

# The Language of thinking of Prospective Teachers in Undergraduate Mathematics Education Programmes in Nigeria; Implications for Teaching and Learning Mathematics

**NIZOLOMAN NABHEL ODUAL**

Department of Science Education, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria.

Corresponding author email id: [oduniz@yahoo.com](mailto:oduniz@yahoo.com) ; +2347031134872

Date of publication (dd/mm/yyyy): 01/09/2018

**Abstract** – This study used a mixed method approach to explore the language of thinking of prospective Mathematics teachers in undergraduate Mathematics education programmes in Nigeria and its implications for teaching and learning Mathematics. Four hundred students in 40 University education programmes and 200 students in 20 Colleges of Education were interviewed and responded to questionnaires. Sixty mathematics educators from each institution were also interviewed and the institution programmes for training mathematics teachers were examined. From this it found out that the prospective Mathematics teachers do not think in their local (native) language. At best they think in Pidgin English. Also, it found out that there is no programme in any of the institutions for training Mathematics teachers dealing with language and Mathematics teaching. It is recommended that the institution that train Mathematics teachers should design and implement programmes for training teachers in language to prepare teachers to teach in their local (native) languages.

**Keywords** – Educators Programmes, Language of Thinking, Nigeria's ICT Policy, Prospective Mathematics Teacher, Teaching and Learning.

## I. INTRODUCTION

Language is considered a critical resource in all endeavours especially in the educative process especially as resources where human beings use in the configuration and organization of their experience as well as building information, attitudes, ideas or points of view. With language, one can entertain, persuade and dissuade others from acting as well as give an account of an event or action in a process. The reasoning process of students can be enhanced by the language used by the students in talking even though it is still ambiguous the connection between what the students actually say and what they are thinking [1], [2], [3], [4].

Language also performs three basic functions of informing, expressing and directing. Hence, it is regarded as the vehicle of learning and proficiency in the language of instruction facilitates learning. For example, a good method of teaching children reading, and writing is when the skills of reading and writing are found mostly in playing situation where a common language understood by the learners is used [5], [6], [7].

It would seem imminently commonsensical to assert that, in the context of formal educational settings, children are going to be most effectively taught when both children and teachers speak well the language of instruction. That,

after all, is the prevailing model in most developed countries where one generally finds effective educational systems producing solid results. This model, however, is NOT the prevailing model in many developing countries. Rather, it is common to find such countries committed to the use of some exogenous or colonial language such as English, Spanish, or French as the primary language of education from the earliest years of formal schooling. Very often in such countries, classroom teachers have only passable proficiency in the designated language of instruction while children speak little or none of this language upon entry into the first year of schooling.

**Mother's Tongue.** In the context of formal education, the term mother tongue is normally used to refer to the language a child learned first and usually speaks best. In a very high percentage of cases, the — the first language a child learns and the — language a child speaks best are one and the same. One can, of course, uncover sociolinguistic settings in which these two are not the same. Such cases often involve complex diglossia due to migration or resettlement. Hence, the clamor for the adoption of mother tongue as a language of instruction in Nigerian schools became concretized in the late 1960s with the birth of the "Ife Six-Year Primary Project" considered a veritable solution to the teaching/ learning problems experienced by the Nigerian children's use of English in schools. The project revealed that children taught in their mother's tongue learn faster and better [8], [9].

Also, pupils taught entirely in their native language in the primary school have had no problems of adjustment in secondary schools, where the medium of instruction is entirely English. In the same way, it also reduces the over-dependence on English language [9], [10]. Children taught in mother tongue are less inhibited in class and tend to participate more actively in classroom activities and discussions and tend to perform better in a test of reasoning than those taught in English. The child's mother tongue forms a large part of the child's early environment as names of most objects ideas, objects and important attributes to the child are known from the mothers' tongue. Also, initial verbal and communication skills are built on the mothers' tongue [11], [12].

Likewise, research has shown that students and teachers have consented that science should be taught to Nigerian students in Nigerian languages and so this was considered a veritable solution to student's underperformance in science as students learn better through communicating in

the mother's tongue which they understood. Similarly, when the method of instruction in mother tongue, it enhances learners to acquire information and facts quickly and easily interpret concepts properly as well as correctly acquire manipulative and practical skills [12], [13]. Also, [14] observed that most technologies in Japan were taught right from their youths in their own language and hardly would one find an average Japanese on the street who understands English. This seems to establish the fact that science and technology can flourish in a language other than English.

