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PERCEPTION AND PERSPECTIVE OF TEACHERS TOWARDS THE USAGE OF ETHNO-MATHEMATICS APPROACH IN MATHEMATICS TEACHING AND LEARNING

Mogege David Mosimege
Professor, Department of Mathematics, Natural Sciences and Technology Education, Faculty of Education, University of the Free State, Bloemfontein, South Africa.

Felix Oromena Egara
Postdoctoral Fellow, Department of Mathematics, Natural Sciences and Technology Education, Faculty of Education, University of the Free State, Bloemfontein, South Africa.

A B S T R A C T

Background: One of the factors responsible for students' poor performance in mathematics is the teaching method adopted by mathematics teachers. Choosing a suitable method of teaching that encourages active learning and is student-centered, is a solution. The ethno-mathematics approach is one method of teaching that considers the learners' cultural backgrounds and bridges the gap between indigenous mathematics and Euro-centric mathematics. Finding out mathematics teachers' perceptions and perspectives on their use of the ethno-mathematics approach is noteworthy. **Objective(s):** The study examined the perception and perspective of teachers towards the usage of the ethno-mathematics approach and materials in the teaching and learning of mathematics. **Methodology:** The researchers employed a descriptive survey design that utilized a sample of 113 mathematics teachers from a population of 161 mathematics teachers. The study's sample was determined using Taro Yamane's formula. The Mathematics Teachers' Ethno-Mathematics Questionnaire (MTEQ) was the instrument used for the study, which has a reliability index of 0.81 using Cronbach's Alpha method. Collected data were subjected to analysis using Statistical Package for the Social Sciences (SPSS) version 23. The mean and standard deviation were used to answer the research questions, while the hypotheses were tested at a 0.05 level of significance using t-test statistics. Result(s): The result revealed that mathematics teachers use the ethno-mathematics approach and materials in teaching and learning mathematics to a low extent. Conclusion: Based on the findings, mathematics teachers' capacity for their usage of the ethno-mathematics approach and materials need to be boosted by the relevant educational bodies through organising training programmes.

A R T I C L E I N F O

Keywords:
Ethno-mathematics, ethno-mathematics approach, ethno-mathematics materials, mathematics, mathematics teachers

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1. INTRODUCTION

Mathematics is a necessary tool in almost every aspect of human endeavour, and its importance in the

growth of a country cannot be overstated. As a result, mathematics teaching and learning at all levels of education in Nigeria, from lower basic to tertiary must be taken seriously. Mathematics cannot be overlooked by any country wishing to advance scientifically, technologically, or economically (Egara et al., 2018, 2021; Nzeadibe et al., 2019a, 2020b). Bot (2017) posited that mathematical knowledge is critical for harnessing both people and material resources to foster growth in every civilization. Mathematics is very relevant and applicable in engineering, medicine, architecture, agriculture, economics, marketing, and accounting, as well as other fields critical to a nation's development (Titrek, et al., 2019).

Mathematics also aid people in logically establishing relationships between known and required facts, allowing them to come up with possible solutions to their many problems. It also pushes learners to be precise, organize data in a systematic and orderly manner, and achieve valid conclusions through logical thinking (Inweregbuh et al., 2020; Okeke et al, 2020a, 2022b; Osakwe et al., 2023). Because of this, every individual, regardless of job or profession, requires some knowledge of mathematics to function effectively in daily life. However, it is disheartening to see that students' achievements in mathematics in both internal and external examinations in Nigeria are not satisfactory. Some studies (Agashi, 2014; Agwagah & Utibe, 2015; Galadima & Yushau, 2007) have revealed that students' academic achievement in Mathematics is fluctuating and is poor. From 2014 to 2018, an average of 37.15 per cent of the 1,597,711 candidates who enrolled for the examination passed with credit marks and above, according to the West African Examination Council (WAEC) results in Mathematics (Ikwong, 2019). This implies that 62.85% of the candidates had either a pass or fail in the subject. Further observations have also shown that student's academic achievement in the subject has been inconsistent in the past few years and falls below average. Interestingly, WAEC Chief Examiner's reports from 2016 to 2022 revealed that candidates demonstrated significant weaknesses in many areas of mathematics, including circle geometry, quadratic graph, logical reasoning and set theory as well as word problems among other topics. Consequently, since most aspects of mathematics require logical reasoning this may likely affect the overall achievement of students in the subject, which therefore calls for considerable attention to the use of appropriate teaching strategies such as ethno-mathematics which is a teaching approach, which focuses on student's background, their immediate environments integrated with the euro-centric mathematics practically (Umar, et al., 2019).

