Teachers’ Perception And Awareness On The Use Of Ethnomathematics Teaching Approach In Mathematics In Calabar, C.R.S., Nigeria

1ORIM, Richard Ekonesi (Ph.D) & 2UZOMA, Theresa Chinagorom

1Department of Science Education
Faculty of Education
University of Calabar,
Calabar, Nigeria

2Department Of Science Education
Faculty Of Education
University Of Calabar,
Calabar, Nigeria

ABSTRACT
The purpose of the study was to determine teachers’ perception and awareness on the use of ethnomathematics teaching approach in mathematics in Calabar Municipality. A total of 60 teachers (50 male and 10 females) from 15 public schools in Calabar Municipality were sampled. 10-item questionnaires made up of three parts were administered to the teachers to ascertain the level of perception and awareness on the use of ethnomathematics teaching approach. The independent t-test was used in analyzing the variables. The result showed that there is a significant relationship between teachers’ perception and awareness on the use of ethnomathematics teaching approach. One of the recommendations made was that ethnomathematics should be inculcated into mathematics curriculum, broken into several contents and emphasized at all levels of education to create more awareness and also clear up any negative perception amongst teachers on the use of ethnomathematics teaching approach.

Keywords: Ethnomathematics, Mathematics, Awareness, Perception and Teaching Approach.

INTRODUCTION
Living a fulfilling and productive life is increasingly challenging for individuals without knowledge in mathematics, science and technology for the participation in all aspect of society (Orim, 2016). The specification of unique role in the academic and professional preparation of students in mathematics makes it role vital. Mathematics is a school subject that has been accorded a central position in the development of man and society (Evans, 2000). Odili 2006 posited that mathematics is one of the school subjects that any nation needs for industrial and technological advancement. Mathematics as a utility subject has been viewed from different perspectives by different exports (Ekwueme, 2006).

Sidhu (2006) in his own view opined that mathematics is a very useful subject for most vocations and higher specialized courses of learning. One interesting thing about the various views is that all of them are pointing in a direction that mathematics is the key subject to individual and national development. Therefore, mathematics can be seen as a human activity that is older than man because it began when God apportion creation among the days of creation (Gen 1:1-15).

The Nigerian junior secondary school mathematics curriculum has spelt out the goals, content, instructional and evaluative strategies of mathematics education at this level. One of the
instructional strategies is that the teaching of mathematics be carried out by using local aids and examples in the immediate environment of the learner for the concretization of mathematics concepts, but this is not done as majority of the mathematics teachers are not even aware of the use of ethnomathematics teaching approach and those who are aware do not perceive it to being important in the communication of mathematical concepts to the understanding of the learners. Gbamanja (2001) posited that a good curriculum must be based on a good theory which reflects the values of the society for which the curriculum is designed.

The term ethnomathematics was introduced by the Brazilian educator and mathematician Ubiratan D’ Ambrosio in 2001. According to him, ethno simply refers to the cultural context while ‘mathema’ refers to explain, to know or to understand and ‘tics’ has to do with, method which is also rooted in art, skill or technique. He thus defined ethnomathematics as mathematics which is practiced among identifiable cultural groups such as national, tribal, societies, labour groups, children of certain age brackets, professional classes and religious tradition (D’ Ambrosio, 1997). The ethnomathematics approach to teaching of mathematics according to D’Ambrosio (2001) is an approach or technique of teaching and learning mathematics which builds on the students’ previous knowledge, background, the role his environment plays in terms of content, methods and his past and present experience of his immediate environment.

There exist in the immediate environment of the student, local aids and examples that teachers can fall back in order to make teaching and learning of mathematics meaningful to students, but this is not done as most teachers are not even aware that mathematics content could be communicated to the understanding of the student with the use of local aids with particular reference to improvization and creativity. Sidhu (2006) opines that the absence of local aids in teaching makes it difficult for meaningful learning to take place in mathematics.

Enukoha (1995) also noted that poor performance of students in mathematics is because both the content and method of teaching mathematics do not reflect the cultural environment of the learners. This, as a result brings about abstractness and negative perception of the subject amongst learners as well as teachers.

Traditionally, there has only been ‘one way’ to do mathematics, and teacher was the person to determine what that might look like. By acknowledging the personal culture of the child, we are able to demonstrate and encourage other students to value the diversity of the children in the classroom and society.