**Multilingual Education.** Prototypically, the term multilingual education refers to a classroom or school-wide instructional strategies in which multiple languages are used for instructional purposes. There is an overabundance of such strategies and continuing controversy as to which is to be preferred and under what circumstances [15]. When this term or model of education is used with reference to educational models in developing countries, it almost always refers to a model in which initial instruction begins in children's mother tongue with accompanying preparation to learn a second language which will serve as a language of instruction in later years of school after sufficient mastery has been developed [16], [17], [18].

**Second Language Medium.** In this paper, the term or phrase, second language medium will be used to refer to educational models in which children receive most or all of their instruction in a language other than their first language or mother tongue. In the literature of bilingual education, this is referred to as submersion (and incorrectly by many as immersion).

Most African countries (Nigeria inclusive), have introduced the use of local languages as the language of learning and teaching for the first few years of schooling. The authors rightly add that this means that for the first few years of learning, learners learn mathematics in their local languages [19]. This is supported by [20]. It is also seen in Nigeria, that the National Policy on Education (2013) is very clear on this. It states that the medium of instruction in primary school shall be the language of the environment for the first three years. During this period, English shall be taught as a subject. From the fourth year, English shall progressively be used as the medium of instruction and the language of the immediate environment and French shall be taught as subjects (Section 20.9 d & e). Hence, the debate on the appropriate language to be used for teaching and learning in classrooms and its implications on the teaching and learning generally continue. Studies have brilliantly summarized the debate for African countries and concluded that even though teachers and learners admit that using local languages is good, they would prefer to study and use the colonial language as a language of teaching and learning rather than the local languages [19], [20], [21].

In Nigeria the colonial language is English. Different writers and researchers lean to one side of the debate or the other. For instance, [22] citing several authorities concluded that the local languages should be the media of instruction. On the other hand, [23] also citing several

authorities concludes that a failure in the effective English language teaching in the primary level can mar the success of the child in all facets of education and indeed their talent in life. Similarly, [24] concluded that the performance in the English language in virtually all levels of education in Nigeria has continued to affect the acquisition of the needed knowledge in other subjects. This paper sees that generally the conclusion of [19] is the most advisory and most people will prefer to teach in English. They were so because in most classrooms in Nigeria, we find learners from different language groups and English is the only common language. In fact, the areas where the local language is common are few and include those areas within the majority language groups, that is, the Igbos, Hausa and Yorubas. The majority of classrooms in the urban centres and other rural areas do not have a common language. Most of the pre-school children cannot effectively speak their local language [23], [20].

Similarly, in teaching and learning Mathematics, [25] introduces another aspect of the challenges to the issue. This is that Mathematics has a language of its own. The language of Mathematics is different from the ordinary day-to-day English language. It is stressed that this was to be taught alongside the Mathematics content. This means also that the teachers and learners have an additional burden, and the Mathematics educators are called to be concerned about this. Language is certainly a vital resource that teachers use to communicate important concepts such as mathematics in a schooling environment, but it is not straightforward when they are working within bi/multilingual classroom. Teachers in Nigeria find themselves in the classroom that has students who are multi-lingual. This provides many challenges in the communication process, especially in teaching mathematics in a classroom situation. But the impact of such language background on learning mathematics, hence on the teaching of mathematics, has only recently been recognized. In a bi/ multilingual mathematics classroom setting, the challenges become a three - dimensional dynamic. It simultaneously entails access to the language of learning, access to mathematical discourse, and access to classroom discourse.

