

# Appraisal of Senior Secondary School Students' Self-Assessment Practices in Mathematics in Nsukka Education Zone

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### Abstract

This study sought to determine senior secondary school students' self-assessment practices in Mathematics, in Nsukka Education Zone, Enugu State. The objectives of this study were to identify senior secondary school students' self-assessment practices and to appraise the proportion of the students that have self-assessment competence in Mathematics. Descriptive survey design was adopted for the study. Three hundred and sixty (360) students, drawn from a population of 3110 students constituted the sample for the study. The instrument for data collection was "Students' Self-assessment Practices in Mathematics Questionnaire (SSPMQ)" developed by the researchers. The instrument consisted of nine (9) items on students' self-assessment practice and fifteen (15) items on students' self-assessment competence with internal consistency coefficients of 0.79 and 0.84 respectively. Mean, frequency, percentage, standard deviation and t-test statistic were used for data analysis. The findings showed, among other things, that majority of the students have low self-assessment practices and competence in Mathematics; and that there was no significant difference in the mean self-assessment practices of male and female students.

Keywords: Self-assessment, Practices, Competence, Mathematics

#### Introduction

Mathematics consists of Geometry, Algebra, Trigonometry, Statistics, Probability; and Number and Numeration. Most authors who defined Mathematics found it difficult in capturing all these components of Mathematics in their definitions. Consequently, today, there is no generally acceptable definition of the term, Mathematics. Nevertheless, it has been noted that, both Mathematicians and laymen have different definitions of Mathematics, but they all agree on the indispensible roles of Mathematics (Chamundeswari, 2014).

Mathematical knowledge is essential for development of individuals in most areas of life (Adu, Assuah & Asiedu-Addo, 2015). It has been observed that, mathematics plays fundamental roles, which can easily be seen in everyday applications in social sciences, physical sciences, biological sciences, engineering, medicine, military, aerodynamic advancements, business transactions and house hold chores (Chege, 2015). In this modern world, no country can survive scientifically and technologically without effective Mathematical knowledge. As it has been noted, 'Mathematics forms the base and inner core of all scientific and technological progress' (Chamundeswari, 2014, P.25). Hence, effective Mathematical knowledge is urgently required to step up the technological backwardness of most underdeveloped and developing nations. In fact, the importance of Mathematics cannot be overstated.

Despite the acknowledged importance of Mathematics and the tremendous efforts being made by educationists and other concerned stakeholders, to improve the teaching and learning of Mathematics in secondary schools in Nigeria, students' achievement in mathematics still remain very low (Obi, 2014). Having recognized students' weaknesses in Mathematics, the West African Examination Council (WAEC) Chief Examiner's Reports (2018) suggested that teachers should give students enough exercise and



assignments and guide the students through provision of feedbacks on the students' performance. Unfortunately, enough exercises and assignments entail more workload for the teachers in terms of students' assessments. Experts have opined that, large number of students affects teachers' effectiveness in implementation of students' continuous assessment (Nworgu, 2015). It is therefore expected that government should employ more teachers to match the growing number of students.

However, since the government at all levels seem to have ignored the call for employment of more teachers, may be due to some constraints like economic meltdown and the like, the tedious work in assessing students' performances can be reduced if, the students could effectively assess their own learning, that is, self-assessment. Students' self-assessment can be defined as 'information about the learners provided by the learners themselves, about their abilities, the progress they think they are making and what they think they can or cannot yet do with what they have learned in a course' (Blanche & Merino as cited in Javier, 2006). Students' self-assessment is a type of formative assessment in which students reflect on their learning strengths and areas of improvement so that learning needs could be identified and areas of improvement reinforced (Fitzpatrick, 2006). Evidence has shown that there exists a significant improvement in students' performance as a result of being taught self-assessment strategies (Kathryn, 2016).

