

TEACHERS' KNOWLEDGE AND APPLICATION OF CLASSROOM ASSESSMENT TECHNIQUES IN SECONDARY SCHOOLS

Obianuju A. Okeke¹, Mercy Chidiebele N. Onyeagba^{2*}, Basil C.E. Oguguo³, Ifeoma Clementina Metu⁴, Mary Nneka Nwaikpo^{5*}, Victor Ugochukwu Ezeonwumelu⁶, Azukaego Ifeoma Eluemuno⁷, Chukwuemeka Metu⁸, Chika Judith Abolle-Okoyeagu⁹, Lydia Ijeoma Eleje¹⁰, Nneka Chinyere Ezeugo¹¹, Oluchi J. Agugoesi¹², Okwara-Kalu Chidinma Eberechukwu¹³

^{1,2,3,12}Department of Science Education, University of Nigeria, Nsukka, Nigeria

^{4,5,6,10,11}Department of Educational Foundations, Nnamdi Azikiwe University, Awka

^{7,13}Department of Psychology/G&C, Alvan Ikoku Federal University of Education, Owerri

⁸Department of Curriculum and Instruction, The University of Alabama, USA

⁹School of Computing Engineering and Technology, Robert Gordon University, Aberdeen

Corresponding Author: mercy.onyegba@unn.edu.ng

Abstract

Classroom assessment techniques have been found to be very effective and beneficial to students learning. This study assessed the level of knowledge and application of classroom assessment techniques (CATs) possessed by Nigerian teachers. The researcher adopted descriptive survey design for the study involving 320 secondary school teachers who participated in the study (53.44% males, 46.56% females). The instrument used for data collection was the teachers' knowledge and application of classroom assessment techniques questionnaire (TKACATQ) with twenty-one (21) items. Cronbach alpha method was used to determine the coefficient of internal consistency to be 0.81. The result revealed that teachers possess high level of knowledge and application of CATs. It was found that gender of teachers significantly influenced the level of knowledge of the teachers in favour of the males but on the basis of application, there was no significant influence of gender. Based on the findings on teachers knowledge and application of classroom assessment techniques in secondary schools, the researcher consider classroom assessment techniques to be an innovation that could contribute to improve students academic achievement in secondary schools. The results of the study thus represent an important contribution to the field of pedagogy and general didactics at secondary education levels.

KEYWORDS: Classroom assessment techniques, muddiest point, memory matrix, assessment for learning and assessment as learning

1. Introduction

In order to determine the progress and pace at which teaching and learning is taking place in a classroom setting, instructional objectives are usually laid out by the teacher at the commencement of teaching and learning exercises or before exposing learners to a particular course content. These objectives serve as guides to the teaching and learning process. Thus, the teacher and the students measure the level of content delivery and the pace at which learning is going on with the help of the instructional objectives. In a classroom situation, the process of measuring this level of content delivery and attainment of learning skills is achieved through

what is called classroom assessment. Assessment generally in an educational setting enables one to easily determine whether behavioural objectives are met or not. According to (Ernest-Ehbuldu & Oporum, 2013), the most accurate way to measure the level of attainment of specific objectives in a classroom setting is through assessment. This agrees with (Nworgu, 2015) who stated that learning cannot be said to have taken place without assessment. Assessment is concerned with the process of collecting information relating to what students have been able to learn during the teaching and learning activities (Propf, 2021). Thus, (Phelan & Phelan, 2010) defined classroom assessment as the act of observing, gathering, analyzing and interpreting evidence or data on the activities of students in order to draw inference or decision on the level of progress of those students. Classroom assessment may be seen as a generic name for activities involving the gathering of data on the level of understanding, abilities, motivation and attitudes of students. Equally, (Nworgu, 2015) defined classroom assessment as a systematic process of gathering data from a variety of sources on the activities of teaching and learning in order to understand, describe and improve learning. These definitions entail that classroom assessment deals with finding out the rate at which teachers are teaching and the level to which students are making progress or not before, during or after learning had taken place in order to make room for improvement where necessary.

