

# FACTORS INFLUENCING THE USE OF INSTRUCTIONAL MATERIALS IN THE TEACHING OF MATHEMATICS IN PRIMARY SCHOOLS IN JOS NORTH LOCAL GOVERNMENT AREA, PLATEAU STATE

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## **Abstract**

*The study investigated instructional materials' utilization in the teaching of Mathematics in primary schools in Jos North LGA of Plateau State. The population of the study was 5474 teachers and 547 were randomly selected using proportionate sampling technique. Two research questions and two hypotheses guided the study. Data were collected using the questionnaire developed by the researcher tagged Utilization of Instructional Materials in Mathematics by Teachers Questionnaire (UIMMTQ). Test-retest reliability value was 0.73. Data collected were analysed using the percentages and the Chi-square for the research questions and hypotheses. Results obtained showed that the widely utilized instructional materials for the teaching of Mathematics by primary school teachers are models and printed materials. The paper emphasizes the importance of utilization of instructional materials in teaching mathematics.*

## **Introduction**

The world is changing fast and becoming more scientific and technical. As this transformation occurs, education in all its forms and in all subjects is not left out. Teaching equipment and materials have changed over the years, not only to facilitate teaching/learning situation but also to address the instructional needs of individuals and groups (Ema&Ajayi2011). The aim of teaching is to change the behaviour of an individual and aid the acquisition of skills, abilities, habits and physical competencies necessary for functional living in a dynamic environment. Udo (1996) observed that to promote learning requires that the conditions that will promote it should be created by the teacher. Learning, according to Onwuka (1996), involves not just acquisition but the utilization of such knowledge, skills and its appreciation. Before any acquired knowledge could

be utilized, it must have to be concretized, and this is one of the roles performed by instructional materials.

Ibidapo&Fagbemi (2001) describe instructional materials as means of making teaching and learning process easy, more meaningful and understanding. According to Ema&Ajayi (2011), instructional materials can be viewed as acts of giving help normally by teachers to provide encouragement and motivation to pupils in learning activities. Instructional materials also refer to all tools which can easily be used by a teacher to correct wrong impressions and to illustrate things that learners cannot forget easily. It is the principle and method which bring together man and materials in a systematic cooperation to effectively solve educational problems. Ema&Ajayi (2011) posit that instructional materials are important because of the numerous instructional problems in our educational system in Nigeria; therefore teachers should try to use instructional materials to resolve educational problems. In using instructional materials to solve educational problems, teachers should be systematic in designing, carrying out and evaluating the total process of teaching and learning in terms of specific objectives to be achieved, which are based on research in human learning and communication to bring about more effective instruction in the learning process. Therefore it is clear that the main objective of using instructional materials in teaching is to achieve excellence in education. This means that no lesson is well-taught without the use of teaching aids or instructional materials.

According to Ibe-Bassey (2004), instructional materials are objects, devices and things used by teachers to transmit, transfer and to share their encoded lessons with their learners who will decode such lessons. By analyzing and interpreting them to facilitate effective learning, the teacher (being the leader) is a competent figure that must first address the code to his lessons to provoke curiosity, capture attention, arouse and sustain interest, quicken perception, enhance retention, create impression in the learner as well as facilitate recall. Instructional materials capture the audience's intellect and eliminate boredom. Speed and accuracy are some of the unique qualities of instructional materials. Instructional materials make teaching easier, neater and more accurate, boosting for clarity and more appealing (Ema&Ajayi, 2011). For the teachers to achieve this, they are used in teaching. That is, the behavioural objectives, the learner's characteristics, the contents, the instructional strategies and the evaluation techniques of the lessons should be matched to the media. This actually will facilitate the integration of the use of visual instructional media in the teaching and learning process.

