

# Preventive Maintenance Practices on School Facilities: Implications for Effective Instructional Delivery in Technical Education Programmes in Colleges of Education in South- East Nigeria

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## ABSTRACT

The study examined the implications of preventive maintenance practices on school facilities for effective instructional delivery in technical education programmes in Colleges of Education in South-East Nigeria. One research question guided the study and two null hypothesis was tested at 0.05 alpha level. It adopted survey research design. The population of the study comprised 204 lecturers in college of education in South-East of Nigeria. The entire population was used for the study since it was not too large and was manageable. Hence, the study did not adopt any sampling technique. A 21- item structured questionnaire was used as instrument for data collection for the study. Three experts validated the instrument. Cronbach's Alpha method was used to establish the reliability of the instrument in a pilot test; which yielded a reliability coefficient of 0.72. The instrument for data collection was sent to respondents through research assistants. Data related to the research questions were analyzed using mean and standard deviation. The t-test statistics was used to test the hypothesis at 0.05 level of significance. Findings from the study revealed that preventive maintenance practices on school facilities to small extent influence instructional delivery in technical education programmes in Colleges of Education in South-East Nigeria. The study recommended among others that, government through the Ministry of Education and Provosts of Colleges of Education should provide funds and materials needed for preventive maintenance of school facilities.

## KEYWORDS

school facilities; technical education; instructional delivery; preventive maintenance practices

## INTRODUCTION

Education is generally seen as an aggregate of all the process by which a child or young adult develops his/her abilities, altitudes and other forms of behaviour which are value to the society in which he lives. Hence, there has been a growing concern in the last few years about the quality education that is offered in nation's schools. A nation cannot survive the present technological advanced world without focusing on human resource development through education. Effective human resources development can only be achieved through quality education (Anaele, 2010). Some countries of the world, today are described as developed or advanced, due to their technological feats and maneuver. They got these through coordinated quality education.

The quality of education can be greatly affected when schools are deficient in essential facilities for effective instructional delivery in different fields learning. Hallack (2010) noted that facilities form one of the potent factor for effective instructional delivery in the school system. They include the school buildings, classrooms, accommodations, libraries, laboratories, furniture, recreational equipment, apparatus and other facilities. He further added that unattractive school building and overcrowded classrooms among other contributed to poor instructional and poor academic attainment and this facilities should be located in appropriate places, while the need of the uses should be put into consideration. In view of this Enya (2018) opined that physical facilities in schools ought to be kept in good condition through regular and periodic maintenance.

Maintenance could be routine ongoing activities such as daily or weekly, cleaning of the laboratory equipment and facilities, it could be periodic activities such as inspection and lubrication of parts of equipment to ensure continued working condition or corrective maintenance which include activities carried out to fix back failed equipment. It can also involve security of the equipment and facilities. Security here covers protection from physical damage from pests, fire, rain, etc. It also pertains to protection from theft or unauthorized uses. Lecturers should not wait for equipment to breakdown before it is serviced. Report of the need for repair or replacement of equipment must be made to school authority with the view to making immediate arrangement for the repairs and maintenance to avoid waste and depreciation.

According to Adebojeji (2015), maintenance enhances performance and durability; prevents wastage, corrects breakdown that could shutdown services. Ihuoma (2015) and Agenyi (2017) had identified major types of maintenance, namely: preventive, corrective and predictive maintenance. Others are routine; emergency and structural which are all under preventive corrective and predictive maintenance.

Preventive maintenance includes regular inspection of the building and immediate repair of minor damages and deterioration (Uko, 2012). This is done to avoid breakdown, and to ensure optimal performance of facilities to save cost and time (Ngoka 2013). This is aimed at reducing the possibility of repairs or breakdown of equipment. It is very economical since it is believed that prevention is better than cure. According to Candoli (2014), preventive maintenance is that programme for servicing machines, systems and structure devised to prevent a breakdown of the system or one of its components. Preventive maintenance allows an equipment or building to remain in its original useful life. Adherence to manufacturer's advice on repairs enables the school to operate efficiently and effectively. In Nigeria situation, equipment preventive maintenance is usually neglected or often postponed until there is total breakdown. According to Ogbodo (2012), school facilities imply substantial cost to the school system for their establishment, if not properly managed and maintained. They dilapidate and wear out faster than their "life span" and also if not properly utilized, the school system will not derive maximum benefit from their use. Ideally, safety takes priority over cleanliness, orderliness, cost effectiveness and even instructional support. Others include:

- (1) It prevents buildings from deterioration.
- (2) It encourages future public investment in the education system.
- (3) It provides clean and safe environments for children or students to learn and understand.
- (4) It creates a physical setting that is appropriate and conducive for learning.
- (5) It updates old school buildings.
- (6) It ensures facilities are available to yield maximum benefits to students' and staff.
- (7) It protects operating personnel and services facilities.
- (8) It extends the life of the facilities for maximum benefits.

