Teachers Rationale and Implementation of Paperless Classrooms for the Attainment of Sustainable Development Goals in Public Universities in Rivers State

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ABSTRACT
The study investigated teacher's rationale and implementation of paperless classrooms for the attainment of sustainable development goals in public Universities in Rivers State. Three research questions as well as three hypotheses were formulated as a guide for the study. Descriptive survey design was adopted for the study. The population of the study was 2, 644 academic staff in the three public Universities in Rivers State (1, 696 male and 948 female) while 605 teachers (324 male and 281 female) were sampled for the study using simple random sampling technique. The sample size was determined using Taro Yamane formula. Instrument used for data collection was a 15-item questionnaire titled "Teachers Rationale and Implementation of Paperless Classrooms for Sustainable Development Goals Questionnaire" (TRIPCSDGQ) and it was face and content validated by two experts in the Department of Educational Management, University of Port Harcourt. The reliability index of the instrument was 0.84 using Cronbach alpha statistics. Out of the 605 copies of questionnaire administered (324 male and 281 female), 555 copies (297 male and 258 female) were retrieved which was 91.7% retrieval rate. Research questions were answered using mean and standard deviation and while hypotheses were tested using z-test at 0.05 level of significance. It was revealed in the findings of the study that teachers do not differ in their opinion on the rationale, strategies challenges of implementing paperless classrooms for the attainment of sustainable development goals in public Universities in River State. It was recommended that the University should partner with other educational stakeholders for the provision of digital devices needed for implementing a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State.
Keywords: Teachers Rationale, Implementation of Paperless Classroom, Sustainable Development Goals, Public Universities, Rivers State

INTRODUCTION
One of the major goals of the Sustainable Development Goals (SGDs) scheduled to be achieved between 2016 and 2030 is the achievement of quality education across all levels in United Nations member countries. This goal aligns with individual national goals of achieving free and compulsory

basic education for all citizens who are willing and qualified. This objective which is part of the educational plan and programmes is Nigeria is designed to contribute to national growth and development in both the short and long run.

In today's global society, providing quality education for all will remain elusive until the necessary strategies are put in place to reach all students with relevant educational services across all boundaries. This demands a shift from the regular and traditional teacher-students classroom where teachers and students need to assemble in the four walls of a classroom before teaching and learning activities can take place. In order to ensure that the educational sector accommodate all citizens and contribute to national growth and development, most developed nations have taken a shift to the adoption of paperless classroom with little or no physical contact with students. Similarly, relevant technologies are regularly introduced into the classroom in order to overcome the rigour of handling papers in the classroom.

Dealing with a paperless classroom requires the interest of teachers in order for it to be effective and contribute to the attainment of relevant SDGs. Teachers need to embrace relevant technologies which provides the ease of handling large documents as well as storing relevant information with ease and also making them accessible when required. However, while some teachers in Universities around the world have embraced a shift to a paperless classroom in order to deal with large volume of educational responsibilities, other teachers within and outside the state have their reservations on why they are willing or not to switch to a paperless classroom. This no doubt has a great implication on the attainment of outlined SDGs in and outside Rivers State.

According to Arney, Jones and Wolf (2010), one of the rational why teachers around the world are willing to embrace the paperless classroom is that it allows for general feedback from students. This implies that the adoption of a paperless classroom provides an opportunity for teachers to be able to get real time and real life feedback from their students with which they can assess the performance of their students. Teachers also build interest in the use of a paperless classroom because they believe that it will helps students to prepare for future educational and non-educational responsibilities. Other teachers around the world have other reasons for adopting the paperless technique of teaching and learning because they believe that it will enable them adequately utilize educational resources available in the school such as time and material resources. The need for building a sense of belonging among students (Tenaw, 2015) is also a vital reason why some teachers have switched to a paperless classroom while others are intending and planning to do same.

