



Teachers' Assessment of Secondary School Students' Valuing Level of Affective Behavioural Outcome in Mathematics

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Abstract

This study investigated teachers' assessment of secondary school students' valuing level of affective behavioural outcome in mathematics. The design used for the study is descriptive survey research design. Two research questions and one null hypothesis guided the study. One hundred and sixty mathematics teachers made up the population of the study. The entire population was used in the study as it's a manageable size. Teachers' Assessment of Students' Valuing Level of Affective Behavioural Outcome Questionnaire (TASVLBOQ) was used to collect data. The data was analyzed using mean and standard deviations, and Analysis of Variance (ANOVA) statistics for the hypothesis. The findings revealed that teachers' assessment of students' valuing level of affective behavioural outcome is of low extent. The result also revealed that teachers' assessment based on teachers' years of experiences is not statistically significant. Based on the findings, it was recommended among others that government should organise seminars and workshops for teachers to educate them on the proper ways of assessing students' valuing level of affective outcome in mathematics.

Keywords: Teachers' Assessment, Students, Valuing level, Affective Behavioural Outcomes, Mathematics.

Introduction

Education is a tool that can be used to effect change and promote national development. Educational revolution can be credited with any shift in a people's attitude, intellectual, or social outlook. As a result, Nigeria's national educational philosophy is aimed toward social, cultural, economic, political, scientific, and technical advancement, among other things. As a result, the Federal Republic of Nigeria [FRN] (2014) views education as a vehicle for achieving Nigeria's primary national goals. The goal of schooling is to modify children's behaviour toward accomplishing national goals by inculcating in them specific experiences through methodical teaching. Mathematics is one of the subjects that have always been seen as a factor in a country's success, progress, and endeavour (Awodeyi, 2004).

Mathematics is one of the compulsory subjects offered in secondary schools in Nigeria. It's the branch of science that studies the logic of form, quantity, and order. The science of space and numbers is known as mathematics. According to Ifiokobong (2016), mathematics is a collection of intellectual disciplines that includes geometry, calculus, and algebra and is concerned with the study of numbers, space, shape, and amount, as well as their interrelationships using prescribed notation. Furthermore, mathematics trains the mind to think logically and analytically, making it a creative environment (Ugwuda, 2014).

Mathematics education encompasses both the activity of teaching and learning mathematics as well as the research that surrounds it. According to

Lawal (2017), mathematics education is the transfer of mathematical ideas with the goal of imparting appropriate mathematical knowledge, comprehension, and abilities to a wide range of students and other subjects. Mathematics is a required subject for basic and post-basic education reflects its importance (Federal Republic of Nigeria [FRN], 2014). In order to achieve these objectives, mathematics teachers should teach mathematics not just only for its comprehension, but to encourage the learner's behaviour toward it as an essential or dependable channel towards their development into useful and responsible citizens in the society. Could the poor achievement be associated with some factors? Students' low achievement in mathematics could be due to a variety of factors. According to Ugwuanyi (2014), some of the factors affecting students' achievement in mathematics include students' attitude, interest, among others. Student's lack of interest in mathematics classroom activities is bound to lead to poor achievement since achievement depends on interest (Ukweze, 2017). Other factors that affect students' low mathematics achievement include students' factor, teachers' factor, mathematics anxiety, class size, government factor, infrastructural difficulty, instructional technique, and so on (Akinoso, 2011). It is observed that one key challenge in mathematics education which is often neglected is the issue of assessment of all domains of behavioural outcomes of students. Most teachers focus only on assessment of cognitive domain neglecting or assigning values arbitrarily to psychomotor and affective domains. As a result, in the National Policy on Education, (FRN, 2014) said



that educational assessment will be based on continuous assessing of individual progress. As a result, continuous Assessment (CA) will serve as a mechanism for determining a student's final grades in the cognitive, affective, and psychomotor domains of behaviour throughout the course of a school year.

The cognitive domain comprises goals related to thinking, memory, knowledge, and problem solving. According to Lorin Anderson, a former Bloom student, and David Krathwohl the six stages of Bloom's cognitive domain as updated in the late 1990s are remembering, understanding, applying, analyzing, evaluating, and creating (Donald, 2015). The psychomotor domain includes tasks involving muscular and motor, material and object manipulation and activities involving muscular coordination. Reflex movement, basic fundamental motions, perceptual capacities, skilful movement, and non-discourse communication are all categories of aims in the psychomotor domain. The objectives in the affective domain are those that have to do with the state of emotion and the degree of acceptance or rejection. Receiving, responding, valuing, organising, and characterisation are the five levels of affective behavioural outcome. Valuing is degrees of understanding within the affective domain which means beliefs and attitudes of worth.