Therefore, for teachers to be able to successfully teach indigenous students, they need to understand which words in the relevant indigenous language have different connotation and meaning. An additional challenge is that many words used in mathematics do not even exist in some Nigerian languages, so word-to-word translations are not always possible. Another reason students have trouble with language is that not all words are translatable; they either do not exist or have a different meaning in Nigerian languages. What students learn in school can be hard to translate from one culture to another. This has made [26] to noted that both first-and second-language learners can struggle with mathematics because of language. [26] Went further to characterized language in mathematics as having two components. The language of instruction and specialized language of mathematics, which consist of symbols and borrowed words. These symbols, (eg.  $>$ ,  $\neq$ ,  $\pm$ ,

$\alpha$ ,  $\leq$ ,  $\frac{1}{8}$ ,  $\sum$ ,  $\int$ ,  $\approx$ ,  $\rho$ ,  $\chi$ ,  $\varphi$ ,  $\sigma$ ,  $\phi$ ,  $\psi$ ,  $\omega$ , etc) and specialized language (hypotenuse, triangle, square, area, perimeter, simultaneous equation, if and only if, etc) pose a problem because student's ability to interpret and conceptualise mathematics texts, especially word problems varies. Thus, mathematical language becomes a second-language challenge for those whose language differs from the medium of instruction. Also, [26] findings showed that being incompetent in non-mathematical conventional English does not necessarily translate into incompetent in mathematical language; however, researchers noted that the use of mathematically specific vocabulary words often add to student's confusion about what they were expected to do mathematically.

Still another aspect of the issue of teaching and learning Mathematics is that of the language of thinking. As [19] puts it, the learners express Mathematics thinking in their own language. It is concluded that the language used for thinking is to be the first or local language. This means that the learner and teachers first think the Mathematics in their local language and translate it into English. The Mathematics teacher educator is also asked to be concerned with this. Students' mathematical thinking can also be expressed through gesture which may not be revealed in their speech or spoken language. In addition, asking students to perform physical activities in the form of construction can reveal the language of thinking of the students which may not be explicitly expressed in the form of language spoken [27].

Similarly, [28] interviewed Latino students about the thought processes they use while solving mathematics problems and found out that many students had difficulty negotiating even simple word problems because they lacked language facility and problem-solving strategies. Interviewing students after a test and asking them about their thought processes in a Nigerian multilingual classroom, researchers found that while many of the students struggle with the exam questions, the test did not accurately measure student's abilities in mathematics because of language barriers. Unfamiliar phrasing in questions places heavy linguistic demands on the students, leading many who actually do understand the mathematics to misunderstand the question and provide a correct answer for the wrong problem [19]. Likewise, [29] study of New Mexico's bilingual classrooms found out that mathematics teachers who encourage flexible thinking and language development achieve greater equity for their Spanish-speaking students. The researchers argued that by using student's native language in the classroom, teachers gave students greater access to challenging problems that helped them gain a greater conceptual understanding of the mathematics.

Again, [19] continued that in response to the directive to teach children in their first few years of schooling in their local languages, much research has focused on the challenges of using local languages in multilingual Mathematics classrooms in schools. That, according to the author, not much research focuses on how the teacher educator prepares the prospective teachers to teach Mathematics in multilingual classrooms. It should be

noted that the policy so far covers only lower primary schools. It does not cover the training of the primary school teachers. It is stressed that the policy does not direct teacher educators to use the local languages, supposed to be the language of thinking of prospective teachers in the college of Mathematics classroom. This is despite the fact that the prospective teachers that they are preparing, are going to use the local language at one time or the other when they begin to teach. This is certainly a challenge to teacher education. It is therefore believed that if teachers are to be produced for the use of mother's tongue, as a medium of instruction at both primary and secondary school, the teaching will extend to colleges of education and universities where teachers will be trained on how to handle these languages effectively.

Hence, learners need to talk to learn, and such talking to learn is a function of fluency and ease in the language of communication. Similarly, learners need to hear teachers speak in both language they (students) speak fluently and language of instruction in classroom situations. In other words, the talk was understood as a social thinking tool [30]. The problem arises when the learner's main languages are not drawn on for talking by teachers. Teaching all subjects in local languages not only enhances understanding for learners but also pave the way for more potential national development. Teaching mathematics in the vernacular is not without challenges. Instruction is an activity that involves the personal experiences of teachers and student's' - cultural and linguistic factors need to be taken into account to help students make sense of new information. Training teachers and their teaching materials must be in the local languages as well.

## II. STATEMENT OF PROBLEM

It is observed that a lot has been done in teaching education programmes about teaching and learning methods, teaching and learning theories, classroom management, writing schemes and records of work and lesson plans. Not much, if any, has been done in the areas of language and Mathematics. The area of language and Mathematics is a very important area to be considered. This is more so these days that classrooms have learners with diverse cultural and language backgrounds. However, this paper is more interested in the language of thinking of prospective teachers and its implication on teaching and learning Mathematics.

