IMPROVISATION IN THE TEACHING OF INFORMATION TECHNOLOGY IN RURAL COMMUNITIES SECONDARY SCHOOL IN AHOADA, LGA, RIVER STATE, NIGERIA

By

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Abstract

Mathematics is an essential part of the education system in Nigeria. However, it is perceived among learners as a tedious and challenging subject. The primary objective of the current study was to enhance the teaching and learning of mathematics using improvisation. The study also examined the role of student's location on mathematics learning when the learning material is improvised. The population of the study included secondary school students in both rural and urban areas of Ahoada, Lga, River State, Nigeria. A total of 68 secondary school students constituted the study samples. A quasi-experimental design was used. Two hypotheses were tested, and it was concluded that improvisation of learning material enhances student's performance in mathematics. Also, the study found that student's location does not affect performance in mathematics when instructional material is improvised. The findings and recommendations are discussed.

Keywords: Improvisation, mathematics, instructional material, performance, location.

Background

Mathematics is a ubiquitous part of education in the universe. In Nigeria, mathematics is a compulsory subject in the early learning system to higher learning levels. Mathematics is part of our everyday lives and in every society. It is the foundation of every scientific finding and technological innovation, including electronic devices, engineering, and so on. Mathematics and English are among the subjects required for transition into various levels of study in Nigeria's education sector. The relevance of mathematics is implicated in its requisite as a criterion for transition into post-secondary education in Nigerian education (Anibueze, 2017). Mathematics is considered crucial in the science, technology, and industrial setting. The aims of mathematics in the secondary level curriculum are preparing students for logical reasoning and higher education practice. It is designed to equip students with appropriate scientific attitudes, competencies, and the ability to apply scientific knowledge to life's challenges (Okori & Jerry, 2017) . The mathematics curriculum for early learners is designed to inculcate mathematical literacy among them (Ekwueme et al., 2013)

Mathematics is a subject that is encapsulated with abstractions (George & Amadi, 2016) . Accordingly, Usman (2002) noted that mathematics is a subject that cuts across every aspect of human activities and a life wire in the study of various academic disciplines. It is described as a science that investigates abstract structures created by logical definitions using logic for their properties and patterns (Ziegler & Loos, 2017) Ezeugo and Agwagah (2000) described mathematics as a systematic tool in attaining the nation's scientific and technological goal. On the whole, these definitions further support the idea that mathematics is a veritable tool for scientific, economic, and industrial development. The advancement of mathematics could be traced to calculations, enumeration, measurement, and systematic inquiries in physical matters' dimensions and gestures. Previous studies, for example, Uwaezuoke (2013) and (Roohi 2012), have highlighted the vital role of mathematics in academia and its implication in human and national growth and development. However, research has pointed to experiences, innovations, and creativities as factors inhibiting the motivation to explore the field of mathematics ((Pound & Lee, 2020; Back, 2014).

The Secondary level is when students ought to make meaning of mathematics, its usefulness to life, and its application to further studies (Uwaezuoke & Charles-Ogan, 2016). Ajagun (2000) asserted that the causes of secondary school student's low performance in Mathematics in examinations had remained an issue of concern to all stakeholders. Over the years, secondary school students' mathematical performance in tests has underscored the relevance of the student's mathematical ability and has further questioned the teacher's approach and method. The common impression that mathematics is complex has led to its poor performance among junior secondary school students (Jega, Muhammad, & Gwandu, 2018). Accordingly, research has implicated instructional materials and approaches in students' observed poor mathematics performance (Eniayeju & Azuka, 2010; Adaramola, 2012; Anene & Okpala, 2012; Ekwue & Umukoro, 2009 Sule, 2009). Furthermore, Adebayo (2010), Ali (2010) Nwankwo (2012) emphasized the role of teachers in the learning of mathematics and attributed the observed poor achievement in Mathematics at West African Senior School Certificate Examination (WASSCE) instructor's inability to make use of appropriate instructional learning material and teaching approach.