The assessment considers a student's entire performance in the cognitive, affective, and psychomotor behavioural outcome. Unfortunately, most teachers continue to focus solely on the cognitive domain, implying that the students' overall competence may not be assessed. This has seriously implicated the skills of mathematics teachers as evaluators. This is because teachers assign values arbitrarily and haphazardly while assessing psychomotor and affective domains. That is why this study found the extent to which mathematics teachers assess secondary school students' valuing level of affective behavioural outcome in mathematics. The reason for this study on affective behaviour is because students' emotional state is a big factor in their learning process. Changes in affective component, produces changes in both cognitive and psychomotor components. Affective behaviour may hinder or promote learning, especially in mathematics.

Affective actions are those that are impacted by and result from emotions. As a result, the affective domain is concerned with the goals that describe interest, attitude, and values, as well as the development of appreciation and appropriate adjustment. It has to do with the value a student places on idea or resource that is represented in the learner's active engagement. According to Nworgu

(2015), the affective domain includes educational objectives that deal with the state of emotion, the degree of acceptance or rejection of specific things presented, and the method of personal and social adjustment. As earlier stated Krathwohl, Bloom & Masia (1964) described the affective domain as falling into valuing, further explained as follows:

Acceptance, preference, and commitment are examples of values that encompass beliefs and attitudes of worth. The value that a student places on ideas or resources is called valuing. Complete, demonstrate, differentiate, explain, follow, form, initiate, join, justify, read, report, select, share, study, work, accept, defend, devote, pursue, and seek, to increase measured proficiency in, relinquish, subsidize, support, and debate are examples of action verbs used under valuing. Specific objectives used here include: Demonstrates a positive problem solving attitude in mathematics, Share material with others and obedience to instruction during mathematics lessons.

Studies have shown that years of experience play important role in teaching and learning. According to Okafor (2010), there was a substantial difference in mean mastery scores between experienced and less experienced teachers, with experienced teachers outperforming less experienced teachers. However, it is still unclear whether years of teaching experience have an impact on the extent of mathematics teachers' assessment of secondary school students' valuing level of affective behavioural outcome in mathematics. The problem of this study therefore is: "what is the extent of teachers' assessment of secondary school students' valuing level of affective behaviour outcome in mathematics".

Purpose of the Study

The main purpose of the study was to investigate the extent of teachers' assessment of secondary school students' valuing level of affective behavioural outcome in mathematics. Specifically, the study found out the:

1. Extent to which Mathematics teachers assess students' valuing level of affective behaviour in mathematics.
2. The influence of years of experience on the extent to which mathematics teachers assess secondary school students' valuing level of affective behavioural outcomes in mathematics.

Research Questions

The study was guided by the following research questions:

1. What are the mean ratings of mathematics teachers on their assessment of valuing level of affective behavioural outcome in mathematics in Nsukka Education Zone?
2. What is the influence of mathematics teachers' years of experience on their assessment of valuing level of affective behavioural outcome in mathematics in Nsukka Education Zone?

Hypothesis

One null hypothesis guided the study, and was tested at 0.05 level of significance:

H₀₁: There is no significant influence of teachers' years of experience on mathematics teachers mean ratings on the extent of their assessment of secondary school students' valuing level of affective behavioural outcome in mathematics.

Method

The study was conducted using a descriptive survey research design. This study was carried out with secondary school mathematics teachers in Nsukka Education Zone of Enugu State. Two research questions and one hypothesis guided the study. The population of this study consisted of all the one hundred and sixty mathematics teachers in Nsukka Education Zone and were used as the sample of the study as it's of manageable size. The instrument for this study was a structured questionnaire titled "Teachers' Assessment of Students' Valuing Level of Affective Behavioural Outcome Questionnaires (TASVLBOQ)". The questionnaire was structured to a modified 4-point rating scale of: "Very High Extent (VHE), High