School facilities need to be adequately managed in order to ensure both effectiveness and efficiency of the system (Ijaduola, 2018). Proper maintenance of school facilities ensures safety for those occupying the school building. It facilitates effective teaching and learning process. It also saves cost; this is because reactivating a collapse building may cost more than to make early repairs on the building. It ensures the suitability of school facilities for continued use because repairs and replacement of various equipment make such to be in good shape. More so, preventive maintenance of school facilities enhances effective instructional delivery.

Effective instructional delivery according to Anita and Charles (2012) is a structural, systematic and effective methodology for teaching academic skills. They added that it is an unambiguous and direct approach to teaching that includes both design and delivery procedures. The researchers further said that it is characterized by a series of support or scaffolds, whereby students are guided through the learning process with clear statements about the purpose and rationale for learning the new skills with clear explanations and demonstrations of the instructional target and supported practice with feedback until independent mastery has been achieved.

Bligh (2019) sees effective instructional delivery as a systematic method of teaching with emphasis on proceeding in small steps, checking for students' understanding and achieving active and successful participation by all students. This means that effective instructional delivery is the proper way to transfer of all forms of knowledge into the learner in schools including colleges of education.

An academically successfully school must radiate a sense of well-being of its facilities which in turn generate information for positive results. This will lead to effective restoration achieved through good design that addresses educational needs of the students. Most classrooms are usually overcrowded with up to sixty or more students in the classrooms designed for only thirty or forty students. The chairs and desks are not enough; students therefore engage in sharing chairs, standing up or sitting on windows or broken desks; a situation that generally stalls the teaching-learning process, disrupts the students' mental activity and militates against the intellectual development of students especially in colleges of Education in Nigeria (Akomolafe, 2013).

Colleges of Education are best known as teacher education institutions in Nigeria. It has the primary role of training teachers who will be awarded the teaching qualification of Nigerian certificate in Education (NCE) (Gabriel & Fehintola 2013). This certificate qualifies one to teach in Primary, Junior, Secondary Schools and Technical Colleges in Nigeria. This is a three-year training programme with the following goals as contained in the FRN (2013):

- To Produce highly motivated conscientious and efficient classroom teachers for all levels of our educational system
- To encourage the spirit of enquiry and creativity in teachers and help teachers to fit into social life of the community and the society at large and enhance their commitment to national goals.
- Provide teachers with the intellectual and professional background adequate for them assignment make them adaptable to changing situations;
- Enhance teachers' commitment to the profession.

Management in the college of education is as paramount as the success of the system. For this educational level to achieve success with respect to the objectives for which it was established there is need for professionalism in managing the humans and material resources effectively (Aliyu, 2011). The effectiveness of managers in the colleges of education is a function of the competence of heads of the various departments, schools and units relative to initiative for prudent management of available human and material resources.

To this end, managers at the various levels are expected to acquire relevant training in the field of management through attending seminars, workshops and conferences to enhance their competence. Failure of the school management to provide these facilities in quantity and quality will result to poor teachers' effectiveness, poor teachers' and students' enrolment in colleges of education and poor teaching of science and technical education subjects in colleges of education (Arugbeyi, 2015).

According to Federal Republic of Nigeria (FRN,2013), Technical Education an aspect of the educational process involving in addition to general education, study technologies and related sciences and the acquisitions of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of the economic and social life. Technical Education as a functional form of education, training or pre-training designed to prepare individuals to enter, or continue as paid employment in any recognized occupation and in new and emerging occupations or apart of the total experiences of person whereby he/she learned successfully to carry on gainful occupation or employment. (Nwokolo, 2010). The researcher views technical education as an aspect of education that apply the principle of science and technology to empower its receiver with practiced skills and attitude to succeed in an occupation. The acquisition of technical skills in Colleges of Education largely depends on the maintenance of school facilities.