The teacher must be a master of his/her teaching subject, that is, he or she must be keen to share, transmit and transfer meaningfully the valuable knowledge and experiences of his expertise to the students so that they can analyse and interpret such encoded lessons. The teacher in his or her teaching must be able to understand the students' world and environment (Ibe-Bassey, 1988). There is the need to make teaching and learning of various school subjects (like Mathematics) more interesting, motivating and stimulating to the learners and one of the ways of doing this, is to utilize instructional materials. The teacher's ability to produce and utilize visual instructional media for teaching and learning depends to a great extent on his/her continuous interaction and use of instructional materials. Instructional media are information carrier and they are integral components of classroom teaching and learning. They are learner-centered, prepared, produced and utilized mainly to facilitate learning: they are designed to promote learner's understanding.

Effective use of instructional materials requires a lot of creativity as well as sound knowledge in their operations. However, concentration is the key that unlocks the instructional materials' miracle. Instructional materials do not just improve the quality of teaching and learning but also enrich the content quality of learning (Ema&Ajayi, 2011). The attention of the learners could be captured, interest aroused and sustained by using visual instructional materials; the attention span of the learners could be expanded and retention enhanced because of the level to which their interests have been aroused. It becomes necessary to make learning entertaining to effect a desirable change on the target audience (learner).

Onyeniran (2003) posits that children learn best if they are given the opportunity to see and to make observation of what they learn. The level of technology of the past is still observed today in some far flung villages where a mother still helps the child to learn to count, or to account for costs through the use of matchsticks, pebbles and sticks as they were thousands of years ago (Ema&Ajayi, 2012).

### **Statement of the Problem**

Mathematics is a core subject at the primary level of education. The prime place of mathematics can be seen when one considers the fact that without a credit in Mathematics, no student can gain admission into any tertiary institution. Despite this importance attached to Mathematics, a cursory look at the performances of learners in Mathematics at all levels of education depicts a persistent trend of poor performance (Goden, 2008). Government and educational researchers have over the years tried several methods and techniques to curb the problem of poor performance of pupils in Mathematics. However, Mbah (2012) argue that the major cause of poor performance of learners in Mathematics could be the teaching of the subject by the teachers. Many teachers of Mathematics at the primary school level do not concretise Mathematics concepts or instruction (Danjuma, 2010), by using relevant instructional materials. Some of the teachers teach Mathematics abstractly, thereby leading to poor retention of learned fact.

However, Ema&Ajayi (2011) have hypothesized that the utilization of instructional aids in teaching helps for longer retention of learned facts. Moreover, considering the tenderness of age of the pupils at the primary level, the teaching of Mathematics needs to be concretized. Hence the problem of this study, if put in a question form, is, what factors influence teachers' use of instructional materials in the teaching of mathematics in primary schools in Jos North LGA of Plateau State?

### **Purpose of the Study**

The purpose of this study is to examine the factors of utilization of instructional materials on the teaching of Mathematics in primary schools in Jos North. The specific objectives of the study are:

1. To identify the various instructional materials teachers use in the teaching of Mathematics in primary schools in Jos North.
2. To determine whether gender of Mathematics teachers influences their utilization of instructional materials in teaching Mathematics.
3. To determine whether the type of school (whether public or private) has any effect on teachers' utilization of instructional materials.

4. To find out whether teachers' years of teaching experience has a bearing on their utilization of instructional materials in the teaching of mathematics.

### Research Questions

The following research questions were asked to guide the study.

1. What are the various types of instructional materials used by primary school teachers in the teaching of mathematics?
2. How does gender influence the use of instructional materials in the teaching of mathematics by primary school teachers?
3. How doestypology of school influence teachers' use of instructional materials inthe teaching of mathematics?
4. How do teachers' years of experience influence the use of instructional materials in the teaching of mathematics?

### Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance.

**Ho<sub>1</sub>:** There is no significant difference in the mean perception scores of teachers in the public and private primary schools on the types of instructional materials they use in teaching mathematics.

**Ho<sub>2</sub>:** There is no significant difference in the mean perception scores of teachers in public and private primary schools on the influence of gender on the use of instructional materials in the teaching of mathematics in primary schools.

