.USE OF DEMONSTRATIVES IN THE TEACHING OF MATHEMATICS TO STUDENTS WITH VISUAL IMPAIRMENT

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Abstract

Mathematics is a core subject that is taught at both the elementary and secondary levels of Nigeria education system. It is so much essential that a credit pass in it is required for any candidate to be admitted into tertiary institutions in Nigeria. Researches have also established the fact that the attitude of students towards its teaching and learning is not encouraging just as their performance in the subject has been found rather poor. English Language on one hand is the official language cum the language of instruction but on the other hand, Mathematics has a language and register of its own. Teaching Mathematics to learners with visual impairment requires more concerted effort by the teacher, particularly in the choice of language. Thus, the study presents effects the use of demonstrative pronouns "this" and "that" could have on the learning of Mathematics by students with visual impairment.

Background

English Language, no doubt has become a global language (Prasanna, 2021). The place of English in Nigeria today cannot be overemphasized as it is not only the official language of Nigeria but also the language of instruction across the various levels of the country's education system (Sonou et al., n.d.). Other school subjects including Mathematics are taught with English Language as the medium. Since Mathematics itself is a language its imperative for teachers to not only master the subject matter but the language of the subject matter as well (Riccomini et al., 2015). In the event that teachers are not well equipped with the appropriate terminologies in teaching Mathematic, there is the tendency for the teacher to make do with the available alternatives.

Those with visual impairment are individuals in whom the sense of sight is non-functional, whether totally or partially. Since there is a defect in the sense of sight, leaners with visual impairment rely heavily on the other sense organs particularly the auditory and the tactile senses (*Osterhaus*, n.d.) . This therefore makes it imperative for teachers of Mathematics to the blind to be explicit, as much as possible in the

delivery of their lesson as they need the those concepts being taught to be concrete and as real as possible(School of Education, University of KwaZulu-Natal, South Africa et al., 2017) . It therefore expected that the Mathematics teacher presents the concepts in such a manner that appeals to the senses such that a mental image of such is created in the mind, considering the fact that they neither see the gestures nor the illustrations made on the board like the other sighted students in the classroom (Pritchard & Lamb, 2012).

Experience has however shown that Mathematics teachers would often resort to the use of demonstrative pronouns as reference to some of the mathematical terms in the course of making explanations on the lesson. For those with normal vision, this could be considered normal considering that the concept, object or symbol to which the pronoun refers are visible to them. It is however worrisome that performances of students with visual impairment in Mathematics is considerably below that of their counterparts with normal vision and this could be owing to the fact that individuals with visual impairment are have difficulty in effectively and efficiently accessing information from print material as well as for the fact that one main skill in mathematics is the learner's ability to access information from graphics, (Oyebanji & Idiong, 2021).

The Concept of Blindness

Blindness is a term broadly used to refer to a loss of vision, total or partial, in an individual to such a degree that the individual cannot see, with or without glasses. An individual is considered legally blind if the vision acuity falls within or below 20/200 (*WHO*, 2021). Visual impairment is "an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness", (Lydia, n.d.) According to WHO (2021), there are two broad categories of visual impairment. These are the distance and near vision impairment. They opined further that regardless of the category, vision impairment poses a great deal of challenge on the individual's daily life including the rate of achievement in education. It is also worthy of note that there are not less than 2.2 billion of individuals living with vision impairment across the globe and that the prevalence might even be higher in the West, East and Central sub-saharan Africa (*Vision Impairment and Blindness*, n.d.).

Effect of Visual Impairment on Learning

Since researchers have opined that 90% of what young people acquire in the process of learning is achieved through the sense of sight as well as all the experiences gathered from the environ men, one can only imagine the challenges posed by visual impairment on learning. This is basically done through “direct interaction, observation, reading, pictures, television and verbal explanations” (*Osterhaus*, n.d.).

