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Modern Classroom Teaching Technologies for Effective Teachers' Instructional Delivery in Public Senior Secondary Schools in Port Harcourt Metropolis, Rivers State, Nigeria

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ABSTRACT

This study examined modern classroom teaching technologies for effective teachers' instructional delivery in public senior secondary schools in Port Harcourt Metropolis, Rivers State. Two objectives, two research questions and two hypotheses guided the study. The study adopted descriptive survey design. The population of the study was 1,950 teachers consisting of 579 males and 1,371 females from 36 public senior secondary schools in Port Harcourt Metropolis. A sample size of 547 teachers consisting of 237 males and 310 females was derived through Taro Yamane's formula and stratified random sampling technique. The instrument was 15 item self-structured questionnaire titled: "Modern Classroom Teaching Technologies for Effective Teachers' Instructional Delivery Questionnaire" which was face and content validated by two experts in Measurement and Evaluation and Department of Educational Management. Cronbach Alpha statistics was used to establish the reliability of the instrument which yielded reliability indexes of 0.94 and 0.87. Mean and standard deviation were used to answer the research questions while z-test was used to test the hypotheses at 0.05 level of significance. Findings of the study revealed that the use of interactive white board and projectors to a high extent enhance effective teachers' instructional delivery in public senior secondary schools in Port Harcourt Metropolis, Rivers State. Based on the findings, it was recommended among others that Rivers State Government should support public secondary schools by providing Interactive White Board so as to enhance the development of 21st century instructional skills among students.

Keywords: Modern Classroom Teaching Technologies, Instructional Delivery, Interactive White Board, Projector

Introduction

The 21st century comes with a lot of innovative changes that cut across various sectors of the nation viz: finance, health, agriculture, transportation, manufacturing etc. Like other areas, education has had its fair share of innovations (Taylor, 2019). The innovation causing rapid revolution in the world today is technology which has affected a wider area of coverage including teaching and learning. Educational institutions all over the world have recognized the important roles technology play in the teaching and learning environment. It is in line with this that classroom settings in the 21st century has experienced a dramatic shift to reflect the digital based learning environment. Many schools and classrooms (especially in the developed countries) are equipped with modern teaching tools. The quest for educational development now makes it imperative for instructional delivery to shift from the existing traditional method of teaching to accommodate the use of modern classroom teaching technologies.

Students today live in an evolving technological society. Rideout, Foehr, and Roberts (2010) stated that today's generation of learners often called digital natives are different from their predecessors. This is because they were born in the digital age and are exposed to digital environment right from birth until their school age. Many students today acquire information daily by using digital tools such as computer, laptops, tablets, internet and mobile phones and this has significantly affected the way they learn. Prensky (2011) noted that teaching this type of learners with the traditional face to face instructional delivery would pose a lot of challenges because the school is supposed to prepare them for a world of work that is becoming highly digitalized by the day. In conjunction with preparing students for the current digital era, teachers are seen as the key players in using modern teaching technologies in their daily classroom. This is due to the capability of these tools in providing dynamic and proactive teaching-learning environment (Arnseth & Hatlevik, 2012). The aim of integrating technological tools in the classroom is to improve and increase the quality of instructional delivery and also benefits the learning communities to face the challenges of current globalization (Albirini in Ghavifek & Rosdy, 2015).

Modern classroom teaching technologies refers to digital tools used in instructional settings. Inije, Utoware and Kren-Ikidi (2013) defined modern classroom teaching technologies as diverse set of technological devices and resources used for teaching-learning process. Olele and Eberechukwu (2017) noted that modern classroom teaching technologies include interactive whiteboards, computers, Internet, CDs/DVDs, search engines, digital libraries, web 2.0 technologies, projectors, cameras, google classroom, mobile and handheld devices. These technologies has unique features that can transform teaching by ushering in various new model for instructional delivery. In the same vein, Gilakjani and Sabouri (2017) stated that the use of technology in education unlocks a new epoch of information and support as a catalyst tool to enhance teaching styles. Anderson and Dexter (2012) noted that provision of modern classroom teaching technologies such as computer, laptop, projectors, interactive whiteboard, tablets, radio and television will

assist teachers to communicate, create, disseminate, store and manage information to the understanding of the 21st century learner. Digitization in education is not a new concept. However, the present quest for 21st century education and the need to give students the skills needed to succeed in the digital world, has necessitated the need for the integration of modern teaching tools in schools for instructional delivery.