The term ethno-mathematics is derived from the three Greek words ethno, mathema, and tics. It is a program that integrates mathematical concepts and methods used by individuals from various cultural groups, which are distinguished from indigenous societies by a group of workers, professionals, and children of a certain age group as well (D'Ambrosio, 1985). This program examines the reasons why people from particular cultures (ethno) have developed the measuring, calculating, inferring, contrasting, and categorizing methods and ideas (tics) that enable them to simulate natural and social environments and contexts to explain and comprehend these phenomena (mathema) (Rosa et al., 2016). Thus, the study of ethno-mathematics is used to explain how mathematics is adapted from culture and serves to communicate the connection between culture and mathematical activity. The activity in question involves the abstraction of ordinary life using mathematics, demonstrating how mathematical ideas have historically been used by society and how they are being used in cultural notions (Sholihah, et al., 2022).

Through ethno-mathematics, mathematical concepts can be studied in cultural practice. In addition, students better understand the relationship between culture and mathematics and teachers can instil cultural values that have an impact on the development of character education for students (Sholihah, et al., 2022). Ethno-mathematics assumes that mathematics, like many other human endeavours, is a cultural product of human experience that varies between groups and that it is contingent upon social power relations (Adamu, 2022). Thus, ethno-mathematics is a method of teaching mathematics that integrates local cultural knowledge. Ethno-mathematics is a field of study that combines mathematical principles with cultural factors, using teaching strategies that are consistent with the local culture and the individual characteristics of the students, and helps students easily grasp the mathematical ideas being taught (Zuhra, et al., 2021). Ethno-mathematics creates a link between the students' diverse methods of learning and knowing the culturally entrenched knowledge, and mathematics; this is facilitated by exploring culturally rich and academic ways to ensure that mathematics is meaningful and relevant to the student (Orim & Uzoma, 2019). By acknowledging the personal culture of the child, we can demonstrate and encourage other students to value the diversity of the children in the classroom and in society. Therefore the use of the ethno-mathematics approach to teaching removes abstraction from both teachers' and learners' perceptions of mathematics (Orim & Uzoma, 2019).

The teaching and learning of mathematics using an ethno-mathematics approach take into account the learners' prior knowledge, cultural background knowledge, and environmental experiences from the past and present (D'Ambrosio, 2001). An ethno-mathematics approach is a learner-centred, activity-oriented teaching

strategy that emphasizes content mastery and fosters a love of mathematics through appropriate, familiar real-world activities (Mogari, 2014). According to the aforementioned definitions of an ethno-mathematics approach, learners can comprehend mathematical concepts and methods more readily and effectively when they are related to their sociocultural backgrounds and everyday experiences. Due to their ability to relate mathematical concepts to a variety of experiences and extracurricular activities, this may make mathematics more approachable for a greater range of students (Sunzuma & Maharaj, 2020). As a result, employing an ethno-mathematics approach entails looking for cultural practices and examples that could serve as a foundation for the teaching and learning of mathematics as well as approaches to coping with practical issues.

The significance of the ethno-mathematics approach, according to Aikpitanyi and Eraikhuemen (2017), is that it advocates for the rights of all individuals, regardless of their sexual orientation, gender, ethnicity, race, and socioeconomic level. This enables students to comprehend the issues and difficulties that a varied society faces. Ethno-mathematics examines both the subject matter and the methodology of curriculum, classroom, teacher expectations, professional development, and relationships among educators, administrators, students, and the community (Aikpitanyi & Eraikhuemen, 2017). As a result, using an ethno-mathematics approach enables students to connect with historical mathematical advancements and the contributions made by various cultures and individuals. According to reports, using an ethno-mathematics teaching strategy can grab students' interest and help them get better results (Abonyi, 2016). However, the approach cannot be complete without the necessary materials needed in complementing the approach during mathematics teaching and learning, this is otherwise known as ethno-mathematics materials or ethno-mathematics teaching materials. Ethno-mathematics materials use specialized instruments such as mathematical sets and environmental resources for the teaching of mathematical concepts such as sculpture, artwork and traditional symbols that show different symmetries that incorporate geometry slopes including games that can be used in teaching mathematics in the classroom (Sunzuma & Maharaj, 2020).

