

EVALUATION OF MAINTENANCE MANAGEMENT OF PHYSICAL FACILITIES IN TERTIARY INSTITUTIONS IN EKITI STATE, NIGERIA

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Abstract: Physical facilities constitute an important factor resource for the implementation of educational programmes in Ekiti state. Its management is very important because when physical facilities are poorly managed, the desired educational objectives will not be achieved. Tertiary institutions in Ekiti state presently and in all ramifications appear to have been bedeviled with physical facility related problems. Based on the pilot survey carried out by the researcher revealed that the prevailing circumstance in virtually all the tertiary institutions in Ekiti State are overcrowded hostels, uncondusive classroom as most floors and walls are found dilapidated and hazardous. This research is aimed at evaluating the maintenance management of physical facilities in tertiary institutions in Ekiti State with a view of developing effective and efficient maintenance management procedures for improvement. The methodology involved survey design, review of related literature, two sets of structured questionnaires, direct observations and walkthrough evaluations. The population for this study covered the selected 144 building structures in the selected institutions, 8,036 students and the 3,041 staff who have adequate knowledge and experience of both maintenance management and condition of buildings in the selected institution and this give a total of 11,074 populations. The sample size of 386 was judged to be representative of the total population and was selected using the proportionate random sampling technique. Data was analyzed using frequencies, percentages and mean scores. The hypotheses for this study were tested using the Pearson Product Moment Correlation Coefficient. The study revealed that, the nature and types of buildings in the institution comprised of laboratories, workshops, hostel blocks, lecture theaters, classroom blocks, auditorium, libraries, clinical sciences building, offices and others. The study revealed that, Lack of maintenance culture, poor design and construction, function and use of buildings, wear and tear, fungal/termite attack, poor funding and aging are some of the factors responsible for deterioration of buildings in the institution. The study further recommended that foundation for building maintenance culture should be practiced at the grassroots levels, in various family homes, schools, offices, in order to provide the bedrock for our children and youths to appreciate and practice maintenance of basic things found in various homes and schools. There is need to intensify the maintenance of buildings in the study organization. This recommend, that the maintenance staff should be more committed in the management and maintenance of buildings in the selected institutions.

Keywords: Physical Facilities, Maintenance Management.

1. INTRODUCTION

Physical facilities in our tertiary institutions constitute part of our most valuable assets, providing learning with shelter, work and leisure (Ogunoh, 2014). According to him tertiary institutions are considered to be key to technological development, productivity and economic growth of a nation and as such been accepted worldwide as the barometer of sustainable development.

According to Adeboboye (2010) and Emetarom (2014), institutional facilities are the physical and spatial production of academics results. They include permanent and semi-permanent structures such as machineries, laboratory equipment, the blackboard, teachers' tools, e-book library, furnitures and library still pictures, chairs, tables, projectors, computers,

games, sporting facilities, lecture halls, accommodations, and other equipment as well as consumables (Oyesola, 2012). Consequently, physical facilities in tertiary institution may include classroom/lecture halls, laboratories, workshops, libraries, equipment, consumables, electricity, water, visual and audio-visual aids, tables, desks, chairs, play-ground, storey space and toilets (Adeyemi, 2015).

This indicates that the performance levels of these facilities are very critical to educational effectiveness. That is why Akinsola and Iyagba (2006) categorically state that tertiary institutions must maintain, renovate and expand their building when necessary and keep equipment and technology current to meet changing workplace needs. Good quality and standard of an institution depends largely on the availability and adequacy, utilization and maintenance of education facilities.

Alerinsola (2004) asserted that education curriculum cannot be sound and well operated with poor and badly managed institutional facilities. Consequently, institutional facilities are expected to function effectively throughout their life span, however, for these facilities to meet these basic requirements, they require constant and regular maintenance.

Maintenance can be defined as people usage of equipment and their day – to-day upgrade. It also includes avoidance of over-work and inadequate service in the case of machines. School facilities maintenance basically relates to the repair, replacement and general upkeep of physical features as found in school buildings, grounds and safety systems (Nhlapo, 2013).

Young (2015) states that school facility maintenance is concerned with ensuring safe conditions for facility users, learners, educators, staff, parents or guests and is also concerned with creating Physical setting that is appropriate and adequate for learning. Leung, Lu and Ip (2015) espouse facilities maintenance as aiming to provide end-users with comfortable, effective and quality environment with minimum resources to enhance organizational effectiveness.