Interactive white board is a modern teaching technology used in classrooms today. The interactive white board exchange mechanism involves the hardware and software. According to Bannister (2010), the hardware include the white electronic board, speakers and the internet to display digital lesson materials. The software on the other hand include: pen and highlighter, browsers, word-processing applications, spreadsheets and simulation applications. Its use in the 21st century has increased greatly especially in schools. The is because it has been found to improve quality of instruction, increase class engagement of students, enhanced lessons, increase flexibility in the classroom and allow interactive learning (Platinum copier solutions, 2019). Interactive white board exposes teachers to various teaching styles in the classroom and allows them have access to various sources of information to explain a lesson. Balta and Duran (2015) buttressed this point when he asserted that teachers can use the interactive white board to show animations, allow students move visual elements around, play videos and import pictures to explain a lesson.

Luckerson (2014) acknowledged that the use of Interactive White Board in the classroom enhance instructional delivery by giving teachers the opportunity to share messages, present information as well as assessing students to monitor their progress in the lesson. Students' understanding of a lesson is seen through touching, drawing or writing on the board. Usage of Interactive White Board enable teachers make use of various media to explain concepts. Graphs, maps, videos, photos and educational games can be played to make a lesson creative and inspiring to students. In the same vein, Baz (2016) opined that use of interactive white board enhance teachers' delivery of instruction in a variety of ways viz; visual learning: allowing teachers present contents by using animations, videos, text and pictures; auditory learning: allowing teachers to use the device in the pronunciation of words through sounds and music. It is the tactile learning and through this feature, the teacher allows students to physically interact with the board assisting them to learn on their own pace.

Another modern classroom teaching technology is projectors. According to Bukoye (2018), a projector is a device that projects small transparencies into large view on the board. With the advent of projectors, teachers now find chalkboard as a thing of the past. Rather than spend time writing notes across the chalkboard, teachers make use of projected information, videos, and images as teaching tools to clarify concepts in a particular subject. Okeke (2017) noted that projector enable teachers to create organized notes in a bulleted points which is been displayed to students during instructional delivery. Unlike the traditional classroom where a teacher writes notes on the chalkboard and erases it due to limited space, projector allows a teacher to repeat a slide for students who may have missed such information (Onuoha, James & Milicent, 2021). Usage of projector allows teachers in extensive and easy duplication of instructional materials such as notes, diagrams, videos, graphs, maps and images during instructional delivery. With a plethora of projected videos, animations, audios and images, a wide range of educational subjects can be covered by a teacher. Ruhul, Mahedi and Abdul (2018) noted that projectors enables teachers use various appropriate images, videos and sounds to make a lesson pleasant and enjoyable. When images are used to present a topic, it makes the lesson become more real and specific to students.

Projector is a modern teaching technology that helps a teacher present information as well as make a lesson clear and understandable to the students. It has released teachers from the stress of writing on the chalkboard while communicating information to students. Teachers use videos, slides and images in teaching students about places they do not know or have not seen. Hussani, Ibrahim, Wali, Libata and Musa (2020) stated the unique features of projectors. They noted that it allows teachers to roll back the lecture notes to specific items presented earlier in the period or even previous class. This modern tool enable teachers to be effective in managing time. Teachers tend to decide on a particular lecture content to be taught and note important points ahead of time. Integrating projector in the classroom, teachers spend less time repeating or rewriting information, all they to do is go back to the previous slide to access such information again. Bukoye (2018) noted that by using projectors, teachers can use videos and image to clarify smaller concepts about a subject to the students in a larger view. While writing of notes on a chalkboard and erasing takes time, usage of projector allows a teacher to repeat the same concepts of a lesson.

