

Assessment of Teachers' Utilization of PowerPoint Usage for Mathematics Instructions in Senior Secondary Schools in Sokoto Metropolis, Nigeria

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Abstract:- The study assessed teachers' utilization of PowerPoint usage for Mathematics instructions in senior secondary schools of Sokoto Metropolis, Nigeria. The study specific objectives were to determine Mathematics teachers' utilization of PowerPoint for Mathematics instruction and readiness for PowerPoint utilization in Mathematics Instruction. The study was guided by two corresponding research questions. The study formulated one hypothesis to test if relationship exists between teachers' level of readiness and actual utilizations. The study used survey research design and the population of the study comprised of 241 Mathematics teachers in Sokoto metropolis. The study used census method where by the entire population was studied. Descriptive statistics of frequency table, percentage, means and standard deviations were used for data analysis, while Pearson Product Moment Correlation was used in testing the formulated hypotheses. The study found that there is no relationship between level of teacher readiness for PowerPoint utilization and actual utilization of PowerPoint for Mathematics instruction in Sokoto Metropolis ($r = 0.13$, $n = 182$, $p = .082 > 0.05$), Majority of Mathematics teachers are not utilizing PowerPoint for Mathematics instruction (cumulative mean=1.39 ;) among others. The study therefore recommended that the state should organize training that will build teachers skills in the use of basic computer application such as PowerPoint. Specialists in computer application should be employed as a permanent staff to mentor other teachers in the use of PowerPoint for instruction.

Key words: PowerPoint, Teacher Utilization, Teacher Readiness and Mathematics Instruction.

I. INTRODUCTION

Education is the solid foundation of development in any given society. This explains why education is regarded as instrument par excellence and the means of achieving human capital and nation development, (Federal Government of Nigeria, 2009). The success of the educational system is reflected in the quality of human capital produced by the training institutions. The responsibility of producing the needed human capital is assigned to teachers who implement societal curriculum to bring about desired changes in the learners exposed to such curricula.

The societal curriculum is made up of subjects, and Mathematics as a subject has taken prominent position and remains indispensable in producing functional citizens. In

Nigeria context, Mathematics is one of the core subjects and the value placed on it is more than any other subjects except English Language. This is due to the fact that Mathematics is useful in all aspect of human life. Furthermore, most of science related subjects in high institutions of learning required a good grade in Mathematics before admission can be offers to study those courses. This implies that when Mathematics is not taught appropriately, its aim of instilling knowledge that is needed on daily basis will not be achieved. Bearing in mind, the position of science related disciplines as driving force of economy, Mathematics therefore must be taught in the manner that it become easier for learner to comprehend.

A computer-aided presentation, defined as PowerPoint, is a method of display that supports lecturing (Suguhara, Boland, 2006). PowerPoint presentation is a dynamic communication tool in oral and visual senses and in terms of reading & writing. According to some studies made, individuals learn the conveyed information more effectively as a result of the supporting of information with visual elements besides lecturing (Levasseur & Sawyer, 2006).

PowerPoint as a teaching tool is becoming more and more widespread among teachers who wish to integrate multimedia technology into their teaching. The sheer popularity of this presentation tool comes from the belief that representation of information using auditory and visual inputs improves learning (Mayer & Moreno, 2003). Although, Microsoft PowerPoint has not been around all that long (Rogers, 2010), but its usage has spread across all business and education to politics and leisure. It is therefore required of teachers to have some degree of PowerPoint expertise in order to effectively integrate this multimedia computer application in teaching of Mathematics.

The teacher is a critical resource for effective implementation and realization of the educational policies and objectives at the practical level of the classroom. It is the teacher who ultimately interprets and implements the policy as represented in school curriculum, which is designed to actualize educational goals (Omojunwa, 2007). It is well known that quality of a nation can only be as high as the quality of its

teachers. The teacher is a model, a father, an encourager and an administrator. Twenty-first-century Mathematics teachers therefore, are expected to create 21st century learning environment using 21st century digital technologies. Mathematics teachers can utilize PowerPoint in Mathematics instruction in diverse ways. Teachers can present Mathematical problems to students through PowerPoint presentation, quizzes that can be designed and presented to learners as classroom activities in Mathematics. Teacher can use equation editor of PowerPoint to present formulas to learners. Other features such as animation, triggers, action buttons and hyperlinks can be used in designing interactive Mathematics instruction. Mathematics Teachers' usage of 21st century digital technology for Mathematics depends on factors such as teachers' readiness, perception and actual utilization.