Effective classroom assessment requires that teachers possess a clear and complete understanding of the learning goals, have tasks that will ensure the attainment of these goals, and also the ability to interpret the data from these observations (Phelan & Phelan, 2010). It has been pointed out that students learning can be greatly impacted by regular classroom assessment (Absolum et al., 2009). Classroom assessment is helpful in improving students learning as it facilitates prompt feedbacks and helps students in developing and understanding their learning strategies. More so, classroom assessment creates rooms for ascertaining students' area of strengths and weaknesses as well as provide evidence on students which can be use by the teacher to monitor students' progress in order to adjust instructions where necessary (Clarke, 2012). Assessment is carried out for the purpose of improving learning and instructional processes as well as student's results (Propf, 2021).

Essentially, classroom assessment is classified into summative and formative assessment. While summative assessment which is also called assessment of learning is carried out at the end of a lesson, a course, a unit or a programme in order to ascertain what learners have been able to gain after a given period of time or to summarize learning, formative assessment is carried out at the beginning of a course/lesson (assessment for learning) or during the teaching and learning process (assessment as learning) for the purpose of improving students and adjusting instructions (Nworgu, 2015). According to Nworgu, formative assessment takes place when learning is about to begin (assessment for learning) or ongoing (assessment as learning). This implies that formative assessment acts like a safety sign or a traffic light on the road since it stops learning at interval to ensure that mistakes are avoided. Thus, it allows the teacher or the instructor the opportunity to understand how the students are learning and the most efficient approach that can help students learn more by modifying the learning process.

Formative assessment as a form of classroom assessment have been identified by several authors to be very beneficial to teaching and learning. According to PowerSchool (2016), some of the benefits of formative assessment includes a well-defined learning goal, enhanced students' motivation, increased students' engagement, focused and target feedbacks, improved academic achievement etc. More so, (Stiggins & DuFour as cited in Bukola, 2010) mentioned some of the benefits of formative assessment to include improved instructional practices and opportunity for reteaching of concepts confusing to students. These agrees with the view of (Nworgu, 2015) who stated some benefits of classroom formative assessment to include the provision of feedback to both students and teachers, helping teachers and students make adjustment to teaching and learning process and the improvement of academic achievement.

The role of formative assessment in measuring students' understanding has become more important than ever in today's blended instructional environments as its diagnostic nature is essential in guiding lesson planning and instructional adjustment to support student's growth and improvement (PowerSchool, 2016). As a result of the benefits of classroom assessment and the desire to raise or improve students' academic achievements, researchers have carried out several studies in order to find out more practical applications to classroom assessments. This has resulted in the unravelling of several practical approaches to assessing students in the classroom formatively called classroom assessment techniques (Zhao et al., 2016).

According to (Center for Teaching, 2020), classroom assessment techniques are anonymous, simple, non-graded and in class activities that are designed to give the teacher and the students useful feedback on the teaching and learning process within the classroom. The Iowa State University Center for Excellence in Learning and Teaching (ISUCEL) (2020) defined classroom assessment techniques (CATs) as relatively quick and easy formative assessment approaches that helps the teacher assess students' understanding in "real time". Classroom assessment techniques is also defined by the Ohio State University Center for Advancement of Teaching (OSUCAT) as those activities which enables the instructor to monitor and measure how students are learning in their courses (OSUCAT, 2020). Additionally, the (Vanderbilt University Center for Teaching (VUCT), 2021) defined CATs as generally simple, anonymous and non-graded in-class activities that are designed to provide the instructor and the students important feedbacks on the teaching and learning process as within the classroom. Equally, the (Yale Poorvu Center for Teaching and Learning (YPCTL), 2021) referred to classroom assessment techniques as quick ways of evaluating students' learning in the classroom in order to generate information about students' learning. These means that classroom assessment techniques act like police at the check point to direct the teaching and learning transaction between the teacher and the learner in order to ensure strict adherence to instructional designs.

Classroom assessment techniques enable the instructor participate actively in students' learning within the classroom by constantly adjusting instructional delivery through immediate feedbacks, thus, providing students with opportunity to assess their own learning (YPCTL, 2021). In essence, one could say that CATs allow the instructor or teacher gather feedbacks on how well and how much teaching and learning is ongoing, thereby, facilitating effective and

efficient instructional delivery. According to (Center for Innovative Teaching & Learning (CITL), 2021), the purpose of CATs is to improve the quality of teaching and learning in the classroom. Thus, CATs are learner-centered, teacher-directed, context-specific, mutually beneficial, formative and firmly rooted in good practice (Angelo & Cross as cited in Gaulden, 2010).