Instructional delivery is a process of facilitating learning which is expected to bring about change in the behaviour of the learner. Ubulom as cited in Boma and Kelechi (2021) emphasized that optimum teaching and learning is only achievable by adequate and efficient provision of requisite instructional facilities and where the requisite teaching and learning tools are non-existence, effective instructional delivery may not take place. Hence, if education is going to serve its purpose of preparing the 21st century learners for the 21st century work environment, there is need for a change in approach of instructional settings. The study examined modern classroom teaching technologies for effective teachers' instructional delivery in public senior secondary schools in Port Harcourt Metropolis, Rivers State.

Statement of the Problem

Secondary education has witnessed drastic change due to rapid increase in technological advancement making teaching and learning in the 21st century more complex and requiring tremendous educational resources. Classrooms in developed countries have been transformed by advancement of technology ranging from mere physical classroom teaching to a technology based classroom. Interactive white boards, computers, projectors among others are utilized for instructional delivery.

However, in developing countries like Nigeria, the reverse is the case as the application of digital tools for teaching and learning process is still in infancy (Ebele, Ejedafiru & Oghenetega, 2013). It has been observed that in classrooms in public secondary schools in Rivers State, instructional delivery is still dominated with chalkboard and textbooks. This is attributed to the inadequacy of government in providing these modern teaching tools in schools. This ugly scenario seems to have made teachers continue in their orthodox or traditional face to face teaching method rather than adopting modern classroom

teaching technologies for instructional delivery. It is disheartening to note that Nigeria, with her abundance of resources cannot boast of being among the countries utilizing technology in schools. The consequence is that the school will be faced with the challenge of not being able to produce the needed manpower for the world of work that is becoming highly digitalized by the day. It is against this backdrop that this study examined modern classroom teaching technologies for effective instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis, Rivers State.

Purpose of the Study

The purpose of the study was to examine modern classroom teaching technologies for effective teachers' instructional delivery in public senior secondary schools in Port Harcourt Metropolis of Rivers State. Specifically, the study sought to:

1. Determine the extent use of interactive white board enhance teachers' instructional delivery in public secondary schools in Port Harcourt Metropolis of Rivers State.

2. Ascertain the extent use of projectors enhance teachers' instructional delivery in public secondary schools in Port Harcourt Metropolis of Rivers State.

Research Questions

The following research questions guided the study:

1. To what extent does the use of interactive white board enhance teachers' instructional delivery in public secondary schools in Port Harcourt Metropolis of Rivers State?

2. To what extent does the use of projector enhance teachers' instructional delivery of teachers in public secondary schools in Port Harcourt Metropolis of Rivers State?

Hypotheses

Ho_1 There is no significant difference in the mean ratings of male and female teachers on the extent use of interactive white board enhance teachers' instructional delivery in public secondary schools in Port Harcourt Metropolis of Rivers State.

Ho_2 There is no significant difference in the mean ratings of male and female teachers on the extent use of projector enhance teachers' instructional delivery in public secondary schools in Port Harcourt Metropolis of Rivers State.

Methodology

The study adopted descriptive survey design. The population of the study was 1,950 teachers consisting of 579 males and 1,371 females from 36 public senior secondary schools in Port Harcourt Metropolis, Rivers State. A sample size of 547 teachers consisting of 237 males and 310 females was derived through Taro Yamane's formula and stratified random sampling technique. The instrument for the study was 15 item self-developed questionnaire titled: "Modern Classroom Teaching Technologies for Teachers' Effective Instructional Delivery Questionnaire" which was face and content validated by two experts in Measurement and Evaluation and Department of Educational Management. The response scale was structured on a 4-point rating scale of Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE) with values 4, 3, 2 and 1 respectively. Cronbach Alpha method was used to establish the internal consistency of the instrument. Reliability indexes of 0.94 and 0.87 were obtained for the two clusters of the instrument respectively. Mean and standard deviation were used to answer the research questions with a criterion mean of 2.50. Questionnaire items with ratings below 2.50 denoted 'Low Extent' while 2.50 and above signified 'High Extent'. The hypotheses were tested using z-test statistics at 0.05 level of significance. Analyzed data therefore with calculated z-value above the z-critical value of ±1.96 was rejected and below was accepted.