Mathematics learning requires some technicality level, meaning that continuing with the conventional teaching mathematics approach would further widen the reported low performances in mathematics. However, adopting a strategy that is environment-specific compliance relating to mathematics learning could enhance mathematics classroom interaction. Improvisation of learning materials entails the ability of instructors to create appropriate, adequate, and relevant material resources (George & Amadi, 2016). Improvisation becomes imperative when there are scarce resources and facilities (Okori & Jerry, 2017). It entails effectively using relevant material obtained in a given environment, probably due to lack or insufficiency of original material, to achieve a better goal. It is the provision of an alternative to a situation that lacks the required approach. In other words, improvisation denotes substituting a learning material with whatever is available to improve learning.

Prior studies have suggested that urban school students had better achievement than rural students (Umar & Samuel, 2018). This claim is having been supported by various reports. For instance, Owoeye & Yara (2011), (Ramos Lobo et al., 2016), Ijenkeli, Paul, & Vershima (2012), and Chianson (2012) have compared mathematics performance among urban and rural students, and the report favored the urban students. Contrarily, some studies (e.g., Tayyaba, 2012; Alokan, 2013) have opposed this claim. Based on this contradiction, the present study intends to examine the effect of improvisation of material on learning mathematic among rural and urban students

There is a growing concern about the low performance of students in mathematics. Thus, the present study aimed to use improvisation to enhance the teaching and learning of mathematical instructional materials on learning among secondary school students in Nigeria's Enugu states. It is hypothesized that improvising instructional material will improve the performance of secondary school students in mathematics. Also, it is hypothesized that student's location will not affect performance when instructional materials are improvised.

Method

The present study applied a quasi-experimental design with a pre-test, post-test control group. The population of the study comprised secondary school students in the Ahoada, Lga, River State, Nigeria. A total of sixty-eight (68) secondary school students were randomly selected from the states as the study samples. The samples were assigned into groups. Group (A) experimental and group (B) the control group. Firstly, the samples were subjected to a pre-tested study to ascertain their performance in mathematics. The experimental group was exposed to an improvised class while the control group was taught conventionally. The sample was later tested with the Mathematics Achievement Test (MAT) to assess their performance following the experimentation.

Result

Table 1:

The table shows the mean and standard deviation scores of the students' performance in mathematics for both groups A and B.

	N	Mean (X)	SD
Experimental	30	11.50	2.84
Control	38	10.84	3.10

From table 1 above, data reveals mean scores of 11.50 and 10.84 for group A and B, respectively, including the standard deviation scores of 2.84 and 3.10, respectively, for the pre-test. It is noted from the above table that no significant difference exists in the mean scores of the experimental and the control groups. It, therefore, means that the students in group A and group B were in the same category of knowledge in relation to mathematics before the test.

Table 2:

The table shows the mean and standard deviation scores of the performance outcome of the two groups (A and B) following the Post-test

	N	Mean (X)	SD

Experimental	30	23.80	3.62
Control	38	14.42	4.21

The above table indicates the mean scores of 23.80 and 14.42 for experimental and control groups for post-test. The data revealed a high mean score for the experimental group (23.80) compared to the control group (14.42). The standard deviation scores also indicated a higher score of 3.62 for the experimental group and a decreased score of 4.21 for the control group. Therefore, the result further supports the literature showing that improvised instructional material is a veritable tool for enhancing mathematics learning.

Table 3:

The table shows the mathematical performance of Urban and Rural secondary school students in the experimental groups following the administration of improvised instructional material in the learning.

Location	N	Pre-test Mean (X)	Post-test Mean (X)	Gain in scores Mean (X)
Rural	12	12.32	24.00	11.68
Urban	18	11.78	23.67	11.89

The above table shows the mean scores of 12.32 and 11.78 for urban and rural students' experimental groups for the pre-test and the mean score of 24.00 and 23.67 for the urban and rural students' experimental groups for the post-test. The data revealed mean scores of 11.68 and 11.89 for urban and rural students, respectively, signifying that both urban and rural sample's mathematical performance increased following exposure to the improvised teaching method. This means that location (rural/urban) does not significantly affect secondary student's performance relating to mathematics when the learning material is improvised.