Mathematics teacher's readiness is the major determinant of actual utilization of PowerPoint for Mathematics instruction. Teacher's readiness for PowerPoint utilization in Mathematics instruction refers to the level of preparedness to deliver instruction through PowerPoint. Tsai and Chai (2012) stated that teacher's readiness to use PowerPoint has four basic indicators which include, knowledge, beliefs, design capacities and willingness to use PowerPoint. The technology-readiness (PowerPoint Inclusive) is a construct which refers to people's tendency to embrace and use new technologies for accomplishing goals in home life and at work (Parasuraman, 2000 in Summaka, Murat Baglibel & Samancioglu, 2010). The variable of readiness to use PowerPoint for instruction at secondary school level includes infrastructural readiness (Availability and Accessibility of ICT Facilities that support use of PowerPoint), personal readiness, (Teacher competencies and willingness) and management readiness (support from management). The level of these constructs of teachers' readiness influence the actual utilization of PowerPoint for Mathematics instruction.

Bearing in mind the determinants of using PowerPoint for Mathematics instruction in Sokoto state, the study focuses on knowing the state of these determinants in respect of teachers' utilization, readiness and perception toward PowerPoint usage for Mathematics instruction in Sokoto state.

Statement of the Problem

There is a global recognition of the important role Mathematics play in national and international developments. In Nigeria for instance, the study of Mathematics is made compulsory for students in all schools and a credit pass in Mathematics is a pre-requisite admission requirement for all courses in tertiary institutions. Mathematics remains one of the most difficult subjects in schools as perceived by students (Suleiman & Hamed, 2019). There is general impression that Mathematics is difficult by its very nature and because of this impression, majority of students have phobia for it (Saad, Adamu & Sadiq, 2014). WAEC Chief Examiner Reports reported that students demonstrated significant weakness in core Mathematics concept (see appendix five). To remediate

the observed significant weakness in core Mathematics concept, WAEC Chief Examiner (2017 and 2018) recommended that teacher should endeavour to use interactive method of teaching and that teacher should teach the subject both theoretically and practically with example. To make Mathematics interactive, practical and provide real life example, as recommended, teacher have to integrate technology that not only appeal to sense of hearing but all senses.

PowerPoint has been described as Powerful instrument in the hand of teachers that can be used in designing interactive learning experience that are practical in nature. This application gives teachers ample opportunities to integrate any format of media resources that is not possible through chalkboard. PowerPoint as one of ICT tools has been highly praised by both developing and developed nations of the world in respect to its contribution in upgrading educational system to meet the need of other sectors that made up the society.

Going by the value of ICT in teaching, Sokoto state equipped schools in metropolitan area of Sokoto State with computer and projectors with high optimism that teachers will integrate the computer provided in their instructional delivery. The preinstalled applications such as PowerPoint are expected to be used in design slides that can enhance teaching and learning process. Based on researcher's observation, these facilities are not being used for Mathematics instruction. This scenario of not using provided school facilities that can enhance teaching and learning of Mathematics has been linked to factors such as level of teacher's readiness, teacher's perception and the actual utilization. It is against this background that the study investigated Mathematics teachers' level of PowerPoint Utilization, readiness and perception of PowerPoint for Mathematics instruction in Sokoto State.

II. RESEARCH QUESTIONS

The following research questions are raised to guide the study:

- What is the level of PowerPoint utilizations for Mathematics instruction among Mathematics teachers in senior secondary schools of Sokoto metropolis, Sokoto state?
- What is the level of Mathematics teachers' readiness for PowerPoint utilization in Mathematics instruction in senior secondary schools of Sokoto metropolis, Sokoto state?

Null Hypothesis

There is no significant relationship between teachers' level of readiness for PowerPoint Utilization and actual utilizations of PowerPoint for Mathematics instructions in Sokoto Metropolis

III. METHODOLOGY

According to Nworgu (2006) stated that descriptive survey designs is one of the best designs for describing situation

without manipulation. Therefore, it concerns with the collection of data and description of events as they exist without manipulation of any kind. The present study is interested in surveying the state determinants of PowerPoint utilization by Mathematics teachers in Sokoto metropolis for Mathematics instruction. This required a description of the situations as its without manipulation. The study population is the entire Mathematics teachers in Sokoto metropolis. There are 153 male Mathematics teachers and 88 female Mathematics teachers making the total of 241 Mathematics teachers in Sokoto metropolis. The entire population participated in the study using census sampling techniques. This decision was influenced by recommendation of Dada (2016) "...virtually the entire population would have to be sampled in small population to achieve a desirable level of precision". Dada described small population to be 200 or less, which the present study fall into such categories.