Several classroom assessment techniques have been identified by many authors. According to the (University of Kentucky, 2021), these classroom assessment techniques include:

Background Knowledge Probe: This is concerned with short and simple questionnaires prepared by instructors for use at the beginning of a course or at the start of a new topic or unit.

Focus Listing: This draws the attention of students to single important term, name, or concept from a class session or a lesson and direct students to list ideas related to the “focus”

Misconception/Preconception Check: This is intended to uncover prior knowledge or beliefs that may hinder new learning. It can be designed to uncover incorrect or incomplete knowledge, attitudes or values.

Empty Outlines: Here, students are expected to complete an empty or partially completed outline at an in-class presentation of homework or assignment in a limited amount of time

Memory Matrix: This requires students to complete a table about course content in which row and column headings are complete but cells are empty. It is usually constructed using a matrix format.

Minute Paper: This is almost the most frequently used CATs. This requires students to answer two question which are; the most important thing learned during the class and the most important question not answered during the class.

Muddiest Point: The muddiest point requires learners to ask question about the most unclear or confusing point during a lecture, discussion, homework or lecture.

Concept Maps: Here, students draw or shows diagram relating to the mental connections they make between a major concept and other concepts they have learned.

One-Sentence Summary: This requires students to answer questions such as “who does what to whom, when, where, how and why? About a given topic and then create a single informative and long summary sentence.

Application Card: This enables students to generate examples of real-world applications for important principles, generalizations, theories or procedures (p.27).

Studies have shown that there are different types of CATs that can be adopted by the teacher or instructor at the point of teaching and learning. Some of these types of CATs include the background knowledge, one-minute paper, the muddiest point, memory matrix, concept mapping, think-pair-share, focused listing, 3-2-1 format, jigsaw, quiz show, chain note, application card, one-sentence summary, students-generated test questions, directed paraphrasing, exam evaluation, empty outlines, misconception/preconception check etc. (Center for Teaching, 2020; Leahy et al., 2005). Though several types of CATs exist and are being practiced by secondary school teachers in many advanced countries of the world. However, literature reviewed shows that secondary school teachers in Nigeria are not making use of these numerous techniques; this can only translate to the fact that they may either not be

aware of these techniques, or they may lack the rudimentary knowledge in applying these techniques. More so, only a few studies in Nigeria were found with respect to CATs. Shockingly, these studies focused on other aspect of CATs; as such, less attention was given to teachers' knowledge or application of these techniques. Thus, it is paramount that this present study be conducted to fill this gap. Classroom assessment techniques have been found to be very effective and beneficial to students learning. Center for Teaching (2020) has outlined some importance of CATs to include provision of concrete evidence on students' progress, anonymous nature, students' ability to monitor their own progress and provision of just-in-time feed-backs.

Despite all these benefits of classroom assessment techniques in simplifying teaching and learning, studies have shown that teachers may be lacking the knowledge of classroom assessment techniques and the possible application of these techniques. This is evident in the study of (Martler & Campbell, 2005) who in their study on measuring teachers' knowledge and application of classroom assessment concepts reported that teachers lack awareness on classroom assessment techniques and their applications. Supporting the above finding, (Idika & Eke, 2017) investigated teachers' knowledge and application of differential assessment techniques in all-inclusive classroom in universities in South-South Zone of Nigeria and found out that majority of teachers in Nigeria neither have the knowledge nor the application of classroom assessment techniques. Contrary to the above reports, Saeed et al. (2018) carried out a study on teacher's perception about the use of classroom assessment techniques in elementary and secondary schools and reported that teachers are aware of classroom assessment techniques. Equally, (Zhao et al., 2016) in their study on teachers' use of classroom assessment techniques in primary mathematics education using an exploratory study with six Chinese teachers found that teachers are aware of classroom assessment techniques and they apply them while teaching students within the classroom.