Asiabaka (2008), observed that tertiary institution facilities in most State were not adequately maintained by institutions administrators and hence their life span depreciated faster. The administrators appear to spend much time on instructional planning, curriculum development, personnel management and community relations claiming that the management and maintenance of institution facilities is the sole preserves of the government. It is against this background that this study seeks to evaluate the maintenance management of physical facilities in tertiary institutions in Ekiti state.

Statement of the Problem

Tertiary institutions in Ekiti state presently and in all ramifications appear to have been bedeviled with physical facility related problems. Based on the pilot survey carried out by the researcher revealed that the prevailing circumstance in virtually all the tertiary institutions in Ekiti State are overcrowded hostels, unconducive classroom as most floors and walls are found dilapidated and hazardous. Often, doors and windows become out of use and create a situation of insecurity while some institution buildings are usually seen in bad condition with either blown-off roofs, broken walls, leaking roofs or both which constitute danger to the lives of the users and invariably pose a threat to the programmes of the institutions. Again, most of the institution environment appears untidily kept suggesting that conservancy facilities are either not available, inadequate, poorly utilized or inadequately maintained. The situation creates unhealthy study environment, which negatively affects teaching and learning, as conducive school and classroom remain important parameters for effective implementation of educational programmes. Furthermore, that student is often seen struggling to be first to use some of the sporting facilities indicated a problem which negatively affect the attainment of tertiary institution set-goals.

The researcher is worried that if the present situation of poor management of physical facilities in our tertiary institutions continue, it may affect lecturers and students' academic activities, thus, affecting our basic education system.

Against this backdrop, the study tends to assess the maintenance management of physical facilities in tertiary institutions in Ekiti State so as to determine appropriate strategies to remedy the situation.

Research Objective

Aim and objectives of the Study

This research is aimed at evaluating the maintenance management of physical facilities in tertiary institutions in Ekiti State with a view of developing effective and efficient maintenance management procedures for improvement. The study seeks to achieve this through the following specific objectives:

1. to assess the nature, types of physical facilities and their state of maintenance in the study area
2. to determine factors hindering the maintenance management of physical facilities.
3. to recommend measure on how to mitigate maintenance problems in the institution.

Research Questions

1. What are the nature, types of physical facilities and their state of maintenance in the study area?
2. What are the factors hindering the maintenance management of the available physical facilities?
3. What are the measures to take in mitigating maintenance problems in the institution?

2. REVIEW OF RELATED LITERATURE

Maintenance Management in Tertiary Institution

Maintenance management is a term used to describe the activities to ensure that the assets operate at the required state and that maintenance is performed in order to achieve continuous improvements in reliability, maintainability and availability. Milje (2011) defines maintenance management as: —all activities of the management that determine the maintenance objectives, strategies and responsibilities, and implementation of them by such means as maintenance planning, maintenance control, and the improvement of maintenance activities and economics. Maintenance management can be done in three different levels (Kobbacy & Murthy, 2008):

1. The first level is dealing with the formulation of the maintenance strategy so that is consistent with the other business strategies within the company.
2. The second level is planning and schedule maintenance in order to ensure efficient maintenance operations.
3. The third level is related to the execution and collection of data from the maintenance actions.

As maintenance has been an increasingly important discipline the last decades, improvement of the maintenance management has been the focus of attention. A common model for maintenance management today is one developed by the Norwegian Petroleum Directorate (NPD).

According to Milje (2011) this process covers the maintenance management process from design to the end of the lifetime of the asset

1. **Goal and requirements:** Both the organization demands and the regulatory demands must be taken into consideration in order to develop the goals and requirements.
2. **Maintenance program:** Establishment of a maintenance program in order to ensure that the maintenance activities are performed in a safe, efficient and cost-effective way. A maintenance program should include maintenance tasks, intervals, resources, documentation and spare parts.
3. **Planning:** All the maintenance activities should be carefully planned. The maintenance activities is planned both in long-term and short-term as well as the work orders are managed.
4. **Execution:** The execution of the maintenance tasks has to be prepared and implemented and the data after the execution must be registered.
5. **Reporting:** The executed maintenance, technical condition, costs, regularity and risk should be reported. Data should be analysed in order to see if there are any improvement potential.
6. **Analysing:** The reported **Improvement measures:** In order to improve the work processes improvement measures are implemented.