The incorporation of ethno-mathematics teaching materials in the teaching and learning of mathematics goes a long way in leading learners towards meaningful learning in the classroom. With an emphasis on the learner's sociocultural environment, ethno-mathematics teaching materials are considered a tool for knowledge development, transmission, and diffusion (Unodiaku, 2013). Thus, using ethno-mathematics in the classroom enables the integration of culture and mathematics. Teaching culturally relevant mathematics to learners is the ideal technique to help them understand the cultural background of mathematics. Fostering a culturally inclusive environment encourages all students, regardless of their age, gender, ethnicity, religion, socioeconomic status, sexual orientation, or political beliefs, to make personal connections and gain useful intercultural skills. This motivates them to work harder and produce better results (Unodiaku, 2013). From the foregoing, therefore, it would be noteworthy to verify the perception and perspective of mathematics teachers in Enugu State towards their knowledge and usage of ethno-mathematics approaches and materials in teaching and learning mathematics.

2. THEORETICAL BASIS

Constructivist theory, developed by Lev Vygotsky in 1968, serves as the foundation for this investigation. This social-psychological theory's central tenet is that learners' verbal and social interactions with their surroundings play a critical role in their cognitive development (Driscoll, 2000). The concept of "the Zone of Proximal Development" put forward by Vygotsky refers to the gap between a child's actual level of development as measured by independent problem-solving and his potential level of development as measured by problem-solving under the guidance of an adult or in collaboration with peers who are more advanced than he is. Learning aims to reduce this distance through learning-social interactions in which the individual receives contributions from the groups, such as ideas, thought patterns, information, reflection, and more, enabling him to construct new meanings as he collaborates with his peers. According to Lev Vygotsky, language determines how thoughts grow, hence the learning environment should also contain interactive communication in addition to the students, learning processes, and materials. People create new information based on their pre-existing knowledge, which is connected to their environment and culture, and they also generate new knowledge. In actuality, the learners' varied cultural backgrounds enhance their learning capacity. The ethno-mathematics approach, which highlights how important it is for students to connect with cultural values and aspects to learn, is related to Lev Vygotsky's constructivist theory. According to the theory, students first pick up cultural mathematical concepts from their surroundings, which acts as a corridor

between them and cultural values and concepts, and they continue to pick them up and cement them in school, which scientifically organizes and processes knowledge. Hence, if mathematics teachers have concrete knowledge of the application of the ethno-mathematics approach and materials, it will not only help the learners to achieve their full potential in mathematics but to help bridge the gap between indigenous mathematics and Euro-centric mathematics.

3. REVIEWED LITERATURE

Studies with an emphasis on ethno-mathematics have been conducted. The research on ethno-mathematics can be categorized into four groups; the first group includes works on ethno-mathematics relating to real-world applications of mathematical ideas in cultural contexts. Numerous types of research have revealed that Indonesian cultural sites, crafts, and fashion all employed ethno-mathematics concepts to estimate, measure, and create patterns (Maryati & Prahmana, 2019; Muhtadi et al., 2017) and the same applies to the study conducted in the Philippines (Rubio, 2016). The second group consist of studies that looked at how ethno-mathematics is incorporated into mathematics curricula and pedagogy in Hawai (Furuto, 2014), Israel (Fouze & Amit, 2018) and Indonesia (Hartinah et al., 2019). The third group of studies emphasizes the teacher's proficiency in instructing mathematics using ethno-mathematics. Some of such studies were conducted in Papua New Guinea (Owens, 2014) and Indonesia (Fitrianawati et al., 2020). The fourth group highlight studies on teachers' knowledge of the use of ethno-mathematics in teaching mathematics in Indonesia (Mania & Alam, 2021), Calabar, Cross River State, Nigeria (Orim & Uzoma, 2019) and Edo state, Nigeria (Aikpitanyi & Eraikhuemen, 2017). These studies have fallen short of presenting teachers' perceptions and perspectives of their usage of the ethno-mathematics approach and materials in mathematics teaching and learning.

