Perceived Efficacy of Teacher-Made Instructional Materials in Promoting Learning Among Mathematics-Disabled Children

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Abstract

The study explored the perceived efficacy of teacher-made instructional materials in promoting learning among mathematics-disabled children in the primary school. One research question and one hypothesis were used to guide the study. The sample for the study comprised of 155 primary 5 mathematics-disabled pupils, and the study area was central education zone. Questionnaire was the instrument used for data collection. Mean, standard deviation, and t-test statistics were used in the analysis of the data. Results indicated that pupils prefer visual aids, recall better, learn faster, achieve more, and prefer contact with teacher-made instructional materials, among other items.

Keywords
learning disabilities, mathematics disability, teacher-made instructional materials, education

Introduction

In teaching, it is required that the environment, instructional materials, and interactions with learners be appropriate for teaching and learning. This is perceived as responding to the learners’ interest and needs. In every classroom, some children need special attention and planning for them to be able to meet up to the teachers’ expectations. However, some children lack pre-requisite skills and knowledge, which are appropriate for their age. Such children are referred to as “learning-disabled” children. Learning is an enduring change in the way an organism responds based on the organism’s experiences (Drew, 2002). Therefore, learning has to do with change in behavior due to environmental and developmental influences. For Igbo (2012), learning is knowledge facilitated through experiences within the school and outside the school environments. Learning is seen as internal events that go inside the students’ brain.

For Kuppuswamy (2010), learning is the process by which an organism, as a result of its interaction with a situation, acquires a new mode of behavior, which tends to persist and affect the general behavioral pattern of the organism to some degree.

The ability to create learning connections through the application of teacher-made instructional materials are the skills through which children develop new combinations and relationships in organizing ideas, symbols, objects, and words (Charlesworth, 1996). Ordinarily, teacher-made instructional materials create curiosity for the learning-disabled child who may seize this opportunity to explore and create. These abilities to explore and create often tend to increase the children’s knowledge and cognitive development.

Children learn a lot from their teachers through the process of applying instructional materials. Bello (1999) is of the opinion that the provision and utilization of teacher-made instructional materials will promote the intellectual ability of children. Probably, this is because instructional materials act as motivator to the children and will equally awaken their interest, more especially children with learning disabilities.

Learning disabilities refer to certain kinds of disorders in the basic psychological process of individuals. These disorders have to do with intrinsic factors such as specific defects in information processing or the ability to learn (Mangal, 2011). The disorders manifest with significant difficulties in language acquisition and ability to solve simple mathematical problems. Such children are not as efficient as their classmates or age-mates without learning difficulties.

Generally, learning disability is a broad terminology that is used to cover different conditions whose major characteristic is significant impairment of mental functioning. Learning disabilities are described differently all over the world. This implies that there is no consensus or agreement...
on the definition of learning disabilities. Recently, children with learning difficulties have been referred to as handi-
capped, subnormal, or retarded. In short, all children with
intellectual deficits, however profound, are referred to as
learning-disabled children (Bennett, 2011). The explana-
tion of this is that learning-disabled children are children with
learning difficulties, no matter how minor or severe the
learning problem might be.

Learning disability is a type of helplessness or handicap
that can be felt by the learner in terms of his or her academic
performance in the same way as experienced by a mentally
disabled child in terms of his or her mental functioning
(Mangal, 2011). This implies that learning-disabled children
are children who undergo extra stress in learning. These are
children who have difficulties in their academic perform-
ances, in spite of the fact that they are not mentally
impaired, do not lack learning opportunities, and have no
emotional difficulties or problems.

Mathematics is important in the life of every individual.
This is because individuals come in contact with mathemat-
ics directly or indirectly as they interact with people. For the
National Institute of Mental Health United States (1990),
mathematics has to do with the recognition of facts, under-
standing abstract concepts such as fractions and place values.
Mathematics disability can be attached to a number of fac-
tors running from individual perception, problems in cogni-
tive functioning, and inappropriate instruction. Therefore,
mathematics disability has to do with pupils’ inability to co-
ordinate properly.