Therefore the use of ethnomathematics teaching approach removes abstraction from both teachers and learners perception of mathematics

**Teachers Perception and Ethnomathematics Teaching Approach**

Teachers’ perceptions have an enormous effect on the successful implementation of quality teaching and learning. Teachers face considerable challenges which are represented in helping learners in learning concepts soundly and to correct such incorrect concepts that are found in their cognitive construct (Chi, 2005). A systematic integration of variety of resources in a teaching learning process or environment produces appropriate learning experiences, which in turn result in effective (active) or meaningful learning. Although teachers need to learn how to use new techniques and tools, most importantly they need to step back from their own learning and consider the implications for the students’ learning and achievement.

Ethnomathematics 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 in order to ensure that mathematics is meaningful and relevant to student. Umoh (2012) ethnomathematicians strive to utilize the cultural experiences of the student as well as the learners’ individual practices, the society and the community, not only to increase the relevance and meaningfulness of mathematics but also, more significantly, to offer learners with insights of how mathematical knowledge is entrenched in their socio-cultural environments. In addition, integrating the principles of ethnomathematics in a culturally relevant curriculum plays
a significant role in introducing an understanding of mathematics as a component of mathematics education (Enukoha, 1995). Ethnomathematicians also dispute the omnipresent perception of mathematics as being value-free and Eurocentric, and that these perceptions conceal the evolution of contemporary mathematics (Umoh, 2012). Rosa (2010) asserts that the students’ experience, stemming from the manner in which they are taught mathematics, have played an integral role in reinforcing this perception. According to Bishop & Glynn (1999), the manner in which teachers view mathematics is often passed on to the students via their instruction, which in turn, influences the student’s perception regarding the nature of mathematics. Despite the fact that the people have not questioned the universality of mathematical concepts and truths, the last three decades saw the questioning of the view that is mathematics culture-free.

According to Bishop & Glynn (1999), the manner in which teachers view mathematics is often passed on to the students via their instruction, which in turn, influences the student’s perception regarding the nature of mathematics. Despite the fact that the people have not questioned the universality of mathematical concepts and truths, the last three decades saw the questioning of the view that is mathematics culture-free. According to Ted, Macfarlane & Bateman (2007), it is not logical to consider mathematics education as a culture free and abstract process since the process of learning is not and can never be context free of abstraction devoid of societal and environmental influences.

The development of ethnomathematics had the primary objectives of confronting the taboos associated with the perception of mathematics as a discipline is accumulated and universal (Rosa, 2010). Looking for solutions to address particular problems to facilitate the development of mathematics are often entrenched in a cultural framework; this is because understanding how mathematics is shaped requires one to have an understanding of the problems that foster its development. In this regard, D’Ambrosio (1990) pointed out that understanding these problems requires one to take into consideration the cultural context, driving these problems. The fundamental nature of ethnomathematics is to recognize that there are diverse ways of performing mathematics practices by taking into account the aspects of academic mathematics knowledge as well taking into account the diverse ways through which cultures exhibit their mathematical practices and ideas.

Recent science education reform encourages teachers to shift their pedagogical practices from traditional teacher-centred instruction, such as textbook-based lectures with an emphasis on scientific facts, to student-centred, inquiry-oriented approaches that provide opportunities for problem solving and active participation by students (National Academy of Sciences, 2006; National Research Council, 1996).

Ethnomathematics has a huge potential to help engage, inspire, and empower Aboriginal children. By incorporating Aboriginal understanding of numbers and mathematics into the curricula, we should see greater levels of passing rates, and more Aboriginal adults who have high school diplomas and university degrees (D’Ambrosio, 2002).

**Statement of the Problem**

The entire populace (Students, parent, educators and government) are worried due to persistent poor performance of students in mathematics. This condition is deplorably high to the point that Nigerian students often compete for the last positions instead of first in mathematics in school certificate examinations. This poor performance could be due to the perception teachers has or non-utilization of appropriate teaching approaches in the subject. One wonders why all the methods used so far are not capable of reversing this ugly trend. However, could it be that ethnomathematics has not been effectively inculcated into the curriculum in Nigeria?.

**Purpose of the Study**

The main purpose of this research is to investigate teacher’s perception and ethnomathematics teaching approach in mathematics in Calabar municipality, Cross River State. Specifically the investigation seeks to:

1. determine teachers awareness on the use of ethnomathematics teaching approach
2. ascertain teachers perception on the use of ethnomathematics teaching approach
Research Questions
1. To what extent does teachers awareness influences the use of ethnomathematics teaching approach?
2. How does teachers perception influences the use of ethnomathematics teaching approach?