**Ho<sub>3</sub>:** There is no significant difference in the mean perception scores of teachers in public and private primary schools on the influence of typology of school on the use of instructional materials in the teaching of mathematics in primary schools.

**Ho<sub>4</sub>:** There is no significant difference in the mean perception scores of teachers in public and private primary schools on the influence of years of experience on the use of instructional materials in the teaching of mathematics in primary schools.

### Method and Procedure

The study adopted survey design. The population for the study consisted of 5,474 primary school teachers in the 238 primary schools in Jos metropolis. The 238 primary schools consist of 53 public and 185 private schools. The number of teachers in public schools are 1219, while those at the private schools are 4255. Hence the population for the study is 5474 primary school teachers. The sample for the study consisted of 547 teachers drawn from 24 primary schools (public and private).

The study used stratified random sampling to draw 547 teachers. The sample (547) represents 10% of the population of teachers. The 24 schools consisted of 5 public primary schools and 19 private schools. Since the two categories of schools are not equally populated; a

sampling fraction of 10% (0.1) was used to select the sample for fair representation. Hence each selected school contributed 10% of its number of teachers to the sample.

Data were obtained using a four-point scale questionnaire tagged utilization of instructional materials in mathematics by teachers questionnaire (UIMMTQ) designed by the researchers. The instrument has points as SA – strongly agree, A – Agree, D – Disagree, SD – Strongly disagree. The questionnaire items were validated by three experts in Tests and Measurement and curriculum studies. The test – retest method of reliability was conducted and the procedure yielded a reliability coefficient of 0.73 which is an indication that the instrument is good.

Data obtained were analysed using the mean and the t-test for the research questions and hypotheses respectively.

## Results and Discussion

**Research Question One:** What are the various types of instructional materials used by primary school teachers in the teaching of mathematics in Jos North?

**Table 1: Types of Instructional Materials used in Teaching Mathematics**

S/N	Types	SA	A	D	SD	Total	$\bar{x}$
1	Real – life objects	50	41	200	256	979	1.79
2	Models (improvised)	200	182	100	65	1611	2.94
3	Charts/books/printed	203	200	84	60	1640	3.00
4	Audio – materials	50	22	275	200	1016	1.86
5	Visual materials	50	39	263	201	1044	1.91
6	Audio –visuals	70	68	209	200	1102	2.01
7	Internet facilities	03	02	342	200	902	1.65

Table 1 shows that the instructional materials widely used by primary school teachers are the charts/books printed with a mean response of 3.00 while the last utilized instructional materials is the internet facilities with least mean response of 1.65.

**Research Question Two:** How does gender influence the use of instructional materials in the teaching of mathematics by primary school teachers?

**Table 2: Level of Utilization of Instructional Materials by Male and Female Teachers**

Gender	Level of Utilization						$\bar{x}$
	N	SA	A	D	SD	Total	
Male	219	80	23	73	43		2.64
Female	328	180	87	41	20	1083	3.30

Table 2 shows that female teachers are better in their utilisation of instructional materials in teaching mathematics than male teachers. The mean score for utilization of instructional materials for female (3.30) is higher than that of the male teachers (2.64).

**Research Question Three:** How doestypology of school influence teachers' use of instructional materials in mathematics teaching?

**Table 3: Level of Utilization of Instructional Materials by Teachers Based**

School Type	Level of Utilization						$\bar{x}$
	N	SA	A	D	SD	Total	
Public	194	73	33	60	28	539	2.78
Private	353	162	98	59	34	1094	3.10

Evidence in table 3 shows that the mean score for utilization of instructional materials by teachers in public schools is 2.78 while that of private schools is 3.10. This means that primary school teachers in private schools utilize instructional aids better in the teaching of mathematics than their counterparts in public schools.

**Research Question Four:** How do teachers' teaching experience influence their use of instructional materials in the teaching of mathematics?