During the process there will be a need for different kinds of resources. There are mainly three main types of resource needs: organizational, material and documentation. The result from the process is measured in terms of the assets technical condition and the related costs, regularity and risk level

Physical Facilities in Tertiary Institution

The relevance of the presence of facilities, equipment and supplies to the smooth running of school physical education programme has been severally emphasized in the literature (Akinsanmi, 1995; Mgbor, 2005). The level of success of most

physical education programmes is greatly dependent on the degree of availability and adequacy of up-to-date equipment and facilities as these forms the hub around which such programmes revolve.

According to Okoro (1991) facilities, equipment and supplies are very vital in teaching and learning in schools. Similarly, Awosika (1992) asserts that facilities and equipment are programme related in any teaching programme and should be provided in sufficient quantity to meet the needs of the school physical education programmes.

Many definitions and explanations have been provided for physical facilities by experts in educational management. For example, Ehiamezor (2001) defined physical facilities as an operational input of every institutional programme. The above definition conceptualizes physical facilities as meaningful in implementing educational programmes. This indicates that physical facilities are not only fixed structures but include mobile structures such as heavy light generating plant which, though fixed in its house, can be moved if there is need for it. In a related definition, the programmes of the school are expressed through site, the buildings, playgrounds, the laboratories, the gymnasium among others.

School physical facilities include permanent and semi-permanent structures. It is expected that school physical facilities should cover the infrastructure requirements of the school system. From the definitions, it can be understood that school physical facilities refer to the buildings, playgrounds and some mobile structures provided and utilized for the purpose of helping education providers, to successfully implement teaching and learning programmes in their schools.

Physical facilities, according to Oshahon (1998) are tangible structures, which serve educational purpose. From the definition, it is obvious that physical facilities are not provided to merely exist but to help in achieving some objectives. Tertiary institutions are established to offer some educational programmes that, among others, include producing highly motivated and quality graduates. All educational programmes of these institutions are expressed by use of relevant facilities. Indeed these physical facilities represent the actual existence of the colleges of education. For effective teaching and learning situation, playground physical facilities and educational goals should be viewed as being closely inter-woven and inter-dependent. They represent a learning environment which has a tremendous impact on the comfort, safety and performances of the learners. In planning for a school, adequate provision should be made for physical facilities so that they operate at the desired level of efficiency.

Maintenance of Physical Facilities

One of the factors paramount for evaluation on the standard or tone of any school, is the examination of its available physical facilities as to whether they are capable of enhancing teaching and learning. This is the major reason why during supervision or important visit to schools, the heads of institutions always ensure that necessary physical facilities are put in place and the physical environment neatly kept. This is necessary because it bears relevance to the availability or the lack thereof of physical facilities. Peretomode (2001) agreed that the school environment must be conducive for meaningful academic programme. The physical appearance of school facilities is the basis upon which the society or community make judgments about the quality of academic programme in school. The condition of the school facilities will determine the extent of patronage available by the users to the school. This is an essential factor because proper care of the school ground and building will be a positive factor in school relations.

Obi (2008) described maintenance as those activities connected with keeping of the buildings, equipment and grounds of the school in such condition of completeness and efficiency, through repairs and replacement that the physical appearance will remain as original. The aesthetic beauty of the college if not maintained will give the impression of a deserted enclave unworthy of teaching and learning.

Mgbodile (2004) observed that physical facilities maintenance involves the effort of the school head in maintaining school buildings, furniture and grounds including fields and lawns. It also includes the beautification and ornamentation of school compound with flowers, hedges, lawns and others. In the same vein, Akilaiya (2001) stated that maintenance of the school refers to keeping the buildings and equipment in as near as their original states as much as possible. He identified three major maintenance services to include:

1. Regular maintenance which is carried out on a periodic basis on a specific school facility.
2. Emergency maintenance, which is usually not planned for, but becomes necessary when there are breakages or spoilt either as a result of disaster; such as storms, or any occurrence causing damage to the facilities.
3. Prevention maintenance, which is carried out to prevent the breakdown of facilities. It is cost effective, but has remained the best way of maintaining physical facilities since prevention is better than cure.