3.1 STUDIES ON THE ETHNO-MATHEMATICS APPROACH

Ozofor and Onos (2018) conducted a study in determining the efficacy of ethno-mathematics on the achievement of students in mathematics in Abia State, Nigeria, and found out that the ethno-mathematics approach affected students' achievement positively in probability. Umar et al. (2019) conducted a study on the effect of ethno-mathematics on the performance and retention of students in trigonometry in Zaria, Kaduna State, Nigeria and they found out that students taught with ethno-mathematics had better performance and retention of trigonometry. In another study conducted by Adamu (2022) in determining the effect of ethno-mathematics on the achievement, interest and retention of students in geometry in Makurdi metropolis in Benue State, Nigeria, Adamu revealed that ethno-mathematics is beneficial in the teaching of geometry as it had a positive effect on students' interest and retention.

In the studies reviewed on the ethno-mathematics approach above, a conclusion can be drawn to uphold ethno-mathematics as a viable approach to teaching some mathematical concepts such as geometry, trigonometry and probability. However, not much has been done in using ethno-mathematics as an approach to teaching mathematics in the southeast region of Nigeria, especially in Enugu State. However, whether mathematics teachers in Enugu State are familiar with the ethno-mathematics approach is another issue that needs to be verified, which this study is interested in. Therefore, the question this study is seeking to answer regarding the perception and perspective of mathematics teachers in Enugu State is: to what extent are teachers using ethno-mathematics approach and materials in mathematics teaching and learning?

Consequently, the study's objective is to examine the perception and perspectives of teachers towards the usage of the ethno-mathematics approach and materials in the teaching and learning of mathematics. The research questions that guided the study are; (i) To what extent do teachers use ethno-mathematics in mathematics teaching and learning? (ii) To what extent do teachers use the ethno-mathematics approach and materials in mathematics teaching and learning? (iii) What is the difference between male and female mathematics teachers in their use of the ethno-mathematics approach? (iv) What is the difference between mathematics teachers in rural and urban areas in their use of the ethno-mathematics approach?

4. METHODOLOGY

In this study, the descriptive research design was employed. Descriptive design according to Nworgu (2015) is one in which a selected portion of a population is studied as a representative of the entire population. The design allows a researcher to collect data without manipulation. Through the data gathering process of a descriptive survey study design, the researcher can explain several facets of a phenomenon or a subject without in any way altering it (McCombes, 2020). The choice of this design was to enable the researchers to get information about the perceptions and perspectives of mathematics teachers on their use of ethno-mathematics approaches and materials.

The study's population comprises 161 mathematics teachers in 59 public secondary schools in the Nsukka Education Zone of Enugu State (Post Primary Management Board, 2022). Nsukka Education Zone comprises three Local Government Areas (LGA) namely; Nsukka LGA, Igbo-Etiti LGA and Uzo-Uwani LGA. The sample for the study was obtained to be 113, determined using Taro Yamane's formula (Yamane, 1973). The sample consisted of 66 male and 57 female mathematics teachers. The sample was randomly selected from the 61 public secondary schools in the Zone. The instrument that was used to obtain data for this study was the Mathematics Teachers Ethno-Mathematics Questionnaire (MTEQ) adapted from Section A of the In-Service Teachers' Questionnaires (ITQ) developed by Sunzuma (2018). The ITQ is a 27 item with a 4-point scale response option of 1 = Strongly Agree (SA), 2 = Agree (A), 3 = Disagree (D), 4 = Strongly Disagree (SD). The adapted MTEQ is a 12-item questionnaire with a 4-point scale response option of Very High Extent (VHE) = 4, High Extent (HE) = 3, low extent (LE) = 2, very low extent (VLE) = 1. The MTEQ was face validated by 3 experts. A pilot study on the validated MTEQ was carried out on 25 mathematics teachers that are outside the area of study. The data obtained were analysed using Cronbach's Alpha method to determine the measure of internal consistency of the MTEQ. The reliability coefficient of the MTEQ obtained was 0.81.

The administration of the MTEQ to obtain the necessary data was done by the researchers and research assistants. The research assistants recruited were postgraduate students of mathematics education. The MTEQ was administered to the sampled mathematics teachers in Nsukka Education Zone and the process recorded a 100% retrieval of the instrument. The data obtained were subjected to analysis utilizing Special Package for Social Science (SPSS) version 23. Descriptive statistics such as mean and standard deviation were used to answer the research questions, while the hypotheses were tested at a 0.05 level of significance using t-test statistics. For the research questions, a criterion mean of 2.50 and above was considered as an indication that an item in the questionnaire is accepted by the respondents to a high extent (HE) (2.50 - 2.99) or very high extent (VHE) (3.0 and above). Similarly, mean ratings below 2.50 signify that respondents do not accept the statement in the questionnaire to a low extent (LE) (1.50 – 2.49) or very low extent (VLE) (1.49 and below).