More so, gender has been identified as a factor which can influence secondary school teachers' level of awareness and application of CATs. Alkharusi (2011) investigated on teachers' classroom assessment skills with respect to the influence of gender, subject area, grade level, teaching experience and in-service assessment training, and reported a significant gender difference in teachers' skills and perception of classroom assessment techniques, however, the direction of the difference was not stated. In the same way, (Asamoah et al., 2019) carried out a study on gender difference in formative assessment knowledge of senior high school teachers in Upper West Region of Ghana and found out that a significant difference exists between the male and female teachers in support of the male teachers in their level of awareness or knowledge of formative assessment techniques.

It is obvious that disagreements exist between researchers based on their findings. This is because, while some researchers believed that teachers have the knowledge of classroom assessment techniques and equally apply them in teaching students, others are of the opposing view. In a similar way, gender has also been identified as a determining factor. This kind of contradiction among researchers need to be properly addressed. As a result, this study is

paramount. Thus, there is need to assess secondary school teachers' knowledge and application of classroom assessment techniques in Nigeria.

Classroom assessment techniques have been found to be very effective in facilitating teaching and learning process as it provides the instructor and the learner with several opportunities for instructional adjustment; thus, leading to enhanced learning and improved academic achievement. As a result, it is paramount that CATs be applied in every teaching and learning transactions. This means that teachers must possess the relevant knowledge and as well the procedures in utilizing or applying these techniques effectively within the classroom settings. Shockingly, literature is brimming of Nigerian secondary school teachers' lack of awareness of these assessment techniques as well as its application within the classroom. This entails that teaching and learning transactions between teachers and students have not been up to the expected standards as these basic practices required of teachers at the point of teaching and learning are not been properly identified with. More so, gender of secondary school teachers has also been identified as a contributing factor to this level of awareness and application of CATs. Regardless of efforts of researchers and stakeholders to bring these practical methods of assessing students to the lime light, it appears, that the knowledge is not taken seriously. This means that the knowledge or level of awareness and application of CATs will continue to be lacking among secondary school teachers. The researcher therefore believes that secondary school teachers need to be assessed in order to determine the way forward. The problem of this study is thus, what is the level of awareness and application of classroom assessment techniques possessed by secondary school teachers in Nigeria?

The purpose of this study is to determine teachers' knowledge and application of classroom assessment techniques in secondary schools in Nigeria. The following research questions were addressed.

What level of knowledge of classroom assessment techniques do teachers possess?

What is the mean rating of knowledge level on classroom assessment techniques do teachers' possess based on gender?

What level of application of classroom assessment techniques do secondary school teachers possess?

What is the mean rating of the level of application of classroom assessment techniques possessed by teachers based on gender?

Method

2.1 Research Design

This study adopt a descriptive survey research design. Descriptive survey design seeks to describe the characteristics or feature of a given population (Nworgu, 2015). This design will be used because the study attempts to assess the level of secondary school teachers' knowledge and application of classroom assessment techniques (CAT) in Enugu State, South-Eastern, Nigeria. This area was used for this study because from the experience of the researchers, there seems to be a consistent record of teachers' poor knowledge of CATs in secondary schools in the area.

2.2 Participants

The participants comprised of ($n = 320$) teachers made up of 171 males and 149 females teachers selected from 20 public secondary schools. Proportionate random sampling technique was used to select 20 schools from the three local governments areas in the State. This is to ensure that every local government is well represented in the final sample. At the final stage, all the teachers in the sampled secondary schools in the three local government area were chosen for the study. The ethics committee at the schools where the research was conducted granted ethical approval. Before the commencement of the study, the respondents were presented with informed consent forms to fill and sign. The informed consent forms were properly filled and signed by the teachers who participated in the study. The demographic characteristics of research respondents are shown in Table 1. The research participants were quite varied in terms of genders, qualification, teaching experiences, and the grades they taught.

Characteristics (%)		Percentages
Gender:	Male	
	53.44	
	Female	46.56
Qualification:	Ph.D	3.44
	Bsc	35.94
	NCE	60.62
Teaching Experience:	< 1 year	
	5.31	
	1 – 5 years	20.00
	6 – 10 years	30.94
	11 – 15 years	32.50
	> 15 years	11.25
Grade:	High-Level Class (SS 1 – 3)	65.94
	Low-level Class (JSS 1 – 3)	34.06

2.3 Measurement

The instrument used for the collection of data for this study was “Teachers’ Knowledge and Application of Classroom Assessment Techniques Questionnaire (TKACATQ)”. The instrument TKACATQ developed by the researchers. TKACATQ consisting of twenty-one (21) items was designed to assess teachers’ knowledge and application of CATs. TKACATQ has two section, section A and B. Section A contained teacher bio data while section B consisting of item statements has two clusters. Cluster A focused on teachers’ knowledge of CATs with response option “Not aware (NA) = 1, Moderately Aware (A) = 2, Highly Aware (HA) = 3 and Extremely Aware (EA) = 4” while cluster B focused on teachers’ application of

CATs with response option; “Not Applied (NA) = 1, Moderately Applied (MA) = 2, Highly Applied (HA) = 3 and Extremely Applied (EA) = 4”.