## III. RESEARCH QUESTIONS

It is interested in knowing how the prospective teachers think in their local languages or English. In this way, the Mathematics teacher educators will be clearer on how to direct their attention. As a result, the following questions are posed for the study;

- 1) How effective are prospective teachers in communicating in their local languages?
- 2) What is the language of thinking of prospective teachers?
- 3) How do the Mathematics education programmes prep-

-are prospective teachers to use their local languages in teaching?

- 4) What is the attitude of the prospective teachers to teach Mathematics in their local languages?

#### **IV. RESEARCH DESIGN**

To answer the research questions, this study employed a mixed method design (interviews and questionnaires) to find out mainly the language of thinking of prospective Mathematics teachers. This method was adopted to reflect the detailed and rich descriptive data collected within this study. The quantitative design was used to count the appearance of code-switching by teachers, while the qualitative design was adopted to accurately analyse the language interaction transcriptions in the classroom.

#### **V. DATA COLLECTION**

The researchers visited 40 Universities and 20 Colleges of Education programmes. The institutions were randomly selected to cover the 6 geopolitical zones in Nigeria. Ten undergraduates (prospective teachers) in Mathematics education programmes, were picked from each of the 40 Universities visited. This makes a total of 400 students in Mathematics Education. A similar thing was done in the 20 Colleges of Education which makes a total of 200 students offering Mathematics as teaching subject. Sixty Mathematics educators from each institution were also interviewed and the institution programmes for training mathematics teachers were examined.

In all the institutions visited, firstly, 5 native speakers of the home (local) language of each of the students picked were asked to interview the student. The interviewer used a prepared interview proforma. The interviewer asked the participating students questions including explanations of how the respondents are able to or unable to fluently speak their languages. The responses were graded on a scale of 5.

Next, the students interviewed were given a questionnaire on their language of thinking. This was to ascertain if they think in their native language or not. If they think in their native language, in what language they think, why they do so and how effective is their “code - switching” The researchers also interviewed one Mathematics educator from each institution visited. The interview was to find out how they the educators are preparing their prospective teachers to teach Mathematics in the lower classes of the primary school. The institution’s programmes for preparing Mathematics teachers were also examined to see if there is anything that could help in the issue of language. Finally, all the prospective teachers involved were given an attitude scale to find out how prepared they are in terms of attitude to teach Mathematics in their local languages.

The whole exercise of data collection lasted over three months another one month for data analysis.

#### **VI. RESULTS**

The results of the interview showed that over 50% of the undergraduate (prospective teachers) picked could not speak their local (native) language fluently. In fact, over 1% per cent of them do not understand salutations in their language. The most common reason for this inability is that the prospective teachers claimed they did grow up in their hometowns and that they hardly visit their homes. It was observed that Pidgin English was the most common means of communication in their families and immediate neighborhood. The respondents also claimed that most of their parents are from different language groups.

In response to the items on the questionnaire in their language of thinking, it was observed that most of the prospective teachers indicate that they think in Pidgin English. They indicate that, in their infant days, Pidgin English was the first language they understood. That as they grew up and started learning “good” English, they did so by code-switching from Pidgin English to “good” English. The few who can speak those local (native) languages indicated that they learnt their languages through Pidgin English in code-switching.

In response to the interview on the teacher education programmes preparedness to train teachers for the teaching of Mathematics in lower classes of the primary school in their local language the following were observed;

- The teacher educators in the Universities indicate that they were not training teachers for primary schools. It is claimed that the Colleges of Education are responsible for training teachers for primary schools;
- In the Universities, nothing is done to train teachers in teaching Mathematics in lower classes of the primary schools. Nothing is also done to train teachers in connection with Mathematics and language;
- In the Colleges of Education, there are few courses in primary education but none of this course is directed towards training teachers to teach Mathematics in the local (native) languages; and
- Generally, there are no programmes for prospective teachers to teach Mathematics in the local languages in all the teachers training programmes.

It is observed that the attitude of the prospective teachers towards teaching Mathematics in primary schools is very negative. This is seen as very difficult and if given the opportunity none of the prospective teachers involved in the study is ready to teach in the primary school. This apathy is largely due to the fact that they are expected to teach the pupils in the language of the environment.