The establishment of a paperless classroom cannot be a successful venture despite the interest in doing so until when the right strategies are implemented. Enforcing a paperless classroom across any level of education first requires putting in place relevant and modern technologies which will make teaching and learning both meaningful and impactful. In addition to this, teachers must make effort to build learning teams where teachers can interact with students by observation so as to reduce the possibilities of making use of paper materials which is often inconvenient for teacher to handle.

There are different challenges that make it easy for teachers to switch to a paperless classroom in a 21st century learning environment. Naicker (2011) revealed that accessing some of the technologies required for switching to a paperless classroom is one of the challenges that teachers in Universities still struggle to overcome. In some of these schools, only the teacher has access to the needed technology to enforce paperless teaching and learning but this becomes ineffective when students who are being taught do not have access to the same technological resources. In addition to the above, Nirmala, Tesfazghi, Appalabatla and Karthikeyan (2013) asserted that the lack of technological skills as well as teachers attitude towards modern technology poses a challenge to the enforcement of paperless classrooms in most schools. Teachers, students, parents, the government and other educational stakeholders therefore have a huge responsibility to play in ensuring that paperless classrooms are developed all around the educational system not only for the purpose of providing formal education for all citizens but for the purpose of ensuring that outlined SDGs are achieved in Rivers State and beyond.

Objectives of the Study

The purpose of the study was to investigate teacher's rationale and implementation of paperless classrooms for the attainment of sustainable development goals in public Universities in Rivers State. Specifically, the objectives of the study were to:

1. ascertain the rationales for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State
2. identify the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State
3. determine the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

Research Questions

The following research questions were answered in the study:

1. What are the rationales for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State?
2. What are the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State?
3. What are the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean ratings of male and female teachers on the rationale for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State
2. There is no significant difference in the mean ratings of male and female teachers on the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State
3. There is no significant difference in the mean ratings of male and female teachers on the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

METHODOLOGY

The study adopted descriptive survey design since the study deals with investigating and existing phenomenon by making inference about a population of study after drawing a sample from the population. Population of the study comprised 2, 644 academic staff in the three public Universities in Rivers State (1, 696 male and 948 female) out of which 605 teachers were sampled for the study (324 male and 281 female) who were drawn using simple random sampling technique. The sample size was determined using Taro Yamane minimum sample size determination formula. The instrument used for data collection was a 15-item questionnaire titled "Teachers Rationale and Implementation of Paperless Classrooms for Sustainable Development Goals Questionnaire" (TRIPCSDGQ). The instrument was validated by two experts in the Department of Educational Management, University of Port Harcourt. Reliability index of 0.84 was estimated using Cronbach alpha statistics. The instrument was administered by the researcher and two trained research assistants. Out of the 605 copies of questionnaire administered (324 male and 281 female), 555 copies (297 male and 258 female) were returned which was 91.7% retrieval rate. This was sufficient for the study. The research questions raised were answered using mean and standard deviation while the hypotheses were tested using z-test at 0.05 level of significance.

RESULT
Research Question One: *What are the rationales for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State?*

Table 1: Mean and standard deviation scores on the rationales for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

S/No	Items	Male Teachers n=297 Mean $\bar{X}_1$	SD	Female Teachers n=258 Mean $\bar{X}_2$	SD	Mean Set $X \bar{X}$	Decision
1	Educational resources are optimally utilized	2.98	0.78	2.84	0.91	2.91	Agreed
2	Students are able develop relevant empowerment skills	2.92	0.81	2.91	0.86	2.92	Agreed
3	Paperless classrooms makes teaching and learning more efficient and effective	2.90	0.85	2.82	0.89	2.86	Agreed
4	Students are able to develop good social character	2.64	0.98	2.74	0.94	2.69	Agreed
5	It prepare students for future responsibilities	2.97	0.79	2.76	0.93	2.87	Agreed
	Grand Mean and Standard Deviation	**2.88**	**0.84**	**2.81**	**0.91**	**2.85**	**Agreed**