2.4 Validity and Reliability

The instrument TKACATQ was examined to determine the face validation, the instrument was given to experts who validated the instrument facially. The face validation was to make sure that the items were clearly stated, unambiguous and properly numbered. The instrument TKACATQ was trial tested on 20 teachers in different school that is not part of the main study area but share similar characteristics to the intended sample in order to ascertain the reliability of the instrument. The internal consistency reliability of the instrument (TKACATQ) was established using Cronbach-alpha method. This is because Cronbach-alpha is very appropriate for estimating internal consistency reliability of instruments that are polytomously scored. The reliability index for TKACATQ was arrived at to be .816.

2.5 Data Analysis

The data for this study was analysed using statistics package program SPSS 23.0. Mean and standard deviation was used to answer the research questions while the hypotheses were tested at 0.05 level of significance using t-test. Mean values ranging between 0 to 2.49 was considered low knowledge and application while mean values above 2.50 was considered as high knowledge and application of CATs.

Results

Table 2 shows the level of knowledge of classroom assessment techniques possessed by teachers in Nigeria. The mean responses of teachers to items 1, 2, 3, 4, 6, 7, 9, 10 and 11 shows high possession of the knowledge level of CATs since they are above the criterion mean of 2.50 while the mean values for items 5 and 8 which are below the criterion mean of 2.50 shows low possession of the knowledge of CATs by teachers. The ground mean value of 2.970 indicates high possession of knowledge level of CATs. However, a ground mean value of 0.855 for the standard deviation shows that a variation exists in the responses of the teachers to the various items.

Table 2. Level of knowledge of classroom assessment techniques possessed by teachers

S/No	Item Statement	($\bar{X}$)	SD	Decision
Item1	Knowledge of classroom assessment techniques	3.184	.788	HP
Item2	Teaching and learning can be very effective when classroom assessment techniques are applied	3.400	.696	HP
Item3	Knowledge of the way classroom assessment techniques are used	3.040	.731	HP
Item4	Classroom assessment techniques are non-threatening assessment techniques	2.890	.869	HP
Item5	Knowledge of several classroom assessment techniques such as think-pair-and-share, muddiest point, memory matrix, one-sentence summary, application card, listing etc.	2.425	.963	LP
Item6	Classroom assessment techniques are student centered	3.053	.888	HP

Item7	Classroom assessment techniques are content specific (i.e., it focuses on the subject content)	2.934	.891	HP
Item8	Classroom assessment techniques are anonymous techniques	2.268	1.078	LP
Item9	Classroom assessment techniques are aimed at improving learning	3.425	.699	HP
Item10	It is not appropriate asking students to use a technique that the teacher has not tried before	2.731	1.067	HP
Item11	Classroom assessment techniques are ways of evaluating students learning and their reactions to teaching	3.325	.738	HP
	Ground Mean	2.970	0.855	HP

HP = High Possession, LP = Low Possession

Result from table 3 shows that the mean response ratings of teachers on the level of application of CATs to items 12, 13, 14, 16, 17, 18, 19 and 20 are above the criterion mean of 2.50 indicating high application of CATs by the teachers whereas, mean responses to items 15 and 21 indicates low application of CATs. However, a ground mean of 2.808 shows a high level of application of CATs. A ground standard deviation value of 0.862 indicates that the level of variation in the responses of the teachers on the application of CATs is relatively high.