#### **VII. DISCUSSION**

Code-switching in school classroom refers to bilingual or multilingual settings, and at its most general, entails switching by the teachers and/ or learners between the language of instruction and the learners’ main language. Code - switching also means the interchange between two or more languages within a single conversation, sentence or constituent. In the classroom, code - switching is the use of more than a single language or linguistic code by

teachers, students or between teachers and students [31], [15], [32].

The most important finding of this study is that most of the prospective Mathematics teachers do not think in their local (native) language or the language of the environment. This means that in situations where the teachers are to teach in the local language, they will be handicapped. The issue is made more complicated by the facts of the next important finding. This is that generally, there are no programmes for preparing prospective teachers to teach Mathematics in the local languages in any of the teacher training programmes. Not even in the Colleges of Education that trains teachers to teach in the primary schools. One wonders how these teachers are coping with the situation under such circumstances. This is certainly a problem.

To this, we could add the findings of [23]. This is that most of the pre-school children cannot effectively speak their local languages. We can rightly assume that the children like the prospective teachers also think in Pidgin English. If this assumption is wrong, the prospective teachers cannot communicate with the children. In either way, we have some challenges.

Also, code-switching in the classroom is used by teachers to clarify and emphasise an important piece of information as well as maintain students' participation in a communication. Teachers use code-switching to translate, give instructions, and re-establish communication [32]. Similarly, code-switching is used by teachers in the classroom to establish and build a relationship, exploring students' background information, at the same time to compensate for lack of language proficiency by students. Teachers most times use code-switching for unofficial interactions between teachers and students.

#### *The Challenges*

- Firstly, the inability to implement the directives of the National Policy on Education in respect of the language of instruction in the first three years of schooling. It will not be possible to teach the children who do not speak the local languages in these languages. Since the prospective teachers do not themselves think in the languages nor fluently speak the languages, the implementation of the directives of the policy is going to be difficult or outright impossible. Maybe a way out, and maybe that is what is going on, is to use the Pidgin English, since this study shows that the Pidgin English is the language of thinking of the prospective Mathematics teachers. This will mean that it is assumed that the children in the majority think and speak the Pidgin English. This assumption may not be strictly so and not all the pupils may be fluent in the Pidgin English. The challenge still remains.
- Secondly, the situation will mean that Mathematical concepts would not be adequately developed in the children. In fact, at best, concepts development in Mathematics may be delayed. It is noted that this is the most important level for the development of the fundamental concepts of Mathematics. It will also mean that pupils will as early as this resort to

memorising the little they are able to hear in class without understanding.

- Thirdly, the use of Pidgin English has another challenge. This is that the Pidgin English would cause interference with the development of the children's English when they start to learn "good" English. In this way, the children will end up performing poorly in Mathematics and English Language. These are the basic subjects in the primary school and constitute the fundamentals of what the children need for their academic development.

Another challenge in addition to the above is that the local language may soon be extinct. This is so because the places where they are to be used may avoid their use. So soon the products of the primary schools and the school will not be using them.

The last finding of this study supports the findings that the attitude of prospective Mathematics teachers towards teaching Mathematics in the primary school is very poor. This may be partly contributed by the fact that they are expected to teach, in the lower classes, in the languages of the environment and they do not think nor speak these languages. In the same vein, [33] opined that since the focus of teaching especially in Mathematics is student thinking and mathematical activities, making use of manipulatives and hands-on activities, an improved attitude of prospective Mathematics teachers is a necessity.

All these problems would have been reduced if there were special programmes for preparing teachers to teach in the lower classes in the primary schools. However, this study has shown that such programmes do not exist. If they existed, they would have helped moderate the attitude of prospective teachers. These programmes would also have introduced elements of the local languages and how to teach Mathematics in a multilingual classroom generally and specifically to teach Mathematics in lower classes of the primary schools even if the prospective teachers do not think in the local languages. The National Policy on Education (2013) expects this.