Based on our assumption that improvising instructional material will enhance the performance of secondary school students in mathematics. The table below shows the t-test comparison of the mathematical understanding of the experimental and control group.

Table 4:

The table shows the t-test comparison of the mathematical performance of the experimental and control group.

Source of variation	N	Mean (X)	SD	df	t-cal	t-crit	P 0.05
Experimental Group	30	23.80	3.62				
Control Group	38	14.42	3.83	64	9.87	2.00	Reject

The above table shows that the calculated t-value of 9.87 is greater than the critical t-value of 2.00 at 0.05 significant. The mean scores of 23.80 for the experimental group and mean scores of 14.42 for the control group suggest that the students exposed to improvised teaching methods performed better than their control group counterparts. Therefore, confirming our assumption that improvisation enhances student's performance in mathematics.

It was also hypothesized that students' location (urban /rural) would not significantly affect performance when improvised instructional materials are used in teaching mathematics. The table below shows the t-test comparison of urban and rural secondary school students' mathematical performance following the use of improvised instructional materials in teaching mathematic.

Table 5:
The shows the t-test comparison of urban and rural student's performance in mathematics (experimental group)

Source of variation	N	Mean (X)	SD	df	t-cal	t-crit	P 0.05
Male	12	24.00	3.27				
Female	18	23.67	4.19	28	0.24	2.05	Not Rejected

From the above table, the calculated t-value of 0.24 for the experimental group's urban and rural students was below the critical t-value of 2.05 at 0.05 significance. Additionally, no significant difference exists between the rural students with a mean score of 24.00 and the urban students with a mean score of 23.67. In other words, the assumption that a student's location (urban /rural) will not significantly affect performance when improvised instructional materials are used in teaching mathematics was supported. This means that students' background does not affect the experimental group exposed to improvised teaching mathematics.

Discussion

From the above tables, firstly, it was further revealed that improvising instructional material for mathematics teaching increases students' performance in the subject. Thus, the result confirmed our expectation that improvisation will enhance secondary school students' performance in mathematics, which means that when teachers improvise the teaching materials, their learning of mathematics will improve. The present study's findings also showed that student's location does not affect their response when the instructional material for mathematics is improvised, thereby supporting the study's hypothesis. Meaning that whether a student is in the urban or the rural community does not affect the student's increased performance when the instructional material is improvised, as observed from the study. This study's finding agrees with previous studies (e.g., Miciano, 2005; Anibueze, 2017), who found improvisation of instructional material to be effective means of enhancing mathematical achievement. It shows that an improvisation is a positive approach to learning in mathematics and other subjects. For instance, Aina (2014) observed that students enjoy or gain more when improvised materials were used for teaching physics. Also, the result disagreed with Owoeye & Yara (2011) and Ijenkeli, Paul, & Vershima (2012), who reported that urban students perform better than their rural counterparts. However, the study supports the literature that student's location has no significant influence on performance (Tayyaba, 2012; Alokan, 2013)

Conclusion

The study aimed to study improvisation to enhance the teaching and learning of mathematics and whether students' location will affect performance when the learning material is improvised. Thus, it was concluded that improvisation of learning material enhances student's performance in mathematics. The study also further discarded the claim that students' location affects their performance in relation to learning. Nevertheless, the present study's findings suggest that prospective researchers explore other factors that could influence mathematics performance, including various socio-cultural variables in more representative samples of not just one area. Additionally, it is recommended that the relevant authorities enforce the improvisation of materials in all subjects and training provided to the teachers to handle improvised materials better.

Ethical consideration

The researchers ensured that the study procedures involving human participants were done by the institution's ethical standard.

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