Table 3. Level of application of classroom assessment techniques by teachers

S/No	Item Statement	Mean	SD	Decision
Item12	Classroom assessment techniques while teaching students	2.818	.833	HA
Item13	Classroom assessment techniques in improving teaching and learning	3.203	.767	HA
Item14	Analyzing feedbacks after administering of classroom assessment technique	3.071	.798	HA
Item15	Using classroom assessment techniques such as muddiest point, listing, memory matrix etc.	2.437	.948	LA
Item16	Using classroom assessment techniques the right way	2.837	.884	HA
Item17	Completing a planning worksheet before applying a classroom assessment technique	2.525	.946	HA
Item18	Classroom assessment techniques in assessing students' retention	2.8906	.821	HA
Item19	Comfortable using classroom assessment techniques	2.909	.857	HA
Item20	Using classroom assessment techniques to evaluate students learning and their reactions to teaching methods	3.006	.845	HA
Item21	Applying classroom assessment techniques once in a while	2.387	.926	LA
	Ground Mean	2.808	0.862	HA

HA = High application, LA = Low application

The mean response of male teachers is higher than that of the female teachers. The standard deviation on the responses of male students is .442 while that of female teachers is .468, these indicates that a low variation in the responses of male and female teachers was observed. The result further revealed the gender difference in the level of knowledge of CATs possessed by

teachers, the t-value of 2.421 has an associated probability value of 0.016 which is lesser than the a priori value of 0.05. Therefore, there is a significant difference in mean knowledge level of CATs possessed by male and female secondary school teachers in favour of the male teachers (Table 4).

Table 4. Difference in the mean ratings of knowledge level of CATs possessed by teachers based on gender

Gender	N	($\bar{X}$)	SD	Df	t-cal	Sig.(2-tailed)	Decision
Male	171	3.028	.442	318	2.421	0.016	Sig.
Female	149	2.904	.468				

Table 5 shows the level of application of CATs possessed by teachers based on gender, the mean response rating of male teachers is 2.840 while the female teachers have a mean response rating of 2.772. This indicates that the mean response of male teachers is higher than that of the female teachers. The standard deviation on the responses of male students is .485 while that of female teachers is .585; thus, there appears to be a low variation in the responses of male and female teachers based on the application of CATs. The difference in the level of application of CATs possessed by male and female teachers shows that the probability associated with the t-value of 1.133 is 0.258 which is greater than the a priori value of 0.05. This implies that there is no significant difference in mean ratings on the level of application of CATs possessed by male and female teachers. Thus, any difference may be as a result of sampling error.

Table 5. Difference in the mean ratings of the level of application of CATs by male and female teachers

Gender	N	($\bar{X}$)	SD	Df	t-cal	Sig.(2-tailed)	Decision
Male	171	2.840	.485	318	1.133	0.258	Not Sig.
Female	149	2.772	.585				

Discussion

The researchers discovered high knowledge level of CATs possessed by teachers. The ground mean of knowledge level of CATs possessed by secondary school teachers imply that secondary school teachers possess high level of knowledge of CATs. However, the standard deviation reflects that a slight variation exists in the level of knowledge of teachers. This finding is in agreement with the finding of (Nenty et al, 2007, Barandon & Atian, 2016) that teachers possess knowledge or awareness of classroom assessment practices. However, the finding of (Yamtin & Wongwanich, 2013) and (Idika & Eke, 2016) disagreed with the above result. This contradiction may be as a result of factors such as the nature and qualifications of teachers used, the time the research work was conducted as well as the location the study was carried out among others.

The result revealed that all items on application of CATs have mean ratings above the criteria mean indicating high application of CATs except two items (15 and 21) that indicated low application of CATs. The result showed high application of CATs among senior secondary

school teachers. However, there was a slight variation in the responses of teachers on the level of application of CATs. This result aligns with the finding of (Zhao et al., 2016), and (Saeed et al., 2018) who in their various studies reported that the level of application of classroom assessment techniques by teachers is high. However, the findings of (Campbell & Evans, 2000), and (Idika & Eke, 2016) disagreed with the above result. These differences may be due to level of knowledge and qualifications of the teachers investigated as well as the location and the nature of the respondents used for the study.

The result also revealed that male teachers are more aware of CATs than the female teachers. Further analysis showed that the difference in the level of knowledge of CATs of male and female teachers is significant. Thus, the male teachers are more knowledgeable about CATs than the female teachers. This finding agrees with the finding of (Asamoah, et al., 2019) and (Alkharusi, 2011) who reported higher knowledge level of classroom assessment techniques in favour of the males. Contrary to the above results, (Ogheneakoke & Akpochafo, 2015) revealed that gender does not have any significant influence on the level of knowledge or awareness of teachers on classroom assessment techniques. This disparity may be as a result of factors such as the level of qualification, personality, intelligence level as well as the area of the study.