## **VIII. CONCLUSION**

This study is a contribution to the lack of research in the area of language and Mathematics. It is not taking sides in the debate of whether it is better to teach Mathematics in the local (native) language or not. It is more concerned with whether the prospective Mathematics teachers think in the local (native) languages or the language of the environments they are to teach or not. However, the National Policy on Education has directed that the local (native) language or the language of the environment should be the language of teaching and learning in the first three years of school. This means the prospective Mathematics teachers will teach children in the first three years of schooling in the local (native) language or the language of the environment. This study has shown that there are challenges to the implementation of this directive. It has also out lighted some of these challenges.

The out lighted challenges include the fact that the pros-

-pective Mathematics teachers do not think in their local (native) languages. At best they think in Pidgin English. They do not also speak their local (native) languages. The children who they are to teach, like the prospective teachers may not also think in their local (native) languages and cannot fluently speak their local (native) languages. Whatever is the case this study has shown that there is a language problem in respect of means of communication. This is in addition to the issue of language of Mathematics which adds to the burden of learning Mathematics.

The educators who train the prospective teachers have a responsibility to ensure that the directive of the National Policy on Education in respect of language can be implemented. This study aimed at directing the minds of educators to the challenges of teaching and learning Mathematics and language and plans their teacher training programmes to include taking care of these challenges. In actual fact, it is not enough to teach the prospective Mathematics teachers, the Mathematics content, teaching and learning methods and theories, classroom management, writing schemes and records of work and lesson plans. It is time to recognise that all the prospective Mathematics teacher learnt is not useful if this cannot be communicated to the pupils they teach. To do so language is important.

It is also time for educators to recognise that Mathematics has a language. This language has to be taught. The Mathematics content, if it is to be understood, has to be through a medium of communication. There is the need to include a course in the teacher training programme dealing with language. It is noted that being a Mathematics teacher does not just involve acquiring new Mathematics knowledge and new teaching methods. It also involves understanding and acceptance of the language of the Education Policy and acquiring a language for teaching. Even if prospective Mathematics teachers think in Pidgin English, basic elements of the local (native) languages can be included in such courses. Teaching in a multilingual classroom and code-switching can also be stressed in these courses. At the end the Mathematics teacher who thinks in Pidgin English can code-switch and using these basic elements of the local (native) language communication may take place and Mathematical concepts can be understood.

Finally, the primary school is the foundation of education of the children. All efforts should be made to develop the basic concepts of Mathematics in these children. This will enable them to generalise and transfer the concepts of later and avoid rote memorisation. Language should not be a barrier.

## IX. RECOMMENDATION

The following recommendations are therefore made;

- Colleges of Education should design and implement a course or courses in the elements of the local languages that the prospective teachers are to serve. During such courses, the prospective teachers should be introduced to how to teach the basic concepts of

Mathematics in these languages in multilingual classrooms and using cod-switching.

- The Universities could do a similar thing.
- The Federal Ministry of Education should not only enact policies but should set up monitoring procedures to see the policies are being implemented.
- All institutions involved in Mathematics teacher training should organize workshops and seminars to highlight the challenges and how these could be handled.