Maintenance of facilities is necessary and it helps to ensure that the environment is clean, attractive and conducive for learning and that the buildings, equipment and facilities are adequately maintained. A healthy and attractive school environment makes for conducive learning and promotes students' pride in their school and their interest to stay in the school. Obi (2001) asserted that:

Maintenance of school physical facilities is very necessary for effective school administration. This is because lack of it brings about poor school environment, poor academic performance of students, general tone of the school will be at its lowest ebb, waste of human and material resources will be most prominent. Wastage of scarce financial resources, improper location of school also becomes rampant; dilapidated building and other structures becomes order of the day (P. 116).

If physical facilities are not adequately maintained everything will be in disarray, but if properly and adequately maintained, the school building and equipment will be as neat as in their original state.

3. METHODOLOGY

The study adopted the descriptive survey research design. A total of number of one hundred and forty-four (144) buildings comprising of fifty-seven (57) in Federal Polytechnic Ado-Ekiti and eighty-seven (87) buildings in Ekiti State University was studied. The population for this study covered the selected 144 building structures in the two institutions, 8,036 students and the 3,041 staff who have adequate knowledge and experience of both maintenance management and condition of buildings in the selected institution and this give a total of 11,074 populations.

A sample of 386 participants was used for this study. The data generated for this study was analyzed with appropriate statistical techniques. The techniques included frequency, percentages and mean score. The hypotheses postulated will be put in null (Ho). All analysis was done using Statistical Package for Social Science (SPSS) version 21. The hypotheses were tested using Pearson Correlation Coefficient, rank correlation coefficient and mean score.

4. DATA PRESENTATION AND ANALYSIS

The table above shows that, of the 386 copies of questionnaires distributed based on the sample size earlier obtained for the study, 343 representing 87% of the total respondents were completed and returned while 43 were not returned nor completed.

The researcher proceeded with the analysis of the data as 87% response rate is regarded as very satisfactory for this study.

1. Assessment of the Effects of Nature of Buildings on Users

To assess the effects of the nature of buildings on users in the selected study institution. The respondents were asked to rank the nature on a likert scale of (5=Highly adequate, 4=Adequate, 3=Inadequate, 2= Grossly Inadequate, 1= Not sure)

The responses to the questions were presented and analyzed in table 4.6

Table 1: Assessment of Nature of Buildings

S/N	Assessment	(5)	(4)	(3)	(2)	(1)	Mean Score	Rank
(a)	Enhances teaching and learning	20	20	50	50	-	2.90	3
(b)	Provide adequate safety and security	15	25	45	55	-	2.80	4
(c)	Natural Lighting Comfort	39	73	28	-	-	4.10	1
(d)	Fitness for purposes	20	20	50	50	-	2.90	3
(e)	Improved quality and efficiency of work	15	25	45	50	-	2.95	2
(f)	Environmental sustainability	20	20	50	50	-	2.90	3
(g)	General accessibility	15	25	45	55	-	2.80	4
(h)	Increased Productivity	20	20	50	50	-	2.90	3
(i)	Artificial Lighting comfort	15	25	45	55	-	2.80	4
(j)	How clean is the building	20	20	40	60	-	2.80	4
(k)	Aesthetics and psychological appeal	13	13	38	63	13	2.50	5

Source: Researchers Field survey 2020

The study enquired about the respondent assessment of effects of the nature of buildings on users. Table 1 reveals that natural lighting comfort is adequate and ranked highest with mean score of 4.10. This shows that, they are adequate provision of doors and windows that threw light in the buildings. Improved quality and efficiency of work is inadequate which ranked second in the list with mean score of 2.95. According to respondents' assessments, enhances teaching and

learning, fitness for purposes, environmental sustainability and increased productivity are inadequate, and they ranked 3rd with mean scores of 2.90 respectively. Provides adequate safety and security, general accessibility, artificial lighting comfort and how clean are the building were considered inadequate by the respondents and they ranked 4th in the list with mean scores of 2.80. It is notable from the list that, aesthetics and psychological appeal ranks least with mean score of 2.50. It can be seen from the table that most of the respondents were of the opinion that the nature of buildings in the studied area were not adequate. This shows that, there is need to intensify the maintenance of buildings in the study organization.