The findings further revealed that the male teachers apply CATs more than the female teachers. The study revealed no significant difference between the male and female teachers in their level of application of CATs. This finding laid credence on the findings of (Ogheneakoke & Akpochafo, 2015), who reported that gender does not influence the level of application of classroom assessment techniques. However, the finding of (Alkharusi, 2011) contradicted this finding. This inconsistency may have arisen because of factors such as location of the study, the qualifications of respondents among others.

Conclusions

Secondary school teachers in Nigeria possess high level of knowledge of classroom assessment techniques. The knowledge level of classroom assessment techniques possessed by male teachers is significantly higher than that of the female teachers in secondary schools of Nigeria. Secondary school teachers in Nigeria possess high level of application of classroom assessment techniques. The level of application of classroom assessment techniques by male and female teachers is not significantly different. The findings of this study will assist school authorities in ensuring that their teachers have adequate knowledge of classroom assessment techniques as well as how to apply them while teaching students. The findings will help educational planners and ministry of education in planning decision making processes that will consider classroom assessment techniques. Hence, educational planners and the ministry of education need to consider policies on classroom assessment techniques to emphasis its importance in the education sector in order to facilitate its integration and usage across various schools in the federation.

5.1. Limitations

The sample size of the study is 320, this does not seem to be a true representative of the entire population, thus, there may be room for bias in sampling. The results so far may not be generalized. Further research should be replicated to cover a wider geographical area and a larger sample of teachers in order to generalize the study. A similar study can be carried out while considering the influence of other demographic variables such as school location, students' age, socio-economic status, among others.

5.2. Practical implications

The implication of this study to students is that students should ensure that they pay keen attention to the usage of CATs by their teachers. This will aid in their active participation in teaching and learning activities as well as easy understanding. Teachers will generally work towards improving their knowledge on classroom assessment techniques as well as finding the right way to apply or make use of classroom assessment techniques while teaching students. This will enable them improve in their instructional delivery process and help the students learn better.

References

- Absolum, M., Flockton, L., Hattie, J., Hiptkis, R., & Assessment in New Zealand (DANZ) Report: Capabilities, Ministry of Education, Wellington.
- Reid, I. (2009), Directions for Developing Students' Assessment
- Alkharusi, H. (2011). Teachers' classroom assessment area, grade level, teaching experience and in- skills: Influence of gender, subject service assessment training. *Journal of Turkish Science Education*, 8(2), 39-48.
- Asamoah, D., Songnalle, S., Sundeme, B., & Derkye, C. (2019). Gender difference in formative assessment knowledge of senior school teachers in the Upper West Region of Ghana. *Journal of Education and Practice*, 10(6), 54-58. Doi: 10.7176/JEP
- Barandon, S. B., & Atian, D. F. (2016). Awareness and utilization of classroom assessment techniques in higher education: The case of a state college in Bicol. *Asia Pacific Journal of Multidisciplinary Research*, 4(2), 51-56
- Bukola, N. (2010). Benefits of Formative assessment for teaching and learning. *Science Scope*, 34 (1), 37-43.
- Campbell, C., & Evans, J. A. (2000). Investigation of preservice teachers' classroom assessment practices during student teaching. *The Journal of Educational Research*, 93(6), 350-355, <https://doi.org/10.1080/00220670009598729>

Center for Innovation in Teaching & Learning (2021). Teaching and learning: Classroom assessment techniques. Retrieved [https://citl.illinois.edu/citl-101/teaching-learning/resources/teaching-strategies/classroom-assessment-techniques-\(cats\)](https://citl.illinois.edu/citl-101/teaching-learning/resources/teaching-strategies/classroom-assessment-techniques-(cats))

Center for Teaching (2020). Classroom assessment techniques (CAT). Retrieved from <https://cft.vanderbilt.edu/guides-sub-pages/cats/>

Clarke, M. (2012), What Matters Most for Student Assessment Systems: A Framework Paper, <https://openknowledge.worldbank.org/bitstream/handle/10986/17471/682350WP00PUBL0WP10READ0web04019012.pdf?sequence=1&isAllowed=y>.