Results

Research Question 1: To what extent does the use of interactive white board enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State?

Table 1:   Mean Ratings of Male and Female Teachers on the Extent the Use of Interactive White Board Enhance Instructional Delivery of Teachers in Public Senior Secondary Schools in Port Harcourt Metropolis of Rivers State.

S/N	Item	Male Teachers N=237			Female Teachers N=310		
		$\overline{X}$	SD	Decision	$\overline{X}$	SD	Decision
1	Usage of interactive white board reduces time spent writing notes on the chalkboard thereby enabling teachers cover their scheme of work	3.25	0.72	**HE**	2.95	0.58	**HE**

S/N	Item	X̄	SD	Decision	X̄	SD	Decision
2	Usage of interactive white board to bold diagrams enable teachers explain a content clearer	3.00	0.60	**HE**	3.09	0.53	**HE**
3	Interactive white board enable teachers to have access to various sources of information to explain a lesson	2.77	0.50	**HE**	3.04	0.62	**HE**
4	Usage of interactive white board enhances teachers digital board teaching skills	3.19	0.69	**HE**	3.30	0.76	**HE**
5	Usage of interactive white board to recall information enable catching up of missed lessons	2.69	0.52	**HE**	3.11	0.65	**HE**
6	Usage of interactive white board to display pictures and play videos enhances teachers explanation of lesson in a more understandable way	2.85	0.65	**HE**	2.95	0.58	**HE**
7	Interactive white board enable teachers to import pictures to explain a lesson	3.00	0.60	**HE**	3.01	0.59	**HE**
8	Interactive white board enable teachers assess students to monitor their progress in a lesson by allowing them touch, draw, write or move visual elements around	3.23	0.69	**HE**	2.94	0.62	**HE**
	Grand Mean	**3.00**			**3.05**		

The result on Table 1 revealed that all the questionnaire items 1, 2, 3, 4, 5, 6, 7 and 8 had grand mean scores of 3.00 and 3.05 for both male and female teachers. This infers that to a high extent the use of interactive white board enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State.

Research Question 2: To what extent does the use of projector enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State?

Table 2: Mean Ratings of Male and Female Teachers on the Extent the Use of Projector Enhance Instructional Delivery of Teachers in Public Senior Secondary Schools in Port Harcourt Metropolis of Rivers State.

S/N	Item	Male Teachers N=237			Female Teachers N=310		
		X̄	SD	Decision	X̄	SD	Decision
9.	Usage of projector enable teachers arrange highly organized notes in a bulleted points for a class	3.31	0.78	**HE**	2.90	0.72	**HE**
10.	Usage of projector allows teachers to use videos, slides and images to clarify smaller concepts about a subject in a larger view	3.08	0.61	**HE**	2.85	0.51	**HE**
11.	Usage of projector enable teachers use less time to repeat same lesson rather than rewriting all the information again	3.13	0.77	**HE**	3.09	0.73	**HE**
12.	Teachers use of projector increases their access to various sources of information to explain a lesson	2.73	0.63	**HE**	2.96	0.69	**HE**
13.	Usage of projector enable teachers project notes already prepared rather than spend time writing notes on the chalkboard	3.20	0.79	**HE**	3.05	0.76	**HE**
14.	Usage of projectors enable teachers project their lesson allowing them more time to disseminate each lesson	3.00	0.60	**HE**	3.01	0.59	**HE**
15.	Usage of projector allows teachers use colorful images and videos to keep students engaged throughout the lesson	3.25	0.50	**HE**	3.19	0.62	3.25
	Grand Mean/SD	**3.10**			**3.01**		

The result on Table 2 revealed that all the questionnaire items 9, 10, 11, 12, 13, 14 and 15 had grand mean scores of 3.10 and 3.01 for both male and female teachers. This infers that to a high extent the use of projectors enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State.

Hypotheses

Ho$_1$ There is no significant difference in the mean ratings of male and female teachers on the extent the use of interactive white board enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State.