Table 1 showed the mean responses of the male teachers to items 1, 2, 3, 4 and 5 to be 2.98, 2.92, 2.90, 2.64 and 2.97. These items were all above the criterion mean score of 2.50 used for decision making and as such implied that the items are agreed. On the part of the female teachers, their responses to the same set of items produced mean scores of 2.84, 2.91, 2.82, 2.74 and 2.76. These items were also above the criterion mean score of 2.50 used for decision making and as such signified that the items were agreed. The grand mean scores of 2.88 and 2.81 from the male and female teachers showed that they both agreed on the rationales for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State. The grand mean set of 2.85 showed that the teachers both agreed on the rationales for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State.

Research Question Two: *What are the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State?*

Table 2: Mean and standard deviation scores on the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

S/No	Items	Male Teachers n=297 Mean $\bar{X}_1$	SD	Female Teachers n=258 Mean $\bar{X}_2$	SD	Mean Set $X \bar{X}$	Decision
6	Media resources are used to build enriched learning	2.88	0.87	2.98	0.83	2.93	Agreed
7	Adaptative learning is used for teachers and students interaction	2.82	0.92	2.57	0.98	2.70	Agreed
8	Teachers adopt group learning for actualizing educational goals	2.83	0.91	2.94	0.87	2.89	Agreed
9	Flipped classroom is used by teachers for instructional delivery	2.44	1.04	2.54	0.99	2.49	Disagreed
10	Mobile instructional interaction is used between teachers and students	2.56	0.99	2.55	0.99	2.55	Agreed
	Grand Mean and Standard Deviation	**2.71**	**0.95**	**2.72**	**0.93**	**2.70**	**Agreed**

In table 2, the responses of the male teachers to items 6, 7, 8, 9 and 10 produced mean scores of 2.88, 2.82, 2.83, 2.44 and 2.56. Items 6, 7, 8 and 10 were all agreed while item 9 with mean score of 2.44 was disagreed. On the part of the female teachers, the same set of items had mean scores of 2.98, 2.57, 2.94, 2.54 and 2.55. These items were all agreed since the mean scores were more than the criterion mean score of 2.50 used for decision making. In summary, the grand mean score of 2.71 and 2.72 from the male and female teachers showed that they both agreed on the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State. The grand mean set of 2.79 showed that the male and female teachers both agreed on the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State.

Research Question Three: *What are the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State?*

Table 3: Mean and standard deviation scores on the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

S/No	Items	Male Teachers n=297 Mean $\bar{X}_1$	SD	Female Teachers n=258 Mean $\bar{X}_2$	SD	$X \bar{X}$	Decision
11	There are insufficient technological devices for use	2.84	0.90	2.84	0.91	2.84	Agreed
12	Information are often overloaded using digital devices	2.82	0.92	2.97	0.82	2.90	Agreed
13	Teachers and students can be distracted in the process	2.83	0.91	2.92	0.87	2.88	Agreed
14	There is the problem of insufficient technical skills	2.64	0.98	2.43	1.04	2.54	Agreed
15	Attitude of device users is a major constraint	2.67	0.96	2.34	1.07	2.51	Agreed
	Grand Mean and Standard Deviation	**2.76**	**0.93**	**2.70**	**0.94**	**2.73**	**Agreed**

Table 3 revealed that the responses of the male teachers sampled for the study to items 11, 12, 13, 14 and 15 showed mean values of 2.84, 2.82, 2.83, 2.64 and 2.67. All of these items were above the criterion mean score used for decision making and as such suggested that the items were agreed. On the other hand, the responses of the female teachers to the same set of items revealed mean values of 2.84, 2.97, 2.92, 2.43 and 2.34. Items 11, 12 and 13 were agreed since the mean scores were above the criterion mean score of 2.50 used for decision making while items 14 and 15 was disagreed since their mean scores of 2.43 and 2.34 were below the criterion mean score of 2.50 used for decision making. The grand mean scores of 2.76 and 2.70 from the male and female teachers implied that they both agreed on the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State. Similarly, the grand mean set of 2.73 also showed that the respondents agreed on the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State.