Ernest-Ehibudu, I. R & Opurum, J. (2013). Family dynamics as correlates of academic achievement in mathematics among secondary school students in Etche LGA. *International Journal of Educational Research*, 12(2), 257-265.

Gaulden, S. (2010). Classroom assessment techniques. Retrieved from http://sloat.essex.edu/sloat/delete/contentforthewebsite/classroom_assessment_techniques.pdf

Idika, O. D. & Eke, U. (2017). Assessment of teachers' knowledge and application of differential assessment techniques in all-inclusive classroom in universities in South-South zone, Nigeria. *Global Journal of educational research*, 16, 1-8.

Leahy, S., Lyon, C., Thompson, M., & William, D. (2005). Classroom assessment: minute-by-minute and day by day. *Educational Leadership*, 63(3), 18-24.

Martler, C. A. & Campbell, C. (2005). Measuring teachers' knowledge and application of classroom assessment concepts: Development of the assessment literacy inventory. Paper presented at the annual meeting of the American Educational Research Association, Montréal, Quebec, Canada April 11-15, 2005

Nenty, H. J., Adedoyin, O. O., Odili, J. N., & Major, T. E. (2007). Primary teachers' perceptions of classroom assessment practices as means of providing quality primary/basic education by Botswana and Nigeria. *Educational Research and Review*, 2(4), 74-81.

Nworgu, B. G (2015). *Measurement and Evaluation: Theory and practice*. Nsukka: University Trust Publishers.

Ogheneakoke, C. E., & Akpochafo, W. P. (2015). Gender difference among social studies teachers' competences in the use of the inquiry method in South-South Nigeria. *Journal of Education and Practice*, 6(23), 48-51.

Phelan, J. & Phelan, J. (2010). Classroom assessment tasks and tests. *International Encyclopedia of Education* (3rd ed.). Los Angeles: Elsevier. doi: <https://doi.org/10.1016/B978-0-08-044894-7.00309-2>

Powerschool (2016). 9 benefits of using formative assessment to increase students' growth. Retrieved from <https://www.powerschool.com/resources/blog/9-benefits-of-using-formative-assessment-to-increase-student-growth/>

Proprof (2021). What is educational assessment. Retrieved from <https://www.proprofs.com/quiz-school/blog/what-is-educational-assessment-and-why-is-it-necessary/>

Saeed, M., Tahir, H., & Latif, I. (2018). Teachers' perception about the use of classroom assessment techniques in elementary and secondary schools. *Bulletin of Education and Research*, 40(1), 115-130.

The Iowa State University Center for Excellence in Learning and Teaching (2020). Classroom assessment techniques. from <https://www.celt.iastate.edu/teaching/assessment-and-evaluation/classroom-assessment-techniques-quick-strategies-to-check-student-learning-in-class/>

The Ohio State University Center for Advancement of Teaching (2020). Classroom assessment techniques. Retrieved from <https://ucat.osu.edu/bookshelf/teaching-topics/assessing-student-learning/classroom-assessment-techniques/>

University of Kentucky, (2021). 50 classroom assessment techniques (CATs). Retrieved from <https://www.uky.edu/celt/50-classroom-assessment-techniques-cats>

Vanderbilt University Center for Teaching (VUCT), (2021). Teaching guide. Retrieved from: <https://cft.vanderbilt.edu/guides-sub-pages/cats/>

Yale Poorvu Center for Teaching and Learning. (2021). Classroom assessment techniques. Retrieved from <https://poorvucenter.yale.edu/Classroom-Assessment-Techniques>

Yamtim, V., & Wongwanich, S. (2013). A study of classroom assessment literacy of primary school teachers. *Procedia-Social and Behavioral Sciences*, 116(2014), 2998-3004. <https://doi.org/10.1016/j.sbspro.2014.01.696>

Zhao, X., Van de Heuvel-Panhuizen, M. & Veldhuis, M. (2016). Teachers' use of classroom

assessment techniques in primary mathematics education-An explorative study with six Chinese teachers. International Journal of STEM Education, 3(9). 2-18.<https://doi.org/10.1186/s40594-016-0051-2>