Garofalo and Lester (1985) listed four categories of activ-
ities involved in mathematics problem solving as orientation,
organization, execution, and verification. This implies that
for a child to operate appropriately in mathematics, the child
requires these qualities.

For the purpose of this study, mathematics-disabled chil-
dren are children who operate 2 years below the standard
from their classmates. In addition, the continuous assessment
scores were equally used as a criterion for declaring children
as mathematics disabled.

Teacher-made instructional materials are constructed
teaching materials developed by teachers in their respective
subjects or subject areas for easy teaching and learning. Otuka
(2004) sees teacher-made instructional materials as
improvised teaching materials. In this case, the teacher acts
as the improviser by composing instructional or teaching
materials that will make teaching and learning easy. It
involves the ability of the teacher to make or invent teaching
materials in the absence of already made instructional mate-
rials for the purpose of meaningful interaction between the
teacher and the learners in the classroom.

Teacher-made instructional materials are the teaching
resources that are purposely designed by the teacher or by
both teacher and pupils mainly to promote meaningful teach-
ing and learning in the classroom (Crawford, 2003). These
are usually teacher-initiated instructional materials which are
used to facilitate teaching and learning processes. Going by
this definition, teacher-made instructional materials will
have some positive effect on mathematics-disabled children
and will also improve their level of understanding in class-
room situations under which teaching process usually take
place. This means that teacher-made instructional materials
will foster or boost the learners’ cognitive learning
processes.

Teacher-made instructional materials can provide the
driving force or incentive for children to explore and dis-
cover already stated objectives. This can be acquired by the
manipulation of these instructional materials and will boost
the interest of children toward achieving the stated objec-
tives. Changing the pattern of teaching and learning by
applying these teacher-made materials will excite learning-
disabled children and make them explore, by being creative
and seeking for what is new in the usage of teacher-made
instructional materials.

Thompson (2001) has also observed that the application
of instructional materials tend to sustain and attract chil-
dren’s attention, and make teaching and learning more inter-
esting irrespective of the gender.

Gender means culturally specified assignments or post of
traits and roles to human beings. Culturally, in some coun-
tries, there are roles expected from girls and boys, respec-
tively. According to Martin and Osborne (1992), the process
begins with labels. For instance an infant is called a boy or a
girl and dressed in blue or pink, respectively. These affect
children directly or indirectly even in their academic perfor-
mancess and academic achievements. In a study carried out
by Mbajiogu F.O.(2002) on male and female students’
achievement in biology, the findings indicated that male stu-
dents performed better than their female counterparts. It is
assumed that with the application of teacher-made instruc-
tional materials, the possibility of both girls and boys impro-
ving is not ruled out. Besides, the difference in their academic
achievement might not be significant.

Stone and Michael (1986) carried out a study on objects
sorting on mathematics-disabled children. The researchers
used tasks ranging from objects sorting and concept attain-
ment to more complex hypothesis testing. The findings indi-
cated that mathematics-disabled children struggled to
identify critical attributes in tasks and are ineffective in their
use of feedback.

In another study carried out by Otto and Smith (1980) on
objects sorting in mathematics, the findings indicated that
during the pre-primary and primary years, many children
cannot sort objects by size, match objects, understand the
language of mathematics, or grasp the concept of rational
counting.

In a study carried out by Young (2003) on the application
of cartoons in teaching Grades 6 to 9 students, the findings
indicated that cartoons acted as visual aid and equally
increased the learning achievement acquired by students. If
this is so, the implication is that teacher-made instructional

materials that are mostly visual teaching aid will go a long way in minimizing the mathematics disability of children in the primary school.