Extent (HE), Low Extent (LE) and Very Low Extent (VLE)" with corresponding values of 4, 3, 2, and 1 respectively. The instrument was subjected to face validation in order to determine its validity. Three experts in Science Education, one mathematics expert and two measurement and evaluation experts, validated the instrument in terms of the items' appropriateness and usefulness for the study. To ascertain the reliability of the instrument, it was trial tested using 30 respondents in a Secondary School in Obollo-Afor Education Zone of Enugu State. The reason for using the above education zone was that the respondents share the same characteristics with those that would be used for the study but in another zone. The reliability of the instrument was calculated as 0.72. The instrument was administered to the respondents (mathematics teachers) in each school. The instrument was collected by the researcher that administered them on the spot. This was done to ensure immediate retrieval after completion by the teacher. The research questions were answered using mean and standard deviation. Interpretation criteria: Very High Extent (VHE) equals 3.50 - 4.00, High Extent (HE) equals 2.50 - 3.49, Low Extent (LE) equals 1.50 - 2.49 while Very Low Extent (VLE) equals 1.00 - 1.49. The hypotheses were tested at 0.05 levels of significance using Analysis of Variance (ANOVA).

Result

The results for this study were obtained based on the research questions answered. The responses to research questions are presented in tables 1 and 2 and the hypotheses are in tables 3 as follows:

Table 1: Mean rating score and standard deviations of the extent of mathematics teachers' assessment of secondary students' valuing level of affective behavioural outcome in mathematics (n=160)

S/N	Item Statement: Mathematics teachers can:	\bar{X}	SD	D
1	Determine students who appreciate the role of mathematics in everyday life	2.10	.73	LE
2	Determine students who demonstrate problem-solving attitude in mathematics	2.11	.74	LE
3	Determine students who demonstrate commitment to learning and improving in mathematics	1.91	.75	LE
4	Identify students who are honest in reporting mathematics work	2.32	.90	LE
5	Identify students who show obedience to instruction during mathematics lessons	1.78	.79	LE
	Grand mean	2.04	.50	LE

Result in Table 1 indicates the extent of mathematics teachers' assessment of secondary students' valuing level of affective behavioural outcome in mathematics. The result indicates that the mean rating score of teachers for all the items (1-5) fall

within the range of 1.50-2.49, which can be interpreted that mathematics teachers determine students who appreciate the role of mathematics in everyday life, determine students who demonstrate problem solving attitude in mathematics, among

others, to a low extent. Likewise, the rating grand mean of ($\bar{X} = 2.04$, $SD = 0.50$) obtained also fall within the range of 1.50-2.49, which shows that there is low extent of mathematics teachers'

assessment of secondary school students' valuing level of affective behavioural outcome in mathematics.

Table 2: Mean rating score and standard deviation of the influence of years of experience on the extent of mathematics teachers' assessment of secondary school students' valuing level of affective behavioural outcome in mathematics (n=160)

S / N	Item Statement: Mathematics teachers can:	Teachers' Experience								
		1-10years (n=77)			11-20years (n=66)			20years and above (n=17)		
		\bar{X}	SD	D	\bar{X}	SD	D	\bar{X}	SD	D
1	Determine students who appreciate the role of mathematics in everyday life	2.13	0.75	LE	2.12	0.73	LE	1.88	0.60	LE
2	Determine students who demonstrate problem solving attitude in mathematics	2.18	0.84	LE	2.08	0.66	LE	1.88	0.49	LE
3	Determine students who demonstrate commitment to learning and improving in mathematics	1.99	0.84	LE	1.79	0.87	LE	2.00	0.61	LE
4	Identify students who are honest in reporting mathematics work	2.34	0.98	LE	2.33	0.81	LE	2.18	0.88	LE
5	Identify students who show obedience to instruction during mathematics lessons	1.81	0.81	LE	1.62	0.72	LE	2.29	0.77	LE
	Grand Mean	2.09	0.56	LE	1.99	0.45	LE	2.05	0.35	LE

Result in Table 2 indicates the influence of years of experience on the extent of mathematics teachers' assessment of secondary school students' valuing level of affective behavioural outcome in mathematics. The result shows that the rating mean score for all the items (1-5) by teachers who have 1-10years of teaching experience, 11-20years and 21years and above teaching experiences respectively were within the range of 1.50-2.49. This is indicative that the teachers determine students who appreciate the role of mathematics in everyday life, determine students who demonstrate problem solving attitude in mathematics among others to a low extent. The grand rating mean of 2.09 with a standard deviation of 0.56 obtained for teachers with 1-10years of

teaching experience, and a mean of 1.99 with a standard deviation of 0.45 for those with 11-20years of teaching experience and a mean 2.05 with a standard deviation of 0.35 obtained for teachers with 21years and above teaching experience also fall within the range of 1.50-2.49. This result shows that teachers with 1-10years of experience had a slightly higher mean, followed by those with 21years and above teaching experience and those with 11-20years of teaching experience. Thus, it can be deduced there is a slight influence of years of experience on the extent of mathematics teachers' assessment of secondary school students' valuing level of affective behavioural outcome in mathematics.