This study was approved by the Post Primary School Management Board, Nsukka Zonal Office, Enugu State. The various school heads granted official permission to the researchers to carry out the research. Informed consent was also provided by the participants.

5. RESULTS

The results and analysis of data are presented in line with the research questions and hypotheses.

Table 1: Perceptions and perspectives of mathematics teachers' usage of the ethno-mathematics approach.

S/N	Item Statement	Mean	Standard Deviation	Decision
1	Ethno-mathematics approach to teaching is a very new concept to me	2.58	1.03	HE
2	I have often used the ethno-mathematics approach in teaching geometry, mensuration, probability, and algebra among other topics in mathematics	2.09	.92	LE
3	Ethno-mathematics teaching approaches recognize the learner's environment as the source of mathematical knowledge	2.25	1.08	LE
4	The learner's language and culture do not influence his/her acquisition of mathematical knowledge	2.12	1.04	LE
5	Ethno-mathematics approach to teaching familiarizes learners with their cultural ways of solving mathematical problems	2.08	1.03	LE

6	Ethno-mathematics approach to teaching assist teachers to understand whether students' problem is of an individual or a collective one	1.85	.94	LE
	Grand Mean (GM)	2.16	1.01	LE

Results from Table 1 show the mean rating of the perception and perspective of teachers on the extent to which they use the ethno-mathematics approach in the teaching and learning of mathematics. The analysis showed that mathematics teachers' usage of ethno-mathematics is to a low extent (LE) as indicated in Item 2 (mean = 2.09 and standard deviation = .92). However, their perception of the ethno-mathematics approach as indicated in items 3,4,5 and 6 is to a low extent following the mean range of 2.25 – 1.85 with standard deviation ranging from 1.08 – .94. Hence, the mathematics teachers' perception and perspective toward the usage of ethno-mathematics approach is to a low extent as indicated from the Grand mean (GM = 2.16 and standard deviation = 1,01).

Table 2: t-test analysis on mathematics teachers' usage of ethno-mathematics in teaching

	N	Mean	Standard Deviation	t	df	p
Teachers' usage of ethno-mathematics	113	2.09	.92	24.09	112	.000

Table 2 revealed that the extent to which teachers in Enugu State use ethno-mathematics in mathematics teaching and learning differs significantly, $t(112) = 24.09$, $p = .000$. Therefore, the null hypothesis was rejected.

Table 3: Perception and perspectives of mathematics teachers' usage of ethno-mathematics approach and materials

S/N	Item Statement	Mean	Standard Deviation	Decision
7	Ethno-mathematics approach and materials are new to me	2.48	.92	LE
8	I use specialized instruments such as mathematical sets and environmental resources for teaching mathematical concepts	2.55	.87	HE
9	Ethno-mathematics materials bring about the practicality, significance and usefulness of mathematics to the learners	2.22	.93	LE
10	The Nigerian culture is full of cultural examples and activities such as sculpture, artwork and traditional symbols that show different symmetries that incorporate geometry slopes including games that can be used in teaching mathematics in the classroom	2.30	1.02	LE
11	There is a lack of ethno-mathematics materials (environmental resources) that match the mathematics concepts to be covered	2.74	.91	HE
12	Teaching using an ethno-mathematics approach and materials makes it difficult to cover all topics in the mathematics syllabus	2.66	1.11	HE
	Grand Mean (GM)	2.49	.96	LE

Table 3 shows the perception and perspective of mathematics teachers' usage of the ethno-mathematics approach and materials in the teaching and learning of mathematics. The analysis showed that mathematics teachers' usage of ethno-mathematics approach and materials is to a high extent (HE) as indicated in Item 8 (mean = 2.55 and standard deviation = .87). Nonetheless, their perception of ethno-mathematics approach and materials as indicated in items 7, 9 and10 is to a low extent following the mean range of 2.48 – 2.22 with standard deviation ranging from 1.02 – .92. Then again, item 11 indicated that there are no enough ethno-mathematics materials to that match the mathematics topics to be covered to a high extent (mean = 2.74 and

standard deviation = .91). Item 12 shows that using ethno-mathematics approach and materials makes it difficult to cover the mathematics syllabus to a high extent (mean = 2.66 and standard deviation = 1.11). However, the mathematics teachers' perception and perspective toward the usage of ethno-mathematics approach and materials is to a low extent as indicated by the Grand mean (GM = 2.49 and standard deviation = .96).