According to the findings of Olaitan, S.O. and Akpan, A.E (2003) and Weikart, P.P. (2000) on teaching strategies, evidences indicate that learning processes carried out through teacher-made instructional materials such as visual aids, flash cards, pictures, and cards have been effectively used in teaching and learning at pre-primary and primary school levels. Therefore, most of the findings on the efficacy of teacher-made instructional materials were from outside Nigeria.

From literatures reviewed so far, it is obvious that the effective application of teacher-made instructional materials is important and needs to be addressed in Nigeria, with particular reference to mathematics-disabled children. If this problem is addressed appropriately, it might reduce or minimize mathematics disabilities among children in Nigeria. This is the thrust of the study.

The study examined the perceived efficacy of teacher-made instructional materials in the promotion of learning among mathematics-disabled children. Specifically, the study determines the perceived efficacy of teacher-made instructional materials in promoting learning among primary 5 mathematics-disabled pupils. The following research question guided the study:

**Research Question 1:** What is the perceived efficacy of teacher-made instructional material in promoting learning among primary 5 mathematics-disabled children?

**Hypothesis 1:** One hypothesis tested at .05 level of significance guided the study.

H0: There is no significant difference between the mean ratings of male and female pupils with regard to perceived efficacy of teacher-made instructional materials among mathematics-disabled pupils.

**Method**

The study applied survey design. This is because it involves assessing opinions, preferences, and perceptions (Cohen, Manion, & Morrison, 2011). The survey design was used for gathering data on pupils’ opinions and perceptions on efficacy of teacher-made instructional materials.

The study was carried out in Nsukka Central Education Zone, which is made up of five sub-zones: Enugu Road, Odenigbo, Leja, Obimo, and Obukpa sub-zones. The area was chosen because of the poor learning attitudes, which created mathematics problems for the pupils. Therefore, the researchers examined whether teacher-made instructional materials will help enhance learning among mathematics-disabled children.

The population of the study was 155 primary 5 learning-disabled pupils in Nsukka Central Education Zone (Source: Nsukka Central Education Authority). This is made up of 82 male and 73 female pupils. The teachers identified these pupils as mathematics-disabled children based on their yearly performances. It is expected that at primary 5, pupils must have acquired mathematics skills.

Random sampling technique was adopted in selecting 25 primary schools for the study. Purposive sampling technique was adopted to select the mathematics-disabled children in the schools selected. There were altogether 155 mathematics-disabled children who were identified by their teachers in the schools, and all the pupils were involved in the study. In identifying the mathematics-disabled children, the researchers involved the teachers who provided the continuous assessment records of the children. The researchers requested from the teachers to select those children who were experiencing mathematics disabilities. This was provided by the teachers based on the pupils’ continuous assessment records. These children were selected based on the pupils’ uneven performances across the school subjects and particularly in mathematics.

**Instrument and Method of Data Analysis**

The technique for data collection was through questionnaires. The cut-off point for the decision making was 2.5. Therefore, 2.5 and above were regarded as acceptable for the perceived efficacy level of the teacher-made instructional materials. Mean and standard deviation were used in answering the research question, while t-test was used to test the hypothesis.

In collecting the data, 155 copies of the questionnaire were personally distributed to the pupils by the researchers with the help of two research assistants. Copies of the questionnaire were distributed to the pupils almost immediately. Two research assistants helped the researchers in the distribution and retrieval of the questionnaire. The return rate was 100%.

The instrument was face validated by three experts in educational psychology guidance and counseling and an expert in measurement and evaluation all from the University of Nigeria, Nsukka. Some items were deleted while some were restructured to meet the standard.

The researchers subjected the validated instrument to trial testing with 20 primary 5 mathematics-disabled pupils in Enugu Urban. These pupils are outside the research area. To ascertain the internal consistency of the instrument Cronbach’s alpha was used. The Cronbach’s coefficient for the internal consistency was 0.78. Mean and standard deviation were used in answering the research question, while t-test was applied in testing the hypothesis.