Data was collected using questionnaire titled Teacher Utilization of PowerPoint for Mathematics Instruction (TUPMI). The instrument is made-up three sections. Section "A" solicits for participant's bio-data such as gender, qualifications and working experience. Section B is made up of series of statements soliciting response from the respondents on the subject matter of the study. Section C on the other hand was adapted from Ashbee Computer Services MS PowerPoint Questionnaire. The questionnaire was modified into 20 items using Likert scale of 4 Point and subdivided into Perceived ease of use and Perceived usefulness. Each of the 20 items elicits information on what Mathematics teachers perceived as usefulness and ease of use of PowerPoint. The respond mode for section A and B is Likert scale of four points: Strongly Agree (SA-rated as 4), Agree (A-rated as 2), Disagree (D-rated as 2) and Strongly Disagree (SD-rated as 1).

The instruments used was validated by experts. The validators changed some words seem to be ambiguous and can confuse readers. They also pointed-out some typographical and grammatical errors. All these were effected in the final copy of the questionnaires. Pilot study was conducted using 5 public senior secondary schools outside Sokoto Metropolis. These schools were not part of the population nor sampled but they share commonality in all ramification with Secondary schools in Sokoto Metropolis. The data obtained from the process was subjected to statistical analysis using Cronbach Alpha and reliability index of 0.89 was obtained section A and B of the questionnaire respectively.

Two research assistants were recruited and trained by the researcher for two days; this was done in order to train them on the main goal of the research work and the modalities that are involved in the field work. The researcher with help of research assistant administered the questionnaire to the targeted respondents and it was retrieved immediately after completion. The data generated in this from administered copies of questionnaire was subjected to descriptive and inferential statistics. The research questions raised in the study were answered using descriptive statistics of frequency table, percentage, means and standard deviations. The formulated hypothesis was tested using Pearson Product Moment Correlation to establish relationship between variables.

IV. RESULTS AND DISCUSSIONS

Research Question One

What is the level of PowerPoint utilization for Mathematics instruction among Mathematics teachers in senior secondary schools of Sokoto metropolis, Sokoto state?

Table 4.1: Level of Mathematics Teachers PowerPoint Utilization for mathematics Instruction

S/N	ITEM	SA	A	D	SD	M	SD	DC.
1	I use PowerPoint to design Mathematics instruction	5	4	18	155	1.23	0.01	SD
2	I use PowerPoint to engage students in learning of Mathematics	8	7	86	81	1.68	0.3	D
3	I present to the student Mathematics problems and how to solved them using PowerPoint	4	1	91	86	1.58	0.3	D
4	I use PowerPoint to create, conduct and guide Mathematics quizzes	2	1	99	80	1.59	0.3	D
5	I Prompt students into Mathematical problems using PowerPoint presentation	0	10	59	113	1.43	0.02	SD
6	I present charts to students using PowerPoint	8	5	33	136	1.37	0.02	SD
7	I create and maintain a classroom glossary related to a lesson using PowerPoint	0	2	11	169	1.08	0.01	SD
8	I Use animation, triggers and action button of PowerPoint to create interactive Mathematics instruction	7	4	44	127	1.40	0.02	SD
9	I reused PowerPoint package for Mathematics instruction	6	9	21	146	1.31	0.01	SD
10	I do download PowerPoint instructional Package and use it for Mathematics instruction	4	5	15	158	1.20	0.01	SD
	Overall mean					1.39	0.1	SD

Majority of the respondents strongly disagree that they use PowerPoint to design for Mathematics instruction, majority of the respondent disagree that they use PowerPoint to engage students in learning of Mathematics, majority of the respondent disagree that they present to the student Mathematics problems and how to solved them using PowerPoint, majority of the respondent disagree that they use PowerPoint to create, conduct and guide Mathematics quizzes, majority of the respondents strongly disagree that they Prompt students into Mathematical problems using PowerPoint presentation, majority of the respondents strongly disagree that they present charts to students using PowerPoint, majority of the respondents strongly disagree that they create and maintain a classroom glossary related to a lesson using PowerPoint, majority of the respondents strongly disagree that they use animation, triggers and action button of PowerPoint

to create interactive Mathematics instruction, majority of the respondents strongly disagree that they reused PowerPoint package for Mathematics instruction, and finally, majority of the respondents strongly disagree that they do download PowerPoint instructional Package and use it for Mathematics instruction. From respondent's opinion on each of the items, it is clear that respondents are not utilizing facilities that support use of PowerPoint for Mathematics instruction. The level of utilizing PowerPoint for Mathematics instruction from Mathematics teachers is very low.