Exposing students to self-assessment with goal setting has also been noted to improve students' performance in Mathematics significantly (Laura, 2015). Generally, self-assessment remains one of the most important skills that students require for future professional development of learning (Tera, 2010). It has been noted that self-assessment increases students' interest and motivation to learn; and provides a highly effective critical thinking exercise; (Shrma, Jain, Gupta, Garge, Batta & Dhir, 2016). Self-assessment can equally reduce the assessment workload of teachers and promotes deep understanding of content topics and learning styles, if the students develop good self-assessment practices and competence. Provision of assessment resources by the teachers would enhance students' competence in assessing their own learning.

Competence is the ability to apply one's skills, knowledge and experience in completing a task in given area. Competence could be seen as the capacity or the use of a set of related knowledge, skills and attitude to complete a task based on standards required in a defined work area (Khoirudin, Hary & Aji, 2016). One can easily see, from the concept of competence, that it can be measured, as it is anchored on ability, skills and knowledge the students have acquired. It is therefore, very pertinent, to investigate self-assessment competence of senior secondary school students in Mathematics, bearing in mind that students comprise both males and females.

Gender is a socially learned behaviour and expectation which are required of male and female members of the society. Studies on the influence of gender on self-related concepts have generated unresolved controversies. For instance, it has been found that female students demonstrated higher level of self-assessment practices than their male counterparts (Yan, 2016). Contrarily, it has also been observed that male students have higher overall self-concept than their female counterparts (Mathuri & Arasa, 2017). In this study, the researchers equally deemed it necessary to investigate the influence of gender, on self-assessment competence possessed by senior secondary school students in Nsukka Education Zone of Enugu State.

### **Statement of the Problem**

Despite the efforts by the students, teachers, school administrators, parents, government at all levels and the general public to ensuring effective teaching and learning of Mathematics in Nigerian schools, students' performance has continued to decline. This poor performance has become very worrisome to all the stakeholders concerned with the teaching and learning of Mathematics. Mathematics is a subject that requires the teachers to effectively assess the students' performance and use the outcome of the assessments for improvement of learning. It has been noted that assessment of students' performance has always constituted a very tedious task for teachers, considering the large number of students that characterizes our schools. The poor performance of students might therefore be related to improper assessment of their learning in Mathematics. Therefore, there is the need for a better complementary and supplementary assessment that would benefit both teachers and students. Students' self-assessment has



been noted to reduce the assessment workload of teachers, promote deep understanding of content and awaken critical thinking ability of the students. The thrust of this study, therefore, is to appraise senior secondary school students' self-assessment competence in Mathematics in Nsukka Education Zone of Enugu State.

# Purpose of the study

The general purpose of the study is to determine the extent to which senior secondary school students have competence in assessment of their own learning in Mathematics. Specifically, the study sought to:

- 1. Identify senior secondary school students' self assessment practices in Mathematics
- 2. Determine the proportion of secondary school students that have self-assessment competence in Mathematics.
- 3. Ascertain the influence of senior secondary school students' gender on their self-assessment competence in Mathematics.

#### **Research Questions**

The following research questions guided the study:

- (i) what are the self-assessment practices of senior secondary school students in Mathematics?
- (ii) what proportions of senior secondary school students have self-assessment competence in Mathematics?
- (iii) what is the influence of senior secondary school students' gender on their mean practices score in self-assessment in Mathematics?

# Hypothesis

Ho<sub>1</sub>:

there is no statistically significant difference between the mean competence scores of male and female students in their self-assessment in Mathematics.