This is why Enya (2018) opined that physical facilities in schools ought to be kept in good condition through regular and periodic maintenance. According to Ikoya and Onoyase (2014), most of the facilities in Nigerian schools more especially in South-East of Nigeria; both urban and rural areas are dilapidated due to inadequate funding for acquisition/replacement and maintenance, and that most tertiary institutions are living in their past glories. Such situations could hinder effective instructional delivery in any field of study especially Technical education by making the process rigorous and uninteresting to researchers and students.

#### **STATEMENT OF THE PROBLEM**

Guldee (2015) observed that despite having government funding, some schools in urban and rural areas reportedly have leaking roofs, gaping holes on windows and floors, unreadable white boards, no visual teaching aids and poor libraries for effective teaching and learning in different fields. The author further asserted that Nigerian education has suffered at the hands of a succession of often-brutal military regimes that lacked value for the system resulting to total neglect of school facilities such as laboratory/workshop equipment, buildings, classrooms, space and furniture among others.

A critical problem In the effective implementation of any educational programme is the utilization and maintenance of the available facilities. This helps to facilitate the quality and effectiveness of the implementation of a green curriculum. Physical facilities (workshops, equipment, tools, laboratories and other facilities) has to be maintained for effective instructional delivery in Technical Education. This is one of the problems confronting Technical Education as observed by Jen (2010); that as a result of underfunding of the education sector, most of the institutions cannot maintain the necessary facilities needed for teaching and learning to take place, hence the production of half-baked graduates who cannot perform in their place of work. It seems that poor instructional facilities remain a characteristic trademark of many technological institutions in Nigeria which has negative effect on instructional delivery. It is based on this background that the study on prevent maintenance of school facilities; a strategy for effective instructional delivery in technical education in colleges of education in South-East Nigeria was conceived.

#### **PURPOSE OF THE STUDY**

The aim of the study was determining the extent at which maintenance of school facilities enhances effective instructional delivery in technical education programmes in Colleges of Education in South-East of Nigeria. Specifically, the study sought to investigate the extent at which preventive maintenance of school facilities influenced Instructional delivery in technical education programmes.

**RESEARCH QUESTION**

The following research question guided the study:

- (1) To what extent does preventive maintenance practices on school facilities influence effective instructional delivery in Technical education programmes in colleges of education in South East Nigeria.

**HYPOTHESES**

The following hypotheses were tested at .05 level of significance:

- (1) Technical education lecturers do not differ significantly in their mean ratings on the extent they apply preventive maintenance practices on school facilities for effective instructional delivery in federal and state colleges of education in South-East Nigeria.
- (2) Location of urban and rural does not significantly influence respondents' mean ratings on the extent which preventive maintenance practices are applied on school facilities for effective instructional delivery in technical education in colleges of education in South-East Nigeria.

**METHOD**

This study will adopt the descriptive survey research design. The population of the study will comprise all 204 Technical Education Lecturers in the four public colleges of education in the South- East that offer Technical Education courses. This comprises of 103 lecturers from federal, 101 lecturers from state, 94 in urban and 110 in rural respectively. The entire population of 204 lecturers in Technical Education departments in Colleges of Education in South- East Nigeria will be used for the study because the size is not too large. The instrument for data collection for this study will be a structural questionnaire developed by the researcher titled "Preventive Maintenance of School Facilities Questionnaires (PMSFQ). The instrument has two main sections; A and B. Section A contains two items on demographic data of respondents while section B contains 21 items It has a five-point scale of Very High Extent (VHE), High Extent (HE), Moderate Extent (ME), Small Extent (SE) and Very Small Extent (VSE). To ascertain the validity of the research instrument, the researcher submitted draft copies of the instrument alongside with research topics, purpose of the study, research questions and hypotheses to two experts in Vocational and Technical Education from the Department of Technology and Vocational Education in Nnamdi Azikiwe University Awka and Alvan Ikoku College of Education Owerri, and one other expert in measurement and evaluation from the Department of Educational Foundation from faculty of Education, Nnamdi Azikiwe University, Awka. Their inputs were used in modifying the items to acceptance standard; thereby making it appropriate for data collection. To determine the reliability of the instrument, Cronbach Alpha method was used to analyzed a pilot study with 20 lecturers from federal college of education (Technical) Asaba, Delta State which is outside the study area. The reliability Coefficient value 0.72 was obtained. The researcher through the help of research assistants administered 204 copies questionnaire to the respondents; out of which, 197 copies were retrieved after two weeks for data analysis. Descriptive statistics of mean and the standard deviation was used to answer the research questions and determine the closeness of the respondents' views. Decision on the questionnaire items and research questions were based on mean rating of 3.50 points. Therefore, items with mean ratings of 3.50 points and above were regarded to have influenced technology education to a great extent while items with mean ratings below 2.50 points were regarded to have influenced it to a small extent. The t-test statistical tool was used to test the null hypothesis at 0.05 level of significance. A null hypothesis was rejected where the calculated p-value was less than the 0.05 level of significance; it meant that there was a significant difference between mean responses. Conversely, where the calculated p-value was greater than or equal to the level of significance 0.05; it meant that there was no significant difference and the hypothesis was accepted.