Table 4:   z-test Analysis of Difference in the Mean Ratings of Male and Female Teachers on the Extent Use of Interactive White Board Enhance Instructional Delivery of Teachers in Public Senior Secondary Schools in Port Harcourt Metropolis of Rivers State.

Respondents	N	$\overline{X}$	SD	Df	α	z-cal.	z-crit.	Decision
Male Teachers	237	3.00	0.62					
				545	0.05	-0.99	±1.96	Failed to Reject No Significant Difference
Female Teachers	310	3.05	0.62					

Data on Table 4 shows z-test analysis of difference in the mean ratings of male and female teachers on the extent the use of interactive white board enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State. At 0.05 level of significance and 545 degree of freedom, the z-calculated value of -0.99 was less than the z-critical value of ±1.96; therefore the null hypothesis was accepted which states that there is no significant difference in the mean ratings of male and female teachers on the extent the use of interactive white board enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State.

Ho$_2$ There is no significant difference in the mean ratings of male and female teachers on the extent the use of projectors enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State.

Table 5:   z-test Analysis of Difference in the Mean Ratings of Male and Female Teachers on the Extent Use of Projector Enhance Instructional Delivery of Teachers in Public Senior Secondary Schools in Port Harcourt Metropolis of Rivers State.

Respondents	N	$\overline{X}$	SD	Df	α	z-cal.	z-crit.	Decision
Male Teachers	237	3.10	0.69					
				545	0.05	1.55	±1.96	Failed to Rejected No Significant Difference
Female Teachers	310	3.01	0.66					

Table 5 shows the z-test analysis of difference in the mean ratings of male and female teachers on the extent the use of projectors enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State. At 0.05 level of significance and 545 degree of freedom, the z-calculated value of 1.55 was less than the z-critical value of ±1.96; therefore the null hypothesis was accepted which states that there is no significant difference in the mean ratings of male and female teachers on the extent the use of projectors enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State.

Discussion of Findings

Findings on research question 1 on Table 1 revealed that the use of interactive white board enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State to a high extent with grand mean scores of 3.00 and 3.05. Hypothesis 1 on Table 4 revealed that there was no significant difference in the mean ratings of male and female teachers on the extent the use of interactive white board enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State with z-calculated value of -0.76 which was less than the z-critical value of ±1.96. This finding is in agreement with Baz (2016) who opined that use of interactive white board enhances teachers' delivery of instruction in a variety of ways viz; visual learning: allowing teachers present contents by using animation, text and pictures; auditory learning: allowing teachers to use the device in the pronunciation of words through sounds and music. Finally is the tactile learning: through this feature the teachers allow students to physically interact with the board assisting to learn on their own pace.

Findings on research question 2 on Table 2 showed that the use of projectors enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State to a high extent with grand mean scores of 3.10 and 3.01. Again, information on hypothesis 2 on Table 5 revealed that there was no significant difference in the mean ratings of male and female teachers on the extent the use of projectors enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State with z-calculated value of 1.55 which was less than the z-critical value of ±1.96. This finding corroborates with Ruhul, Mahedi and Abdul (2018) who noted that projectors enables teachers use various appropriate images, videos and sounds to make a lesson pleasant and enjoyable. When images are used to present a topic, it makes the lesson become more real and specific to students.

Conclusion

In view of the results obtained from this study, it was concluded that to a high extent the use of interactive white board and projectors enhance instructional delivery of teachers in public senior secondary schools in Port Harcourt Metropolis of Rivers State. Todays' classroom is becoming highly digitalized and teaching the 21st century learners with the traditional face to face learning environment would pose a lot of challenges. Teachers therefore, need to adopt modern teaching technologies if they are to carry out the responsibility of training the 21st century learners for the 21st century society.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Rivers State Government should support public secondary schools by providing Interactive White Board so as to enhance the development of 21st century instructional skills among students.

2. Federal and State Government should increase the budgetary allocation of education so as to provide modern teaching technologies such as projectors in classrooms for effective teaching and learning process.

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