## REFERENCES

- [1] F.O. Ezeokoli (2005). Home language as Discriminate of Reading Interests of Senior Secondary School Students in Oyo State, Nigeria. In Dada, A, Abimbada, A and Kolawole, O. O (eds) *Issues in Language, Communication and Education*, Ibadan: Constellation Books, pp 77-97.
- [2] D.T. Brookes and E. Etkina, (2015). The Importance of Language in Students' Reasoning about Heat in Thermodynamic Process. *International Journal of Science Education*, 37(5-6), pp. 759-779.
- [3] M. Umar, S. Saidu and Y.G. Azare, (2015). The Impact of Language and Literature Education in Quality Inclusive Education for Sustainable Development in Nigeria. *National Journal of Inclusive Education*, 3(1), pp. 99-106.
- [4] V. Cook (2016). *Second Language Learning and Language Teaching*. eBook ISBN 9781134683222, 5<sup>th</sup> Edition New York. Routledge.
- [5] F. O. Ezeokoli (2005). Home language as Discriminate of Reading Interests of Senior Secondary School Students in Oyo State, Nigeria. In Dada, A, Abimbada, A and Kolawole, O. O (eds) *Issues in Language, Communication and Education*, Ibadan: Constellation Books, pp 77-97.
- [6] K. S. Goodman and GOODMAN, Y. M. Goodman (2014). *Sense of Learners Making Sense of Writing Language*. 1<sup>st</sup> Edition, eBook ISBN 9781134062515. Imprint Routledge. pp 17.
- [7] S. I. Bunda (2006). The Relationship between Understanding the Language of Mathematics and Performance in Mathematics. *ABACUS the Journal of the Mathematics Association of Nigeria*. Vol. 3, Issue 1, pp 94 -102.
- [8] H.A. Ibrahim, M.A. Shafaatu and U.U. Nafisat, (2017). English Language as a medium of instruction: Challenges to Nigerian Primary Schools. *The Victorian*, 5(2), pp. 63-72.
- [9] M. Lawal (2014). The role of indigenous language in education for meaningful national development in Nigeria. *Journal of Language Studies (JAGORA)*, 1(1), 23-34.
- [10] D. Akindele and M. Letsoela (2001) Code-Switching in Lesotho Secodary and High Schools Lessons and Its effect on Teaching and Learning. *BOLESWA Educational Research Journal*, Vol. 18; pp 83-100.
- [11] M. Araromi (2005). The Mother Tongue, Language of Instruction and Issues in Methodology: The Nigerian Experience in Dada, A. Abimbade, A and Kolawole (eds) *Issues in Language, Communication and Education*, Ibadan: Constellation Books, pp 385-398.
- [12] S.S. Olanipekun, D. Atteh, J.A. Zaku and P.E. Sarki (2014). Mother tongue and students' academic performance in English language among secondary school students. *International Journal of Language, Literature and Culture*, 1(1), pp. 1-6.
- [13] E.N. Emenanjo, (2000). Nigerian and Foreign Languages in Education. In UNESCO the State of Education in Nigeria. Abuja: UNESCO.
- [14] A.C. Izuagba (2001). Monoligualism, Bilingualism and Multiligualism: Implications for Teaching and Learning in R.N Amadi, S.U. Anyanwu & A.C. Izuagba (eds) *Language Education: Issues and Insight*. Oweri: Barlaz Publications.
- [15] R. Amorim (2012). Code switching in student-student interaction; functions and reasons! *Revista de Estudo Linguisticos da Univerdade do Porto*, 7, pp. 177-195.
- [16] H. Igboanusi. (2008). Mother Tongue-Based Bilingual Education