**Results**

From the table, the data indicate that 15 items out of 18 items have mean scores that range from 2.83 through 3.68. The indication is that, there is a general acceptance of the items on the application of teacher-made instructional materials as
a way for enhancing teaching and learning among the learning-disabled children in the primary schools studied. However, only 3 items have indications of “disagree.”

The mean score is above the criterion mean of 2.5. Therefore, the means scores are evidence that teacher-made instructional materials can help enhance learning among the learning-disabled children.

The data on Table 2 indicate that male pupils had a mean score of 3.00 while the female pupils had a mean score of 3.15. The data were analyzed using t-test analysis, to enable the researcher find out whether there is a significant difference existing between the rating of male and female pupils.

The result indicates that there was no significant difference between the mean rating of male and female pupils in their perception of teacher-made instructional materials. This is simply because the result is less than a .05 level of significance by which the hypothesis was tested. This implies that the effect due to gender is not significant at the .05 level of significance. Therefore, the null hypothesis is accepted.

**Table 1.** Mean Scores and Standard Deviations of the Efficacy of Teacher-Made Instructional Materials(TMIM) as Perceived by the Pupils Generally.

| S/N | Item statement                                                                 | M    | SD  | Decision  |
|-----|--------------------------------------------------------------------------------|------|-----|-----------|
| 1   | I can remember better about a subject seeing the teaching material made by my teacher | 3.24 | 0.87| Agree     |
| 2   | I prefer to see information on a visual aids constructed by my teacher         | 3.11 | 0.81| Agree     |
| 3   | I learn better whenever I see the teaching aids                              | 3.04 | 0.97| Agree     |
| 4   | I remember better about a subject whenever the teacher uses models            | 3.33 | 0.63| Agree     |
| 5   | I learn best whenever the teacher uses real objects in teaching               | 2.99 | 0.72| Agree     |
| 6   | I prefer posters than copying notes because this makes me recall easily what I was taught | 3.07 | 0.73| Agree     |
| 7   | I can remember best about a subject by developing some of the instructional materials | 3.05 | 0.82| Agree     |
| 8   | Usually, I perform badly in academic subjects whenever the teacher brings in instructional materials. | 2.05 | 0.82| Disagree  |
| 9   | Whenever the teacher uses diagrams, graphs, and any visual object as teaching material I recall better. | 2.99 | 1.03| Agree     |
| 10  | I always have the image of what I was taught because of the instructional materials used by the teachers | 3.68 | 0.46| Agree     |
| 11  | Coming in contact with instructional materials while learning helps me recall subject taught. | 2.83 | 1.09| Agree     |
| 12  | I prefer to have contact with instructional materials than reading about the subject. | 3.20 | 0.75| Agree     |
| 13  | I see my learning effort as a result of the application of teaching material. | 3.02 | 0.95| Agree     |
| 14  | I am motivated whenever I see my teacher come in with teaching materials and I learn better | 3.38 | 0.56| Agree     |
| 15  | The use of instructional material is a waste of time and makes the subjects boring. | 2.86 | 0.86| Agree     |
| 16  | I avoid teachers who use teacher-made instructional materials in teaching. | 2.44 | 0.95| Disagree  |
| 17  | I understand a new topic better whenever teacher-made instructional materials are used. | 3.07 | 0.84| Agree     |
| 18  | Teaching aids make me feel uncomfortable                                     | 2.28 | 0.84| Disagree  |

Note. 2.5 and above = acceptance level. M = mean; SD = standard deviation.

Data presented above in Table 1 reveals that majority of the item statements have mean scores above 2.5 which is the cut-off mark for decision making.

**Table 2.** The t-Test Statistical Analysis of the Significant Difference Between the Mean Rating of the Male and Female Pupils.

| Group | M    | SD  | n    | Df  | t-cal | t-crit | Decision |
|-------|------|-----|------|-----|-------|--------|----------|
| Male  | 3.00 | 0.58| 82   | 153 | 1.96  |        | Accepted |
| Female| 3.15 | 0.49| 73   | 0   |       |        |          |

Note. M = mean; SD = standard deviation; t-cal= t calculated; t- crit= t critical; Df= Degree of freedom.