**Table 4: Teachers' teaching experience and their utilization of instructional materials in teaching mathematics.**

Status	Level of Utilization						$\bar{x}$
	N	SA	A	D	SD	Total	
Experienced	403	158	89	99	57	1154	2.86
Inexperienced	144	50	34	41	19	412	2.86

Table 4 shows that the mean of utilization of experienced teachers is 2.86 while that of the inexperienced teachers is 2.86. This shows that experienced teachers utilize instructional materials equally the same as the inexperienced teachers in teaching mathematics.

### Hypotheses Testing

**Hypothesis one:** There is no significant difference in the mean perception scores of teachers in the public and private primary schools on the types of instructional materials they use in teaching mathematics.

**Table 5: t-test Summary of Hypothesis One**

School type	N	$\bar{x}$	SD	$\alpha$	df	t.cal	t.crit	Decision
Public	194	2.55	1.18	0.05	545	1.701	1.96	Retain
Private	353	2.68	1.33					

Results in table 5 shows that our calculated t-value of 1.701 is less than table value of 1.960 at 0.05 level of significance, hence the null hypothesis is retained. Hence there is no significant difference in the perception of public and private school teachers on the types of instructional materials used in teaching mathematics.

**Hypothesis Two:** There is no significant difference in the mean perception scores of teachers in public and private primary schools on the influence of gender on the use of instructional materials in the teaching of mathematics in primary schools.

**Table 6: t-test Summary of Hypothesis two.**

Gender	N	$\bar{x}$	SD	df	t.cal	t.crit	Decision
Male	219	2.64	1.381	545	2.321	1.960	Reject
Female	328	3.30	1.792				

Table 6 shows that the calculated t-value of 2.321 is greater than table value of 1.960 at 0.05 level of significance, hence the null hypothesis is rejected. The study therefore holds that male and female primary school teachers differ in their utilization of instructional materials in teaching mathematics.

**Hypothesis three:** There is no significant difference in the mean perception scores of teachers in public and private primary schools on the influence of typology of school on the use of instructional materials in the teaching of mathematics in primary schools.

**Table 7: t-test Summary of Hypothesis Three.**

Typology	N	$\bar{x}$	SD	df	$\alpha$	t.cal	t.crit	Decision
Public	194	2.78	1.384	545	0.05	3.112	1.960	Reject
Private	353	3.10	1.501					

Table 7 shows that calculated t-value (3.112) is greater than table value (1.960); hence the null hypothesis is rejected. The study then holds that school type influences the level of utilization of instructional materials in teaching of mathematics.

**Hypothesis Four:** There is no significant difference in the mean perception scores of teachers in public and private primary schools on the influence of years of experience on the use of instructional materials in the teaching of mathematics in primary schools.

Table 8: t-test Summary of Hypothesis Four.

Status	N	$\bar{x}$	SD	df	$\alpha$	t.cal	t.crit	Decision
Experienced	403	2.86	1.318	545	0.05	1.869	1.960	Retain
Inexperienced	144	2.80	1.299					

Evidences in table 8 show that calculated t value of 1.869 is less than table value of 1.960; hence there is no significant evidence to reject the null hypothesis; hence it is retained. This leads to a conclusion that teachers' years of teaching experience does not influence their utilization of instructional materials in the teaching of mathematics in primary schools.

### Summary of Findings

The following results ensued from the study:

1. The instructional materials that are utilized by primary school teachers in teaching mathematics are models (improvised) and printed materials (books and charts).
2. Female teachers are found to utilize instructional materials in teaching mathematics than their male counterparts.
3. Primary school teachers in private schools are found to utilize instructional materials for teaching mathematics better than teachers in public schools.
4. Experienced teachers are equally the same using instructional materials in teaching mathematics as the inexperienced teachers.
5. Both public and private primary school teachers do not differ in their perception about the types of instructional materials used in the teaching of mathematics.
6. Male and female primary school teachers differ in the utilization of instructional materials in the teaching of mathematics.
7. School typology was found to cause a difference in the utilization of instructional materials by primary school teachers in the teaching of mathematics.
8. Teachers' years of experience does not cause any difference in the utilization of instructional materials in the teaching of mathematics among primary school teachers.