#### Methods

This study adopted a descriptive survey design. Descriptive survey design aims at collecting data on, and describing, in a systematic manner, the characteristics, attributes or fact about a population from a sample considered to be a representative of the population (Nworgu, 2015). The population for the study was three thousand one hundred and ten (3110) students comprised of one thousand three hundred eighty-eight (1388) males and one thousand seven hundred twenty-two (1722) females senior secondary school two (SS2) in the fifty-nine (59) public schools in Nsukka Education Zone of Enugu State (Post-Primary School Management Board Nsukka [PPSMBN], 20<sup>th</sup> January, 2019). The choice for SS2 was based on the assumption that SS2 students are the next to start their external examinations such as WAEC and NECO and would need different study habits which include self-assessment. The sample size for the study was three hundred and sixty (360) students (consisting of 160 males and 200 females). The sample size was chosen based on Cohen, Manion and Morrison (2007) table of sample size. In the sampling procedure, purposive sampling was first used in selecting co-educational schools with at least twenty (20) students in class. Simple random sampling technique (through balloting) was then used in selection of eight (8) male and ten (10) female students from each of the schools.

The instrument for data collection is a questionnaire titled "Students' Self-assessment Practices in Mathematics Questionnaire (SSPMQ). The instrument has three sections, namely; A, B and C. Section A contains the demographic information of respondents. Section B contains nine (9) items on students' self-assessment practices in Mathematics while section C contains fifteen (15) items on students' self-assessment competence in Mathematics. The SSPMQ was validated by three experts from the Department of Science Education, University of Nigeria, Nsukka.

The internal consistency of the instrument was estimated using Cronbach Alpha. The reliability coefficients of section B and section C were found to be 0.79 and 0.84 respectively. The research question one was answered using mean and standard deviation while research question two was answered using percentage. The hypothesis was tested using t-test statistic. For decision rules, the proportion of students that have summated competence scores of (15%-26%), (27%-38%), (39%-50%), (51%-62%) and (63%-75%) in the SSPMQ were considered to have Very Low Competence, Low Competence, Moderate Competence, High Competence and Very High Competence respectively. Similarly, a mean benchmark of



2.5 and above was used for judging the students' agreement on their self-assessment practices in Mathematics.

# Results

**Research Question One**: what are the self-assessment practices of senior secondary school students in Mathematics?

Table	1:	Mean	and	Standard	Deviation	of	Senior	Secondary	School	Students	Self-assessment
Practices in Mathematics											

S/N	Items	Ν	Mean	S. D	Remarks
1.	I set target for myself at the beginning of every week to	360	2.31	.46	Disagree
	monitor my progress in Mathematics.				
2.	I have special notebook for daily summary of what I have	360	1.70	.71	Disagree
	learnt in Mathematics.				
3.	After writing an assignment in Mathematics, I do	360	2.90	.43	Agree
	compare my work to that of my classmates before				
	submitting.				
4.	I do engage in clarifying, interpreting and critiquing my	360	1.78	.71	Disagree
	own work in Mathematics.				
5.	I do use graphic organizer to monitor my progress in	360	1.92	.46	Disagree
	Mathematics				
6.	I do take cautions of time while solving past Mathematics	360	3.15	.47	Agree
	examination questions such as WAEC/ NECO.				
7.	At the end of every exercise/assignment in Mathematics, I	360	2.30	.58	Disagree
	do reflect on what I have learnt.				
8.	I do grade myself based on the marking scheme provided	360	2.70	.46	Agree
	to me by my Mathematics teacher.				
9.	My teachers provide checklist, success criteria and rubrics	360	2.10	.68	Disagree
	which I use for monitoring my learning.				
	Valid N (listwise)	360			

Table 1 shows that three (3) items out the nine (9) items have mean of 2.5 and above. This shows that students agreed on their uses of self-assessment practices captured in item 3, item 6 and item 8. Contrarily, the students disagreed on their adoption of the self-assessment practices captured in the remaining six (6) items. It implies that students have not adopted majority of the current self-assessment practices in assessing their own learning in Mathematics.

**Research Question Two:** what proportions of senior secondary school students have self-assessment competence in Mathematics?