**RESULTS**

Data analyzed for research question and hypotheses were presented in tables 1 to 3.

**Research Question 1:** (1) To what extent does preventive maintenance practices on school facilities influence effective instructional delivery in Technical education programmes in colleges of education in South East Nigeria.

Data obtained in respect of research question 1 were analyzed and presented in Table 1.

**TABLE 1:** Mean Ratings and Standard Deviation on preventive maintenance of school facilities.

S/N.	Preventive maintenance practices	Mean	SD	Decision
1	Facilities with bolts and knots are tightened at regular interval	2.20	.47	Small Extent
2	Laboratory equipment are often cleaned to prevent them from damage	2.80	.52	Small Extent
3	Facilities are regularly inspected to ascertain their working conduction	2.00	.44	Small Extent
4	Facilities required lubrication are lubricated regularly	3.10	.54	Small Extent
5	Facilities allergic to sunlight kept out of direct sunshine	2.20	.47	Small Extent
6	Water sensitive facilities are kept away from rain drop	2.30	.45	Small Extent

S/N.	Preventive maintenance practices	Mean	SD	Decision
7	Lecturers always anxious to replace facilities signals of deteriorating	2.30	.44	Small Extent
8	Equipment displaying abnormal values are replaced immediately	2.20	.46	Small Extent
9	School computers are serviced regularly	2.10	.48	Small Extent
10	Preventive maintenance is carried out on school equipment	2.80	.50	Small Extent
11	Machines and other mechanical devices are lubricated to make them run smoothly	2.60	.58	Small Extent
12	Fire extinguishers are always checked to ensure that they are in good conditions	2.30	.45	Small Extent
13	Facilities that shows evidence of wear and tear are replaced immediately	2.00	.44	Small Extent
14	Facilities with parts are frequently adjusted to avoid malfunction	1.43	.53	Small Extent
15	Experts are invited sometimes for quality maintenance to avoid complete failure	2.39	.46	Small Extent
16	Obsolete facilities are changed or replaced by constructing new ones	1.30	.49	Small Extent
17	Long time used facilities are greased often to avoid failure	2.38	.52	Small Extent
18	Worn-out facilities are changed when noticed to avoid total destruction	2.44	.50	Small Extent
19	Facilities often undergo overhauling to avoid total failure	2.10	.46	Small Extent
20	Lecturers undergo supervision and programmes on maintenance	1.40	.50	Small Extent
21	Facilities used in workshops are properly arranged to avoid breakdown	2.30	.46	Small Extent
22	Facilities parts are always lubricated to avoid being stiff and damaged properly	2.38	.52	Small Extent
<b>Cluster Mean</b>		<b>2.23</b>	<b>.48</b>	<b>Small Extent</b>

The data in Table 2 shows that almost all the items were rated small extent. The cluster mean of 2.23 indicate that, in the opinion of the respondents, preventive maintenance practices to a small extent are applied on school facilities in college of education in South-East Nigeria for effective instructional delivery in Technical Education. The standard deviations of 0.48 to 0.58 show that the respondents are homogenous in their responses.

**Hypothesis 1:** Technical education lecturers do not differ significantly in their mean ratings on the extent they apply preventive maintenance practices on school facilities for effective instructional delivery in federal and state colleges of education in South-East Nigeria.

Data obtained in respect of hypothesis 4 were analyzed and presented in table 2

**TABLE 2:** Summary of t-test comparison of the mean ratings of technical education lecturers on the Extent of application of preventive maintenance on school facilities.