Table 4: t-test analysis of mathematics teachers' usage of ethno mathematics approach and materials

	N	Mean	Standard Deviation	t	df	p
Teachers' usage of ethno-mathematics materials	113	2.55	.87	31.29	112	.000

Table 4 revealed that the extent to which teachers use the ethnomathematics approach and materials in mathematics teaching and learning differs significantly, t(112) = 31.29, p = .000. Therefore, the null hypothesis was rejected.

Table 5: Male and female mathematics teachers' usage of the ethno-mathematics approach

Item Statement	Gender	N	Mean	Standard Deviation	Mean Difference	Decision
I have often used the ethno-mathematics approach in teaching geometry, mensuration, probability, and algebra among other topics in mathematics	Male	65	2.11	.90	0.05	LE
	Female	48	2.06	.95		LE

Table 6: t-test analysis of male and female mathematics teachers' usage of the ethno-mathematics approach

Gender	N	Mean	Standard Deviation	t	df	p
Male	65	2.11	.904			
Female	48	2.06	.954	.257	111	.798

Table 5 shows male and female mathematics teachers' usage of the ethno-mathematics approach. The male teachers had a mean of 2.11 and a standard deviation of .90 while the female teachers had a mean of 2.06 and a standard deviation of .95. Both genders' mean difference was recorded as 0.05. Thus, both the male and female mathematics teachers' usage of the ethno-mathematics approach is to a low extent.

Table 6 revealed that the difference between male and female mathematics teachers in their use of ethno-mathematics do not differ significantly, t(111) = .257, p = .798. Therefore, the null hypothesis was not rejected at p > .05.

Table 7: Rural and Urban mathematics teachers' usage of the ethno-mathematics approach

Item Statement	Location	N	Mean	Standard Deviation	Mean Difference	Decision
I have often used the ethno-mathematics approach in teaching geometry, mensuration, probability, and algebra among other topics in mathematics	Rural	49	2.12	.83	0.06	LE
	Urban	64	2.06	.99		LE

Table 8: t-test analysis of rural and urban mathematics teachers' usage of the ethno-mathematics approach

Location	N	Mean	Standard Deviation	t	df	p
Rural	49	2.12	.832	.341	111	.733
Urban	64	2.06	.990			

Table 7 shows rural and urban mathematics teachers' usage of the ethno-mathematics approach. The rural teachers had a mean of 2.12 and a standard deviation of .83 while the urban teachers had a mean of 2.06 and a standard deviation of .99. Both rural and urban mathematics teachers had a mean difference of 0.06. Thus, both rural and urban mathematics teachers use the ethno-mathematics approach to a low extent.

Table 8 revealed that the difference between rural and urban mathematics teachers in their use of ethno-mathematics do not differ significantly, $t(111) = .341$, $p = .733$. Therefore, the null hypothesis was not rejected at $p > .05$.

6. DISCUSSION

The finding revealed that mathematics teachers in Enugu State utilize ethno-mathematics to a low extent. This finding was further confirmed by Hypothesis 1. Mathematics teachers in Enugu State are not utilizing the ethno-mathematics approach enough. However, of their perception and perspectives, most of the mathematics teachers agreed to the fact that the ethno-mathematics approach is new to them. Hence, they have little or no knowledge about the concept and that could have led to their low utilization of the approach in the classroom. This finding lay credence to the finding of Orim and Uzoma (2019) found in their study conducted in Cross River State, that mathematics teachers lack the perception and awareness of the usage of the ethno-mathematics teaching approach in mathematics. However, the finding contradicts the report of Aikpitanyi and Eraikhuemen (2017) that found in their study conducted in Edo state, that majority of mathematics teachers in that region are using the ethno-mathematics approach in the teaching of mathematics. The result also conflicts with that of Mania and Alam (2021), who discovered in their study conducted in South Sulawesi, Indonesia, that math teachers in that area used an ethno-mathematics approach in the instruction of mathematics in their classrooms and that they had a positive view of the approach. This is true because the ethno-mathematics method of teaching and learning mathematics may have been introduced to and taught to math teachers in such areas, thereby changing their perceptions and raising their awareness of the approach.