Research Question Two

What is the level of Mathematics teachers' readiness for PowerPoint utilization in Mathematics instruction in senior secondary schools of Sokoto metropolis, Sokoto state?

Table 4.2.: Mathematics teacher's Readiness for PowerPoint integration in Mathematic Instruction

S/ N	Items	SA	A	D	SD	M	ST.D.	DC
Personal Readiness								
1.	I know how to integrate PowerPoint in Mathematics instruction	8	12	97	65	1.8	0.7	D
2.	I know the types of PowerPoint presentation format to used based on my selected teaching method	31	21	90	40	2.2	1.1	D
3.	I think PowerPoint is helpful in improving student learning	54	15	72	41	2.5	1.1	A
4.	I am willing to use PowerPoint for Mathematics Instruction	117	39	13	13	3.4	0.9	A
5.	I have enough competency to design mathematics instruction using PowerPoint	54	15	72	41	2.4	1.1	D
6.	I can download PowerPoint Slide from Internet to facilitate Mathematics instruction	71	19	72	20	2.8	1.1	A
Facilities Readiness								
7.	My schools is equipped with functional projector	54	15	72	41	2.5	1.1	A
8.	My schools have adequate computer system installed with PowerPoint Application	92	75	8	7	3.4	0.7	A
9.	Our school have standby generator in case of power supply interruption	109	37	30	6	3.4	0.9	A
10.	I have access to ICT facilities that support use of PowerPoint for Mathematics instruction	54	15	72	41	2.5	1.1	A
11.	I have personal computer that can be used to prepare slides for Mathematics instruction	120	42	14	6	3.5	0.8	SA
Management Readiness								
12.	My school have an expert in computer as permanent staff	54	15	72	41	2.4	1.1	D
13.	My principal knows the value of using PowerPoint in Mathematics instruction	31	21	90	40	2.2	1.1	D
14.	My principal supports the use of PowerPoint for Mathematics instruction	130	42	8	2	3.6	0.6	SA
Overall mean						2.75	0.95	A

Majority of the respondents disagreed that they know how to integrate PowerPoint in Mathematics instruction. Majority of the respondents agreed that their schools have adequate computer system installed with PowerPoint Application. Majority of Mathematics teachers agreed that they can download PowerPoint Slide from Internet to facilitate Mathematics instruction. Majority of respondents have

personal computer that can be used to prepare slides for Mathematics instruction. Majority of Mathematics teachers are willing to use PowerPoint for Mathematics instruction. Majority of the participated Mathematics teachers strongly agreed that they don't have the skills necessary to use PowerPoint in Mathematics instruction. Most of Mathematics teachers that participated in the study agree that they don't

know format of PowerPoint that are suitable for the teaching method in used. Majority of Mathematics teachers from various schools agree that their school have alternative power supply in case of interruption of power supply. The schools under study are also equipped with functional projector which is a prerequisite to use PowerPoint for Mathematics instruction as majority of respondents agreed with this statement. Most of the schools lacked expert that can engineer the use of PowerPoint for Mathematics instruction. From respondents' opinion on each of the items, it is clear that

respondents are ready in terms of facilities that support use of PowerPoint for Mathematics instruction. The level of personal readiness is low while that of management readiness is very low.

Testing of Null Hypothesis

Null Hypothesis One: There is no significant relationship between teachers' level of readiness for PowerPoint Utilization and actual utilizations of PowerPoint for Mathematics instructions in Sokoto Metropolis.