**Discussion**

The purpose of the study was to ascertain the perception of primary school children on the use of teacher-made instructional materials. The results revealed that teachers enrich the performance of learning-disabled children by utilizing teacher-made instructional materials in teaching. This could be attributed to the fact that the children came in contact with the teaching materials. They had the opportunity to see, feel, and sometimes touch the objects and this might have appealed to their various sense organs. In addition, the results indicated that pupils feel comfortable and relaxed whenever teacher-made instructional materials were used. They learn faster, achieve more, and prefer contact with teacher-made instructional materials. This is in line with Gillingham and
Stillman (1970) who found that seeing and hearing tend to stimulate the sense organs and make the child learn more effectively by practice.

The finding is also in line with the recent study by Bennett (2011), who found that coming in contact with teacher-made instructional materials is an opportunity for children with learning difficulties to gain communication skills. The results of the grand mean score of 3.09, with the criterion benchmark of 2.50, is evidence on the influence of teacher-made instructional materials. The above result is also in line with the finding of Igbo (2006) that the use of real objects in the teaching of learning-disabled children is very effective and highly significant.

On the male and female pupils taught using teacher-made instructional materials, the finding revealed that there is no significant difference in the mean ratings. This is in line with the findings of Thompson (2001) and Bello (1999), who found no difference in the achievement of children based on gender. This finding could be attributed to the fact that both male and female pupils were all taught under the same environment and condition by the teachers. When this is achieved, the teacher has successfully made learning connections through the teacher-made instructional materials. For the fact that the teaching materials are created by the teacher, he or she ensures that the environment is not threatening and learning becomes easier. Teachers are always ready to take steps and learning becomes easier to increase motivation and continuous desire for the learners to learn from the new situation which the teacher has created. Usually, when education involves the processes of constructing physical and logical mathematical evidences, the teacher’s role is more of facilitating learning and initiating the instruction.

Generally, the findings revealed that among the 18 items stated, 16 items were agreed on by the respondents as items that could help in the process of learning using teacher-made instructional materials in primary schools. The favorable rating of the teacher-made instructional materials with high scores 2.5 and above on 16 items out of the 18 items on agreement by respondents indicated that it is necessary to lay more emphasis on teacher-made instructional materials. This is in agreement with Olaitan, S.O. and Akpan, A.E (2003), who found already made materials such as audio and visual flash cards relevant in the process of teaching pre-primary and primary school children. In support of the findings, Weikart (2000) also indicated that visual teaching aids, cards, and pictures have been found relevant in enhancing teaching and learning at the primary school level. The findings could be attributed to the fact that children are usually attracted by pictures, actions, and demonstrations. Besides, from the observation made by the researchers, primary school-level children are very good in imitating and using their teachers as role models.

**Concluding Remarks**

The result, as indicated by the study, shows that the use of teacher-made instructional materials was highly useful in enhancing the learning-disabled children’s performance in the classroom as perceived by the children in this study. There is the indication that there is no significant difference between male and female pupils taught using teacher-made instructional materials. Therefore, the place of teacher-made instructional materials in the process of teaching and learning cannot be overemphasized. They attract the attention of pupils and enable them to contribute to discussions on the topics being taught, using the materials to illustrate and in that process store the information acquired in their long-term memory for further application.

**Recommendations**

The following recommendations were made based on the findings of the study:

1. Teacher-made instructional materials should be included for teaching all the subjects in primary schools to enable children to get information from the primary source.
2. The curriculum planners should encourage teachers to use teacher-made instructional materials by paying specific allowance, basically, for this purpose.
3. Curriculum planners should make use of the findings of this study to revisit and review the application of teacher-made instructional materials for enhancing teaching and learning.

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