Lecturers	N	X	SD	$\alpha$	df	t-cal	p-value	Decision
Federal	115	2.05	.12	0.05	195	1.54	.063	Not significant
State	82	2.13	.14					

Data in Table 2 show that respondents do not differ significantly in their mean ratings on the extent they apply preventive maintenance practices on school facilities for effective instructional delivery in federal and state colleges of education with mean scores of 2.05 and 2.13 while the corresponding standard deviation is .12 and .14. The Table indicated a t-value of 1.54, at degree of freedom of 195 and a p-value of .063. Testing at alpha level of 0.05, the p-value is not significant, since the p-value is greater than the alpha value (0.05). Therefore, the null hypothesis is not rejected; hence, technical education lecturers do not differ significantly in their mean ratings on the extent they apply preventive maintenance practices on school facilities for effective instructional delivery in federal and state colleges of education in South-East Nigeria.

**Hypothesis 2:** Location of urban and rural does not significantly influence respondents' mean ratings on the extent which preventive maintenance practices are applied on school facilities for effective instructional delivery in technical education in colleges of education in South-East Nigeria.

Data obtained in respect of hypothesis 2 were analyzed and presented in Table 3.

**TABLE 3:** Summary of t-test comparison of the mean ratings of technical education lecturers on the Extent of application of preventive maintenance on school facilities based on location.

Lecturers	N	X	SD	$\alpha$	df	t-cal	p-value	Decision
Urban	107	2.23	.46	0.05	195	1.39	.063	Not significant
State	90	2.10	.40					

Data in Table 3 show that location do not significantly influence respondents' mean ratings on the extent they apply preventive maintenance practices on school facilities for effective instructional delivery with mean scores of 2.23 and 2.10 while the corresponding standard deviation is .46 and .40. The Table indicated a t-value of 1.39, at degree of freedom of 195 and a p-value of .063. Testing at alpha level of 0.05, the p-value is not significant, since the p-value is greater than the alpha value (0.05). Therefore, the null hypothesis is not rejected; hence, location of urban and rural does not significantly influence respondents' mean ratings on the extent which preventive maintenance practices are applied on school facilities for effective instructional delivery in technical education in colleges of education in South-East Nigeria.

## DISCUSSION

The findings of this study revealed that preventive maintenance practices to a small extent is carried out on school facilities in college of education in South-East Nigeria for effective instructional delivery in technical education. Such maintenance practices include keeping water sensitive materials away from rain drops, regularly lubricating of facilities requiring lubrication and keeping out of sunshine facilities allergic to sunlight. The finding is consonance with the report of Vandiver (2011), which revealed that continuous existence and utilization of school facilities can only be achieved through quick and regular servicing and repairing of broken facilities through preventive maintenance. This is also in line with the findings of Aliyu (2011), which states that management of school facilities has not been achieved because facilities are not serviced or repaired promptly utilize, they become worst or broke down in Nigeria. Efficient school facilities maintenance according to Edward (2012) is a precondition for strong effective instructional delivery. Uchendu, Ekanem and Jonah (2013) revealed that poor preventive maintenance practices are indicated by poor physical appearance, untidy walls, leaking roofs, irregular lubricating of parts and servicing of equipment.

The findings also show that lecturers in rural and urban areas and those in federal and state-owned colleges of education did not significantly differ in their mean ratings on the extent at which preventive maintenance practices are applied on school facilities for effective instructional delivery in technical education in colleges of education in South-East Nigeria. This is in agreement with Dude (2014) who discovered that irrespective of location, human activities such as failure to clean and carry out routine maintenance are responsible for the deterioration and decay of facilities. Preventive maintenance practice is the most significant activity required on school facilities for effective instructional delivery.

## CONCLUSION

Based on the findings of the study, it was concluded that both federal and state-owned colleges of education and those located in urban and rural areas carry out preventive maintenance for effective Instructional delivery in technical education programmes in Colleges of Education to a small extent.

**RECOMMENDATIONS**

Based on the findings of this study and the conclusion reached, the following recommendations were made:

- (1) Lecturers, students and workshop attendants should be trained and / or retrained on how carry out some preventive maintenance on school facilities.
- (2) Government through the Ministry of Education and Provosts of Colleges of Education should provide funds and materials needed for preventive maintenance of school facilities.

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