Table 4.3.: Summary of PPMC showing relationship between Teachers' readiness for PowerPoint Utilization and Actual Utilization for Mathematics instructions in Sokoto Metropolis

Variables	N	Mean	SD	Df	r.	p-value
Teachers' Readiness for PowerPoint Utilization	182	38.5	5.28	180	0.13	.082
Teachers' Actual utilization of PowerPoint for Mathematics instruction	182	13.9	0.05			

Table 4.3 revealed a weaker, positive correlation between the two variables, $r = 0.13$, $n = 182$, $p = .082 > 0.05$. This implies that as teachers' readiness for PowerPoint utilization increase, teachers' actual utilization of PowerPoint for Mathematics instruction increases by 1.69%. This relationship is not statistically significant. Thus, the hypothesis that says "there is no significant relationship between mathematics teachers' level of readiness for PowerPoint utilization for Mathematics instruction and actual utilization of PowerPoint for Mathematics instructions in Sokoto Metropolis" is retained.

V. FINDINGS

1. Sixty-seven point eight (67.8%) of Mathematics teachers are ready in physical facilities for using PowerPoint in Mathematics instruction, 41.8% are personally ready whereas 53.7% are managerially ready for PowerPoint utilization for Mathematics instruction.
2. The actual utilization of PowerPoint for Mathematics instruction is relatively low among Mathematics teachers. The found level of utilization is not influence by level of teacher readiness for PowerPoint utilization as there is no significant relationship between these variables.

VI. DISCUSSION

The study assessed the teachers' readiness and level of PowerPoint utilization toward using PowerPoint in Mathematics instruction. The study intension is to provide empirical based information to the educational planners in Sokoto state of other factors capable of jeopardized landslide achievement of equipping schools in Sokoto metropolis with ICT related facilities that support integration of Computer in teaching and learning process. The study therefore focused on Mathematics teachers and one of the applications preinstalled in the computers (PowerPoint) was used as case study on the basis of ubiquitous of PowerPoint in computer system.

The first research question was raised to determine the level of PowerPoint utilization for Mathematics instruction among Mathematics teachers in Sokoto metropolis. The finding shows that majority of the Mathematics teachers that participated in the study are not using PowerPoint for Mathematics instruction. Relatively low number of Mathematics teachers indicated that they actually utilized PowerPoint for Mathematics instruction. The findings of this study confirmed findings of Yusuf (2005) and that of Njoku (2006) even after 13-14 years in which those studies were conducted. In line with the findings of the present study, Yusuf (2005) found that majority of the teachers—both male and female in Nigeria Secondary schools do not have needed competence in basic computer operations that could enhance utilization of available ICT in school for instruction. The study further established that Nigerian teachers as at then do not have needed skills and knowledge in the use of common computer software. In the same vein, Njoku (2006) found that ICT awareness and use among teachers in secondary schools in Nigeria is generally low. The findings of this study also confirmed the finding of Garba (2013) after reviewing existing literature in collaborated with observation on the state of technology integration in Nigeria school, he concluded that Nigeria teachers are not ready to integrated technology because they are not trained to do so and curriculum didn't demand to do so.

The second research question two was raised to know the state of readiness to used PowerPoint for Mathematics instruction in Sokoto metropolis. The find shows that the teachers under study are only ready in physical facilities for using PowerPoint in Mathematics instruction but personal and managerial readiness is very low. This finding is contrary to the previous study that found that Nigeria schools are not equipped ICT related facilities Ezegebe (2009) because the teachers under study expressed readiness of their schools in ICT related facilities needed to used PowerPoint such as

computer labs, school own projector, alternative power supply among others. The present finding shows low readiness in personal and managerial readiness and this is in alignment with the reason purported by Garba (2013) as justification for none readiness for technology integration among Nigeria teachers. He opined that teacher's education experiences do not exposed Nigeria teachers to interrelationship between Technological Pedagogical Content Knowledge as related to their specialization. This explains why Mathematics teachers have neither feeling nor confidence in integrating PowerPoint in Mathematics instructions.

VII. RECOMMENDATIONS

From the findings of this study, the following recommendations are proffered:

1. The state should organize training that will build teachers skills in the use of basic computer application such as PowerPoint. Via this training, teachers will be exposed to interrelationship between technological know, Pedagogical know and Content know how and how to properly integrate technological tool like PowerPoint in an instruction
2. A specialist in computer application should be employed as a permanent staff. This expert should be an expert in instructional technology who can design varieties of instructional templates or packages for other teachers to adopt or adapt for their classroom instruction.
3. The government should set-up a panel that will monitor and reward teachers that constantly integrate available ICT facilities in their instruction and it will motivate others to follow suit.

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