Statement of Hypotheses
The following research questions were posed to control the investigation:
1. There is no significant influence of teachers awareness on the use of ethnomathematics teaching approach
2. There is no significant influence of teachers perception on the use of ethnomathematics teaching approach

METHODOLOGY
The region of this investigation was Calabar municipal local government area of Cross River State, Nigeria. A descriptive survey study was designed and executed in Calabar municipality local government area of cross River State. A total population of 60 (50 male and 10 female) teachers from 15 secondary schools, 4 from each school were sampled. The instrument used was the questionnaire. The questionnaire was made up of 5 questions each from 2 variables making a total of 10 questions. The split-half method was used to establish the reliability of the instrument.

Population of the Study
According to data obtained from Planning, Research and Statistics (PRS) Department of Cross River State Ministry of Education in 2014, the number of public secondary schools in Calabar municipality is 15, with 60 (50 male and 10 female) mathematics teachers and the constitute the study population

Hypothesis one
There is no significant influence of teacher’s awareness on the use of ethnomathematics teaching approach.

This hypothesis was tested using Pearson product moment correlation coefficient analysis. Reason being that both the independent and dependent variables that form these hypotheses were measured continuously. The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-cal</th>
<th>t-tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers awareness</td>
<td>Aware</td>
<td>29</td>
<td>5.15</td>
<td>2.44</td>
<td>4.7</td>
<td>1.64</td>
</tr>
<tr>
<td></td>
<td>Not aware</td>
<td>31</td>
<td>2.8</td>
<td>1.13</td>
<td></td>
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</tr>
</tbody>
</table>

Significant level at 0.05: df = 58, t-tab = 1.64, t-cal = 4.7

The summary of results presented in Table 1 shows that the calculated t-value of 4.7 is greater than the tabulated t-value of 1.64 at 0.05 level of significance with 58 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. This means that, there is a significant influence of teachers’ awareness on the use of ethnomathematics teaching approach.
Hypothesis two
There is no significant influence of teacher’s perception on the use of ethnomathematics teaching approach

Table 1: Independent t-test, showing the level of perception of respondent

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-cal</th>
<th>t-tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>Negative perception</td>
<td>20</td>
<td>3.08</td>
<td>1.14</td>
<td>3.47</td>
<td>1.64</td>
</tr>
<tr>
<td>Perception</td>
<td>Positive perception</td>
<td>40</td>
<td>2.01</td>
<td>1.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant level at 0.05: df = 58, t-tab = 1.64, t-cal = 3.47

The summary of results presented in Table 1 shows that the calculated t-value of 3.47 is greater than the tabulated t-value of 1.64 at 0.05 level of significance with 58 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. This means that, there is a significant influence of teachers’ perception on the use of ethnomathematics teaching approach.

DISCUSSION OF FINDINGS
The first hypothesis states that there is no significant influence of teachers’ awareness on the use of ethnomathematics teaching approach. This null hypothesis was however rejected on the ground that the calculated t-values obtained from the analysis of data were statistically greater than the critical t-value. The implication of this result is that there is a significant influence of teachers’ awareness and the use of ethnomathematics teaching approach in mathematics.

The findings is in line with the position of Anderson, 2002 who made it clear that Due to the incomplete understanding of ethnomathematics, teachers do not know how to use the ethnomathematics teaching approach in the teaching of mathematics to the understanding of their learners.

The second hypothesis states that there is no significant influence of teachers’ perception on the use of ethnomathematics teaching approach. This hypothesis was however rejected on the ground that the calculated t-values obtained from the analysis of data were statistically greater than the critical t-value. The implication of this result is that there is a significant influence of teacher’s perception on the use of ethnomathematics teaching approach.

The findings agrees with the position of Crawford, 2007 who noted that several factors affect teachers mode of teaching among this is, teachers’ views of learning and teaching method, level of education and mastery of subject matter. Therefore, it is necessary to introduce ethnomathematics into the mathematics curriculum to enable both the teachers and students have better understanding of the subject.

CONCLUSION
Students should be allowed to use their existing knowledge, and cultural understandings to construct personal meaningful experiences in mathematics. When they construct knowledge base on their own ideas or ways they retentive ability in them is higher and can relate it to other areas rather than rote learning.

By bringing ethnomathematics into the classroom, educators are empowering those whose voices and ideas have traditionally been marginalized.
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