Table 3: ANOVA of the difference in the mean rating score of the extent of mathematics teachers' assessment of secondary school students' valuing level of affective behavioural outcome in mathematics based on years of experience

	Sum of Squares	Df	Mean Square	F	Sig.	Dec.
Between Groups	.359	2	.179	.723	.487	NS
Within Groups	38.952	157	.248			
Total	39.311	159				

Result in Table 3 shows that an F-ratio of 0.723 with an associated or exact probability value of 0.487 at (2, 159) degrees of freedom was obtained with respect to the difference in the mean rating score of the extent of mathematics teachers' assessment of secondary school students' valuing level of affective behavioural outcome in mathematics based on years of experience. For the fact that the associated or

exact probability value of 0.487 when compared with 0.05 (a priori value), was found not significant because it is greater, thus the null hypothesis one (H_{01}) was not rejected. Hence, the conclusion drawn was that years of experience has no statistically significant influence on the extent of mathematics teachers' assessment of secondary school students'

valuing level of affective behavioural outcome in mathematics.

Discussion

The result showed that mathematics teachers' assessment of students' valuing level of affective behaviour in Nsukka Education Zone is to a low extent. These valuing level activities includes; determining students who appreciate the role of mathematics in everyday life, determining students who demonstrate problem solving attitude in mathematics, determining students who demonstrate commitment to learning and improving in mathematics, identifying students who are honest in reporting mathematics work and identifying students who show obedience to instruction during mathematics lessons. All these are personal qualities students exhibit which are to be assessed by their teachers but the obtained result in this study indicated low extent. This agrees with Ezeuba (2014) earlier finding that revealed that majority of teachers does not assess their students' personal qualities.

Result revealed that there was a little influence of years of experience on the extent to which mathematics teachers assess secondary school students' valuing level of affective behaviour outcomes in mathematics. The observed little influence implies that it is difficult for mathematics teachers, irrespective of years of experience, to assess secondary school students' valuing level of affective behaviour because change in students' morals, values, attitudes, likes, dislikes are not easily observable. The finding from the test of hypothesis in Table three showed that the difference in the ratings mean of the three groups of respondents, (i.e., 1 – 10 years; 11 – 20 years; 20 – above years) on the extent of mathematics teachers' assessment of secondary school students' valuing level of affective behaviour is not statistically significant. This implies that the groups of respondents hold the same opinion on the extent of assessment of students' valuing level of affective behaviour. The result of the study is in agreement with the finding of Steven (2009) who indicated that inexperienced teachers did not differ from experienced teachers in their assessment feedback structure. This means that both teachers irrespective of their teaching experience were the same in the assessment of valuing level of affective domain.

Conclusion

Based on the findings of this study, the following conclusions were drawn. Mathematics teachers' assessment of the valuing level of students'

affective behavioural outcome in Nsukka Education Zone is to a low extent irrespective of the teachers' years of experience. Hence the said level of affective domain is not usually assessed properly the way it should be by the mathematics teachers. Therefore the researcher concludes that the number of years a mathematics teacher had put in teaching mathematics in secondary school does not make him /her knowledgeable enough to assess valuing level of affective domain behaviours properly.

Recommendations

Based on the findings and discussions, the following were recommended:

1. The students should give their maximum co-operation to the teachers regardless of their years in the job when assessing them knowing that they are at the receiving end of any positive change in Education.
2. The teachers who are the curriculum implementers and evaluators should acknowledge assessment of all domains especially affecting domain as part of teaching and learning and also be sensitive to students' emotion while carrying out their duties.
3. The government should organize seminar and workshop for teachers to educate them on the proper way of assessing valuing level of affective outcome in mathematics as this will help in improving the competence of teachers towards assessment of the entire behavioural outcome especially affective domain.

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