Test of Hypotheses

Hypothesis One: There is no significant difference in the mean ratings of male and female teachers on the rationale for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

Table 4: Summary of z-test analysis on the difference between the mean ratings of male and female teachers on the rationale for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male Teachers	297	2.88	0.84					Fail to reject
				553	1.37	1.96	0.05	
Female Teachers	258	2.81	0.91					

Table 4 showed that the value of z-crit. was 1.96 at 553 degree of freedom and 0.05 level of significance while the value of z-cal. was 1.37. Since the value of z-cal. of 1.37 was less than the value of z-crit. of 1.96, the null hypothesis was not rejected showing that there was no significant difference in the mean ratings of male and female teachers on the rationale for a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State.

Hypothesis Two: There is no significant difference in the mean ratings of male and female teachers on the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

Table 5: Summary of z-test analysis on the difference between the mean ratings of male and female teachers on the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male Teachers	297	2.71	0.95					Fail to reject
				553	0.17	1.96	0.05	
Female Teachers	258	2.72	0.93					

In table 5, it was revealed that the value of z-crit. was 1.96 at 553 degree of freedom and 0.05 level of significance while the value of z-cal. was 0.17. Therefore, since the value of z-cal. of 0.17 was less than the value of z-crit. of 1.96, the null hypothesis was not rejected indicating that there was no significant difference in the mean ratings of male and female teachers on the strategies used by teachers for the implementation of a paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State.

Hypothesis Three: There is no significant difference in the mean ratings of male and female teachers on the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

Table 6: Summary of z-test analysis on the difference between the mean ratings of male and female teachers on the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State

Variable	n	Mean	SD	df	z-cal.	z-crit.	Level of Significance	Decision
Male Teachers	297	2.76	0.93					Fail to reject
				553	1.05	1.96	0.05	
Female Teachers	258	2.70	0.94					

Table 6 indicated that at 553 degree of freedom and 0.05 level of significance, the value of z-crit. was 1.96 while the value of z-cal. was 1.05. Therefore, since the value of z-cal. of 1.05 was less than the value of z-crit. of 1.96, the null hypothesis was not rejected suggesting that there was no significant difference in the mean ratings of male and female teachers on the challenges to the implementation of paperless classroom for the attainment of sustainable development goals in public Universities in Rivers State.

DISCUSSION OF FINDINGS

Rationales for a Paperless Classroom for the Attainment of Sustainable Development Goals in Public Universities in Rivers State

If switching to a paperless classroom will make any impact on the growth and development of the nation, teachers must have the right attitude and perception towards the switch. Teachers must have a rationale for desiring to move towards a paperless classroom as long as it will contribute to sustainable development in the short term. The findings of the study however revealed that teachers have certain rationales for a peerless classroom as a means for attaining sustainable development. This finding suggests that the instruction of a paperless classroom will successfully contribute to sustainable development as long as the teachers have the right attitude and perception towards it.

The findings of this study is not different from the outcome of the study conducted by Hults (2015) which showed that the paperless classroom had a positive impact on both student engagement and on student attitudes toward science as perceived by the teachers. Therefore, since teachers are constantly in search of ways of improving the performance of their students, embracing a paperless classroom will be a welcomed ideas as well as it will contribute to educational and national goals and objectives.

In a related study conducted by Runnels and Rutson-Griffiths (2013), it was indicated that while teachers significantly preferred interacting with classroom materials on the regular-sized tablet, students did not show preference toward either device for classroom use. Furthermore, the study showed that students suggested that for everyday use, such as doing homework, the miniature version was preferred. The implications the results make on materials design and mobility as a component of a paperless classroom are discussed. This finding clearly states that despite the fact that teachers have a reason for desiring the paperless classroom, effort must be made to provide the right resources that meets the personality of the teachers as well as the students who are the center of the learning process for national development.