For young children who are with normal vision, observation and direct interaction with objects and events within the environment should come as natural as possible as they can easily make the sense out of the referent (object). For a child who had once seen Olumo rock, a mental representation of such an image is expected to be registered in his mind such that at a mention of it subsequently, the picture readily comes to bare.

However, for a child with vision loss or impairment, there is a heavy reliance on what is heard or felt or touched by engaging the auditory and tactile sense. Thus, any form of misinformation could prove quite devastating for a child or an individual with visual impairment.

Teaching Mathematical Concepts to Learners with Visual Impairment

Mathematics is one of the core subjects taught in Nigeria secondary schools and it is a one of the required courses before a candidate can be admitted into tertiary institutions in the country. Blind students should not be denied the privilege of learning Mathematics as a result of their disability as the only thing they cannot do is see. As such, much is expected of Mathematics teachers, especially those in inclusive classrooms where students with visual impairment are mainstreamed with others with normal vision towards ensuring that the lesson instructions are enriched to such an extent that the vacuum created by loss of vision is conveniently filled through appropriate use of language in the classroom, (Riccomini et al., 2015).

Oyebanji and Idiong (2021) also considers it a necessity making concepts to be taught in Mathematics as real as possible and that concrete objects should be presented for the blind students to feel and touch.

Use of Demonstratives in English for Instruction

Demonstratives are a type of pronoun that are used in sentences to show the distance of a person or a thing from the speaker. According to Olabode (2021), Demonstrative pronouns are used in pointing out the nearness or otherwise of an object from the place or point of use. He went further to provide the list of demonstrative pronouns that are available in English Language which are: this, these, that and those.

Demonstratives pronouns are used to point out a particular object, person, animal or place that must usually be physically present from others. This and that one hand are used to make reference to an object (usually singular) which is relatively or assumedly near to the speaker. These and those, on the other hand, would normally be used for making plural reference. It is also to be noted that nearness or otherwise as used in this context is not exclusively connected to distance as it may also be used to make reference to or suggest the time of occurrence. Hence, "those" and "that" may serve as pointers to things or objects that surfaced prior to the time an utterance is/was being made.

However, it essential to note demonstrative pronouns are expected to be employed when the addressee had once been introduced to the object or concept in focus. This is to say that the teacher can, for example, use “this or that” to refer to a triangle if the students have seen it before. It therefore becomes questionable when such an expression is used in an inclusive class that has a blind student.

Implications of Misuse of Demonstratives on Mathematics Teaching to Students with Visual Impairment

Researchers have stressed the need for a more concrete and real-object based Mathematics classroom, (Oyebanji and Idiong, 2021, Sonou et al, n.d.). However, from a personal observation and experience of the researcher, teachers of Mathematics sometimes engage the use of demonstrative pronouns in conveying instructions and making explanation. For instance, "if I add "this and that" or take away "that from this", we would be left with “this”. Ordinarily, "this" and "that" as used here refer to certain figures or concepts in Mathematics which of course must have been written on the board by the teacher. Thus, it would make sense to those who can see the board as they could easily make sense out of the referents but this might not be the case for a learner with Visual Impairment.

As a teacher of Mathematics to the blind, it is necessary to bear in mind that the lesson needs to be made as concrete as possible such that the mental image of each of the mathematical terms in their mind. For instance, the teacher should rather say 11 plus 33 will give us 44 instead of having to say if I add this (11) or this plus this (33) will give us “that” (44).

Conclusion

Although demonstrative pronouns are quite useful element of the English structure as the assist users of the language avoid being unnecessarily tautologous, its use in the teaching of Mathematics, particularly to students who are blind should be carried out with caution. This is mainly because functions performed by the pronouns, particularly the anaphoric function might appear somewhat confusing to a blind student who is not able to see the object outside of the text, to which the pronoun refers. Hence the use of such in the process of teaching Mathematics to learners with visual impairment has the tendency of making the lesson or the instruction being passed across entirely vague and confusing. Thus, this poses a challenge to how well the blind students will perform in Mathematics.

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