The results showed that mathematics teachers in Enugu State utilize the ethno-mathematics approach and materials to a high extent. This finding was further tested by Hypothesis 1, which revealed that the extent of the use of the ethno-mathematics approach and materials is not fully utilized by mathematics teachers in Enugu State. However, the mathematics teachers' perception and perspectives about ethno-mathematics materials, apart from the fact that they are familiar with some of the ethno-mathematics materials without their knowledge application of the ethno-mathematics approach, teachers have the notion that ethno-mathematics materials may not be adequate to match the mathematics topics/contents to be covered. They also believe that ethno-mathematics materials could make it difficult for them to cover all the required topics in the mathematics syllabus. from the foregoing, there is a need to train the mathematics teachers on the application and usage of the ethno-mathematics approach and materials in the teaching and learning of mathematics in the classroom.

Results further revealed that the difference between male and female mathematics teachers' usage of the ethno-mathematics approach is to a low extent. This finding was further tested by Hypothesis 3, which revealed that the difference between male and female mathematics teachers in their use ethno-mathematics approach does not differ significantly. In other words, both male and female mathematics teachers who know the ethno-mathematics approach utilizes it at the same level. This finding corroborates the finding of Aikpitanyi and Eraikhuemen (2017) who found that no difference exists between male mathematics teachers and their female counterparts in their use of ethno-mathematics in teaching mathematics.

Furthermore, results revealed that the difference between rural and urban mathematics teachers' usage of the ethno-mathematics approach is to a low extent. This finding was further tested by Hypothesis 4, which revealed that no difference existed between rural and urban mathematics teachers in their usage of the ethno-mathematics approach in teaching mathematics. This goes to show that location was not a factor to influence the teachers of their use of the ethno-mathematics approach in teaching mathematics. This also shows that the

ethno-mathematics approach can be used anywhere irrespective of location. This finding supports the finding of Aikpitanyi and Eraikhuemen (2017) who reported that no significant difference existed between rural mathematics teachers and their counterparts in urban areas in their use of the ethno-mathematics approach in teaching mathematics.

7. CONCLUSION

The findings from this study revealed the perception and perspectives of mathematics teachers of their usage of ethno-mathematics approach and materials is to a low extent. Consequently, this study has established that mathematics teachers in Enugu State are not utilizing the ethno-mathematics approach and materials enough. The study has also established that the gender and location of mathematics teachers, of their usage of the ethno-mathematics approach, do not differ significantly.

8. IMPLICATION(s) FOR PRACTICE / POLICY

The study's findings have implications for the government and relevant educational bodies within and outside Nigeria and mathematics teachers. The government and the relevant education bodies owe the teachers the obligation to host seminars/workshops, conferences and various educational fora on the awareness, application and use of ethno-mathematics approach and materials. The mathematics teachers owe the learners and themselves the duty of improving on their capabilities and knowledge gained from different educational fora on the use and application of the ethno-mathematics approach and in turn pass the knowledge accurately to the learners in a conducive and friendly atmosphere.

9. RECOMMENDATION(s)

This study, therefore, recommends the following based on the findings;

1. Training of mathematics teachers on the use and application of the ethno-mathematics approach and materials is needed. The government should carry out this through appropriate educational institutions within and outside Nigeria.

2. Pre-service mathematics teachers should be exposed to the ethno-mathematics approach and materials at their level so that when they transition into in-service teaching roles, the teaching methodology would not seem foreign to them.

3. The ethno-mathematics approach should be introduced into the mathematics curriculum from lower basic to senior secondary school levels. That way, the mathematics teachers and learners would have better knowledge of the subject matter.

10. LIMITATION(s)

There are some limitations to this study; firstly, the instrument utilized was a questionnaire and as such, respondents may not have been entirely sincere in their responses. Therefore, the use of structured interviews would have provided more insight into the findings. Secondly, since this study was limited to Nsukka Education Zone, the findings may not be transferable to other Education Zones of Enugu State. This is so because the mathematics teachers used in this study may or may not possess the same characteristics as the mathematics teachers of other Education Zones in the State. The researchers couldn't cover all the Education Zones in Enugu State due to lack of finance and time.

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