### Discussion

Results of research question one depicted that the widely utilized type of instructional materials on the teaching of Mathematics are the improvised (model) and the printed materials (books/charts). This may be due to ease of accessibility or availability. As Danjuma (2010) notice, due to high cost of factory-made instructional materials, many resourceful teachers resort to models (using local resources).

Teachers' responses regarding whether their gender affects their utilization of instructional materials in their teaching of Mathematics show that a difference exists. This is because female teachers are found to utilize instructional materials more than their male counterparts. However, this result does not support Akudo (2003) whose study showed that male teachers are better in terms of improvisation of instructional materials and utilization of same. The reason may be that female teachers tend to be more homely (as mothers and future mothers)



hence they may be more humane or down-to-earth to ensure that no child is left behind in the class by utilizing relevant instructional materials.

Similarly, it was gathered from the study that school type affects the utilization of instructional materials. Teachers in private schools were found to be better in utilizing instructional materials than those in public schools. The disparity may be traced to the level of availability of the instructional aids. It may be that private school heads are more prompt in providing relevant instructional materials. This is because Kajotoni (2013) points out that most private schools source out money in providing learning aids while public schools totally depend on the government for such. Teachers' years of experience did not make any difference regarding utilization of instructional materials by teachers for teaching of mathematics. This result simply means that both experienced and inexperienced teachers use teaching aids equally the same. This corroborates Mbah (2012) who stated that not many experienced teachers the studied use of instructional materials in teaching.

In addition, hypothesis one shows that teachers in public and private schools are unanimous in their perception regarding the types of instructional materials used in the teaching of mathematics. This simply means that school type does not affect the type of instructional aids used in teaching. This is because the scheme of work for mathematics remains the same for both public and private schools. Gender was found to be significant in the level of utilization of instructional materials by primary school teachers.

Moreover, the testing of hypothesis three showed that the teachers in public and private schools differ significantly in their utilization of instructional materials in the teaching of mathematics. The reason for the observed difference may be as a result of level of availability or provision of the instructional materials. A lot of funds is needed to provide the relevant materials for use in teaching; it may be that private school heads may be more financially balanced than public schools who depend on funds from the government. However, Kajotoni (2013) argues that, in addition to provision, teachers' level of understanding of the importance of instructional materials in teaching is another critical factor to its utilization. It is possible that teachers in private schools have been attending workshops and seminars more than those in public schools where they gain more insight into the importance of utilization of instructional materials, hence the result.

Finally, teachers' years of teaching experience was found not to have any significant effect on their utilization of instructional materials. This means that utilization of instructional materials in teaching by teachers is not a function of number of years in teaching. Accordingly, Ajunwa (2009) posits that some teachers who have stayed long in teaching often default more in using instructional aids than the newly recruited teachers.

### **Recommendations**

Sequel to the findings of the study, the following are recommended.

1. Female teachers are found to be better in utilizing instructional aids in teaching than their male counterparts. Consequently, it is imperative that male teachers be challenged and encouraged to emulate them for better teaching of mathematics.

2. Teachers in private schools were found to utilize instructional aids more than those in public schools; hence it is important that government provide relevant instructional aids to public schools for the teaching of mathematics.
3. Teachers in public schools should be sponsored by the government to attend workshops and seminars to gain more understanding about the importance of utilization of instructional materials in teaching of mathematics.

### **Conclusion**

The study was the factor influencing the use of instructional materials in the teaching of mathematics in primary school. The study discovered that models and printed materials were widely used by teachers. Female teachers were found to be better in utilizing instructional materials than their male teachers. Also, teachers in private schools were better in utilizing instructional materials than those in public schools. However, both experienced and inexperienced teachers were found to utilize instructional materials equally the same in teaching of mathematics.

Moreover, it was equally gathered from the study that school typology did not affect the type of instructional materials utilized by teachers in teaching mathematics. In addition, gender and school typology had significant effects on the utilization of instructional materials in the teaching of mathematics by teachers; while teachers' years of experience did not.

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