- in Nigeria: Attitude and Practice. *International Journal of Bilingual Education and Bilingualism*, 11(6), pp.721-734. DOI: 10.1080/13670050802149291.
- [17] E. I. Dejong, (2012). Multilingual Education in North America. *Wiley Online Library*. <https://doi.org/10.1002/9781405198431.wbeal0788>.
- [18] J.I. Weber, (2014). Flexible Multilingual Education: Putting Children’s Needs First. *Multilingual Matters*. ISBN: 13:978-1-78309-199-7 (hbk), pp. 179.
- [19] Chitera, N. (2011). Language of Learning and Teaching in Schools: *An Issue for Research in Mathematics Teacher Education*, 14(3), pp. 231-246.
- [20] A.A. Williams. (2016). Promoting Quality Control in Yoruba Language Textbooks for Primary Schools in Nigeria. *Interdisciplinary Journal of African and Asian Studies*, 1(2), pp. 1-9.
- [21] R. TUPAS (2015). Inequalities of multilingualism: changes to mother tongue-based multilingual education. *Language and Education*, 29(2), pp 112-124, <https://doi.org/10.1080/09500782.2014.977295>.
- [22] A.C. Izuagba. (2004). Language and Politics of Exclusion: Implications for Human Resource Development. *Nigerian Journal of Curriculum Studies*. 11(1), pp. 182-186.
- [23] A.E. Udosen. and I.U. Ubom. (2004). Effective Language Education Teachers for Nigerian Pupils: Implications for Human Resource Development. *Nigerian Journal of Curriculum Studies*, 11(1), pp. 175-181.
- [24] N. Ozo-Mekuri (2016). *Nigerian Languages, Literatures, Cultures and Reforms. A Festschrift for Ayo Bamgbose*. M and J Orbit Communication Ltd. ISBN: 978-978-54164-1-1, pp. 8.
- [25] W.A. Jonah-Eteli, (2008). Effect of Teaching the Language of Mathematics on Students’ Performance and Attitude. *African Journal of Interdisciplinary Studies*. 8(2), pp 25-33.
- [26] K. Garegae. (2008). Language in Mathematics Education: Double Jeopardy for Second Language Learners. *Paper Presented at ICME-11, Monterrey, Mexico*, 2008.
- [27] C. Williams-Pierce, E.L. Pier, R. Boncoddio, V. Clinton, M.W. Alibali and M.I. Nathan (2017). What We Say and How We Do: Action, Gesture, and Language in Proving. *Journal for Research in Mathematica Education*, 48(3), pp. 248-260.
- [28] C. Anhalt, A. Fernandes and M. Civil (2008). US Latino student’s thinking and Communication on National Assessment of Educational Progress (NAEP) Measurement Items. Paper Presented at ICME-11, Monterrey, Mexico. 2008.
- [29] M. Marshall, S. Musanti and S. Celedon-Pattichis (2008). Reform Mathematics in Bilingual Classroom: Flexible thinking and Language development in Spanish-Speaking First Graders. Paper Presented at ICME-11, Monterrey, Mexico.
- [30] N. Mercer (1995). *The Guided Construction of Knowledge: Talk amongst Teachers and Learners*. Clevedon: Multilingual Matters LTD. ISBN 1-583699-262-5 (pbk).
- [31] M. Setati, M. and J. Adler (2001 ; 243). Between languages and Discourse: Language Practices in Primary Multilingual Mathematics Classroom in South Africa. *Education Studies in Mathematics*, 43, pp 243-269.
- [32] E. Yataganbaba and R. Yildirim. (2015). EFL Teachers’ Code Switching in Turkish Secondary EFL Young Language Learner Classroom. *International Journal of Linguistics*, 7(1), pp. 82-101. ISBN 1948-5425.
- [33] Y.L. TSAO, Y-L (2018). The Effect of Constructivist Instructional – Based Mathematics Course on the Attitude Towards Geometry of Pre-Service Elementary School Teachers. *US-China Education Reviews A*, 8(1), pp. 1-10, doi: 10.17265/2161-623X/2018.01.001.
- educational measurement and evaluation.
- 3) **Bachelor of Education**; University of Ibadan, Ibadan, Nigeria; 1991; mathematics education.
- I am a lecturer for over 25 years teaching undergraduate level in Department of Science Education, Faculty of Education, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria.
- My publication:**  
 Relationship between Mathematical Ability and Achievement in Mathematics among Female Secondary Students in Bayelsa State of Nigeria. *Procedia - Social and Behavioral Sciences*. Volume 106, 10 December 2013, pp 2230-2240.
- CONFERENCES:**
1. **A Child’s World International Conference** organized and hosted by the School of Education and Lifelong Learning, Aberystwyth University at Penglais Campus, Aberystwyth, Wales, United Kingdom, held between 11-13<sup>th</sup> July 2018.
  2. **Aberystwyth University Learning and Teaching Conference**, Aberystwyth University, Penglais Campus, SY23 3UX, 10-12<sup>th</sup> July 2017.
  3. **The 7<sup>th</sup> Early Career Research Meeting** organised by the British Ecological Group, Tropical Ecology Group, University of York, Derwent College, YO10 5DD, York, held between 14-15<sup>th</sup> August 2014.
  4. **A Child’s World International Conference** organized and hosted by the School of Education and Lifelong Learning, Aberystwyth University at Penglais Campus, Aberystwyth, Wales, United Kingdom, held between 25-27<sup>th</sup> June 2014.
- The 4<sup>th</sup> International Conference on New Horizon in Education (INTE)** organised by Sakarya University and University of Mala at Mercure West Rome Hotel held between 25-27<sup>th</sup> June 2013. Paper presented: Relationship between Mathematical Ability and Achievement in Mathematic among Female Secondary School Students in Bayelsa State, Nigeria.

## AUTHOR’S PROFILE



### Dr Nizoloman Nabel Odual

I was born in Okodi-Ogbia, Bayelsa State, Nigeria on 5<sup>th</sup> September 1967.

My educational background.

1) **PhD in Education**; Aberystwyth University; Ceredigion, Aberystwyth, SY23 3UX, 2018; ICT in education.

2) **Master of Education**; University of Ibadan, Ibadan, Nigeria; 2010;