 

 Table 2: Percentage, Mean and Standard Deviation of Senior Secondary School Students Selfassessment Competence in Mathematics

S/N	Students' Competence Scores	Ν	Mean	S.D	Percentage (%)	
1	Very Low Competence (15% - 26%)	52	19.35	.77	14.44	
2	Low Competence (27% - 38%)	111	32.12	.94	30.83	
3	Moderate Competence (39% - 50%)	124	45.72	1.52	34.44	
4	High Competence (51% - 62%)	48	56.47	1.31	13.33	
5	Very High Competence (63% -75%)	25 360	68,43	.75	6.94 100	



Table 2 shows that 14.44% of the students with mean and standard deviation scores of 19.35 and .77 respectively have very low self-assessment competence. Similarly, 30.83% of the students with mean and standard deviation of 32.12 and 0.94 respectively have low self-assessment competence. More so, 34.44% of the students with mean and standard deviation of 45.72% and 1.52 respectively have moderate self-assessment competence. Furthermore, 13.33% of the students with mean and standard deviation of 56.47 and 1.31 respectively have high self-assessment competence. Finally, 6.94% of the students with mean and standard deviation of 68.43 and .75 respectively have very high self-assessment competence. It implies that few of the senior secondary school students have high self-assessment competence in Mathematics.

**Hypothesis One:** there is no statistically significant difference between the mean scores of male and female students in their self-assessment practices in Mathematics.

Table 3: t-test Analysis of Gender	Difference in Self-assessment	t Practices of Senior	<b>Secondary School</b>
<b>Students in Mathematics</b>			

Students' Gender	Ν	Mean	S.D	df	t	Sig. (2-tailed)	Remark
Males	16	42.45	15.304	358	438	.662	Not Sig.
Females	20 0	43.17	15.468				

Table 3 above revealed that (t-.438; df = 358), with p-value of .662 is greater than 0.05 (.662 > p > 0.05). Therefore, the hypothesis is upheld. This implies that gender has no influence on senior secondary school students' self-assessment competence in Mathematics.

#### Discussion

The results shown in Table 1 revealed that students agreed on their adoption of three (3) out of the possible self-assessment practices in Mathematics. It means that the students do not practice most of the self-assessment strategies identified in this study while learning Mathematics. The reason for this could be that teachers have not exposed the students to most of the required self-assessment practices in Mathematics. This finding is consistent with the view of Yan (2016) who observed that senior secondary school students had lower mean score on self-directed feedback seeking and self-reflection as compared to junior secondary school students. More so, the results of the study with respect to research question Two show that only 13.33% and 6.94% of the students have high and very high self-assessment competence in Mathematics that ranges from very low to moderate competence. This could be as a result of students' inadequate practicing in self-assessments. This study is in line with Ahmad (2016) who discovered a significant difference between students' self-assessment and teachers' assessment of the students. Ahmed further observed that students can assess themselves accurately if they are trained on how to implement self-assessment.

The result of hypothesis one revealed no significant difference in self-assessment practices score of male and female students. This means that both male and female students have similar self-assessment practices in learning in Mathematics. This could be as a result of insufficient exposure of the students (males and females) to self-assessment practices in Mathematics. This finding is in consistent with Mathuri and Arasa (2017) who found no significant relationship between gender and different dimension of self-concepts.

#### Conclusion

Based on the findings of the study, it was conclusively affirmed that students self-assessment practices in Mathematics are inadequate; that students' self-assessment competence in Mathematics is unsatisfactorily low and; that gender has no significant influence on senior secondary school students' self-assessment practices in Mathematics.



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### Recommendations

Based on the findings of this study, the following recommendations were made:

- 1. Teachers and school administrators should make concerted efforts to adequately expose students to varieties of self-assessment practices.
- 2. Teachers and school administrators should ensure the implementation of self-assessment in schools by providing students with necessary materials and guideline for self-assessment; and integration of results of self-assessment in the final grading of students.
- 3. There is the need for experts in education and Mathematics to review mathematics textbooks so as to include varieties of self-assessment strategies and tools.

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