Strategies used by Teachers for the Implementation of a Paperless Classroom for the Attainment of Sustainable Development Goals in Public Universities in Rivers State

The successful enforcement of paperless classrooms begin with the teacher who is at the center of teaching and learning activities in the school. When teachers begin the practice of shifting into paperless instruction in the school, it becomes easy for it to be sustained. In the response of the teachers, it was revealed that the teachers have developed the attitude of using available media resources and other technology to enforce paperless instructions. This implies that these teachers are likely involved in bringing their personal technological devices as a way of enforcing a paperless classroom for the attainment of outlined sustainable development goals in Rivers State. Similar study by Cornwell (2015) revealed that the bring your own device assisted teachers and students to develop a meaningful teaching and learning interaction. This finding further revealed the fact that teachers have a huge role to play in the enforcement of paperless classroom for national development.

Similarly, implementing paperless classrooms that will contribute to the attainment of sustainable development require teachers and other educational stakeholders to be proactive, by engaging other stakeholders in the provision of other relevant resources that will make this goal seamless. This explains why the outcome of the study showed that teachers also adopted group learning as a way of promoting paperless classrooms. This type of learning which can sometimes be based on observation helps to reduce emphasis on the use of paper for instructional delivery and national development. Kuriakose and Luwes (2016) in a related study that agreed with the finding of this study revealed that instructors make use of presentations animated videos and multimedia to better explain their course content to students. These measures are relevant measures of implementing the paperless classroom which will go a long way to contribute to sustained development. However, the respondents used for the study pointed out that they don't implement the practice of a flipped classroom and this is an issue that needs to be visited for the prompt attainment of the goals of the SDG in Rivers State.

Challenges to the Implementation of Paperless Classroom for the Attainment of Sustainable Development Goals in Public Universities in Rivers State

The practice of a paperless classroom is one that is still gaining attention in Universities in Rivers State. This is as a result of the various challenges that teachers encounter in the process of implementing this practice. Findings from the study showed that one of the challenges that teachers face in switching to paperless classrooms is the lack of technical skills among them which is vital for this type of classroom. The study conducted by Shonfeld and Meishar-Tal (2017) in a related area

showed that some teachers were concerned that the transition from the regular classroom to a paperless one may negatively impact students' reading and writing skills. This finding further reveals the fact that the attitude of these teachers to the paperless classroom poses a challenge on its own to the process which can threaten the actualization of the paperless classroom for national development. Furthermore, the overloading of available devices in the implementation of a paperless classroom equally pose a challenge to teachers in the process of using this measure to achieve outlined educational goals and objectives. In addition to this, the absence of support facilities also poses a challenge to the implementation of paperless classroom in these Universities. Kganyago (2018) agreed with this position as they revealed in the outcome of their study that insufficient training and technical support, anti-social behaviour by learners and technophobia by older teachers pose a challenge to the process of switching to paperless classrooms. These issue need to be resolved in order to prepare the University for the attainment of relevant sustainable development goals in Rivers State.

CONCLUSION

The study concluded that teachers in public Universities in Rivers State have lots of reasons for switching to a paperless classroom. However, this move is hindered by several challenges among which are the shortages of technological devices in these schools which require urgent attention.

RECOMMENDATIONS

The following recommendations were made in line with the findings of the study:

1. Teachers in public Universities in Rivers State should be kept abreast through seminars and conferences on the objectives of the University as well as national educational goals and objectives so as to ensure that the switch to a paperless classroom will also take into cognizance the goals and objectives of the University.
2. The University in partnership with the government should ensure to provide relevant technological and other media devices are provided in these Universities for easy switch to paperless classrooms which will fast track the attainment of outlined sustainable development goals.
3. The University should regularly role out policies guiding the use of paperless classrooms in line with other professional recommendations. This will help to ensure that the goals and objectives of the University and other professions is not eroded in the process.

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