 4.00 (VHE), while the criterion mean score of 2.50 was applied as a benchmark for accepting items in cluster B.

3. Results

Table 1 Mean and standard deviation on the extent teachers use different CA modes in biology teaching (n=59)

S/N	Item statement	Mean	SD	Remark
1	Multiple Choice Questions (MCQs)	3.02	0.84	HE
2	Essay Questions	2.96	0.90	HE
3	Assignment	2.64	0.92	HE
4	Practical/Experiment	2.44	0.92	LE
5	Group Projects	2.48	0.93	LE
6	Oral Presentations	2.41	1.00	LE
7	Classwork/exercises	2.55	0.98	HE
8	Computer-Based Test/Online Assessments/Quizzes	2.23	0.93	LE
9	Attendance/participation	2.47	0.93	LE
10	Fieldwork	2.98	0.85	HE
	Cluster mean	**2.52**	**0.64**	**HE**

Table 1 indicates that items 1, 2, 3, 7 and 10 are to a great extent, as their mean values are also above the acceptable mean of 2.50. Conversely, items 4, 5, 6, 8 and 9 are on a low extent as their mean values are below the benchmark mean of 2.50. The cluster mean of 2.52 and its corresponding standard deviation value of 0.64 further buttress that the extent to which teachers use CA modes in Biology teaching was high.

Table 2 Mean and standard deviation on the challenges affecting the effective use of Continuous Assessment modes in secondary school biology teaching (59)

S/N	Item statement	Mean	SD	Remarks
1	Lack of training of teachers in the use of digital mode of Continuous Assessment	2.92	0.86	Agree
2	Time constraints in the implementation of Continuous Assessment modes	3.32	0.89	Agree
3	Limited access to technology for continuous assessment implementation	3.02	0.84	Agree
4	Teachers' persistence in the use of traditional continuous assessment modes.	3.32	0.89	Agree
5	Grading burden on teachers	2.97	0.89	Agree
6	Communication barriers between teachers and students	2.87	0.86	Agree
	Cluster Mean	3.06	0.32	Agree

Table 2 shows that items 1, 2, 3, 4, 5, and 6 are above the criterion mean value of 2.50, regarded as agree. The cluster mean score of 3.06 and standard deviation further show that the identified items constitute the challenges affecting the effective use of continuous assessment modes in secondary school biology teaching.

4. Discussion

The findings revealed that biology teachers use, to a great extent, some notable conventional continuous assessment modes in secondary school biology teaching. Such CA modes as indicated include multiple-choice questions (MCQs), essay questions, assignments and classwork; unlike practical/experiment, group project, oral presentation, computer-based test/online assessment/quizzes and attendance/participation, which were used to a low extent. The low extent to which teachers' use of practical/experiments, group work, oral presentations, online assessments, and attendance as modes of continuous assessment in biology teaching suggests that students may lack hands-on experience associated with laboratory techniques, apparatus handling, observation, and data interpretation. This is likely to weaken their

scientific inquiry skills and stifle their willingness for further studies in laboratory-based careers. Also, practical activities, group work, and oral presentations help students connect theory to real-life applications. Using such modes to a low extent may bring about superficial understanding, rote memorisation, and reduced motivation. Limited online assessment indicates that teachers may not be fully integrating technology into instruction. This reduces the opportunities for immediate feedback, flexible learning, and the development of digital literacy skills that are essential in modern education. Again, group work and oral presentations foster communication, collaboration, critical thinking, and confidence among students. When these modes of assessment are used to a low extent, students may not adequately develop teamwork and public speaking skills, which are important for academic and professional success.

Although the cluster mean of Table 1 suggests that different continuous assessment modes are used in biology teaching in the study area, the CA modes that were used to a low extent, as contained in Table 1, suggest that evaluation may focus mainly on cognitive aspects rather than practical competence, communication ability, participation, and affective learning outcomes. As such, it limits the comprehensiveness and validity of continuous assessment. The findings are in line with Abrahams and Millar (2008), who state that the underutilisation of practical work is particularly a concern in biology education, where experiential learning is crucial for conceptual understanding.

The low adoption of e-assessment contrasts sharply with findings from developed contexts, such as Holmes (2018), who reported high utilisation of digital assessment in UK secondary schools. This can be attributed to robust technological infrastructure and teacher training in its usage available in such a developed country, unlike in Nsukka, Enugu State. Okoye and Okecha (2021) maintained that while UK institutions benefit from comprehensive digital resources and pedagogical support, schools in Nsukka Local Government Area of Enugu State, Nigeria, face infrastructural limitations and resource constraints that impede technology integration.

The study also revealed that lack of training, time constraints, limited access to technology, teachers' persistence in using traditional continuous assessment modes, grading burden on teachers, as well as communication barriers between teachers and students are the key barriers to the effective use of continuous assessment modes in secondary school biology teaching. These challenges can hinder the effective implementation of diverse continuous assessment modes, thereby negatively affecting students' holistic development, practical competence, and long-term effective learning in biology. The findings are in line with Tesfaye (2017), who states that the challenges militating against the effective use of continuous assessment techniques are related to instructors, students, curriculum, and institutions. The findings are in line with Gikandi, Morrow and Davis (2011) that teacher reluctance toward online assessment may stem from technological barriers and concerns about validity in digital environments.

5. Conclusion

It can be concluded from the findings of this study that the extent of teachers' implementation of different modes of continuous assessment in secondary school biology teaching in Nsukka Local Government Area was moderately to a high extent, with a strong bias toward students' cognition and less emphasis to the CA modes that assess the affective and psychomotor domains that are also important for biology teaching. This imbalance indicates that continuous assessment is not holistic thereby limiting effective learning in biology. It revealed the challenges affecting the effective use of continuous assessment modes in secondary school biology teaching included teachers' persistence in the use of traditional continuous assessment modes.

Recommendations

The following recommendations are made:

- The Ministry of Education, school administrators and professional associations such as the Science Teachers' Association of Nigeria should organize regular workshops, seminars, and in-service training programmes to enhance biology teachers' competence in the use of different modes of continuous assessment in biology teaching particularly practical-based, oral presentations and digital-based continuous assessment modes.
- Education authorities should implement policies that promote manageable class sizes to enable teachers use different modes of continuous assessment effectively in biology teaching.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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