Table 2: Rating of Buildings in Terms of Their Management and Maintenance

S/N	Buildings	(5)	(4)	(3)	(2)	(1)	Mean Score	Rank
1	Lecture theaters	-	20	100	20	-	3.00	3
2	Classroom blocks	15	15	45	65	-	2.60	7
3	Students hostel blocks	20	30	70	20	-	2.80	6
4	libraries	20	70	30	20	-	3.70	1
5	Laboratories	20	30	70	20	-	2.80	6
6	Workshops	20	20	50	50	-	2.90	5
7	Auditoriums	20	30	70	20	-	3.30	2
8	Offices	-	20	95	25	-	2.95	4
9	Cafeteria	20	20	50	50	-	2.90	5
10	Sport Centre	-	20	95	25	-	2.95	4
11	Generator house	20	30	70	20	-	3.30	2
12	Stores	20	20	50	50	-	2.90	5

Source: Researchers Field survey 2020

Respondents Rating of Buildings in Terms of Management and Maintenance

Table 2 shows that libraries are adequate and ranked highest with mean score of 3.70, followed by auditoriums, generator house and lecture theaters with mean scores of 3.30 and 3.00 respectively. Laboratories, according to respondents are inadequate and ranked 6th in the list with mean score of 2.80. Workshops, cafeteria, stores and students hostel are inadequate; they ranked 5th and 6th with mean scores of 2.90 and 2.80 respectively. Classroom blocks ranks least with mean score of 2.60. This shows, that the maintenance staff should be more committed in the management and maintenance of buildings in the selected institutions.

Table 3: Rate of Deterioration of Building Elements/Components

S/N	Building Elements/Components	Variables	No of Responses	Percentages (%)
1	Foundations	(a) High	6	2.00
		(b) Low	-	-
2	Floor slabs and finishes	(a) High	19	15.00
		(b) Low	-	-
3	Walls	(a) High	24	20.00
		(b) Low	-	-
4	Columns	(a) High	9	5.00
		(b) Low	-	-
5	Beams	(a) High	6	2.00
		(b) Low	-	-
6	Doors and Windows	(a) High	19	15.00
		(b) Low	-	-
7	Plumbing fittings	(a) High	19	15.00
		(b) Low	-	-
8	Electrical fittings	(a) High	19	15.00
		(b) Low	-	-
9	Roofs/Ceilings	(a) High	9	5.00
		(b) Low	-	-
10	Painting and Decoration	(a) High	10	6.00
		(b) Low	-	-
Total			140	100

Source: Researchers Field Survey 2020

Respondents Responses on the Rate of Deterioration of Building Elements/Components

On the issue of the rate at which building elements, components deteriorate. Table 3 shows that foundations and beams deteriorate at the rates of 2.00% as pointed out by 10 respondents. Floor slabs and finishes, doors and windows, plumbing and electrical fittings all deteriorate at the rates of 15.00%. 24 respondents representing 20.00% said that walls deteriorate faster than other elements/components. While 10 respondents maintained that painting and decoration deteriorate at the rate of 6.00%. This trend shows that the rate at which building elements/components deteriorate in the study area are increasing. For example, based on the observation and walkthrough conducted by the researcher, revealed that most of the walls have various cracks on them (see plates). Therefore, there is need to intensify periodic inspection and maintenance of buildings in the study institutions.

2. Factors Leading to Maintenance Problems of Buildings

To rank the factors leading to maintenance problems of buildings. The respondents were asked to rank on a likert scale of (5. Strongly agree to 1 = Not sure) the responses to the questions were therefore presented and analysed in table 4.

Table 4: Respondents Opinion on the Factors Leading to Maintenance Problems of Buildings

S/N	Factors	(5)	(4)	(3)	(2)	(1)	Mean Score	Rank
1	Design error	45	60	15	-	20	4.00	3
2	Poor workmanship	45	60	15	-	20	4.00	3
3	Poor selection of materials	50	60	20	-	-	4.00	3
4	Shortage of skilled craftsmen	50	40	-	20	30	3.60	5
5	Inadequate maintenance tools	50	40	-	20	30	3.60	5
6	Lack of training and re-training of maintenance staff	50	65	20	-	5	4.30	2
7	Natural deterioration due to age and environment	45	60	15	-	20	4.00	3
8	Function and use of building	65	55	20	-	-	4.4	1
9	Lack of building maintenance culture	70	30	20	20	-	4.30	2
10	No priority for the use of maintenance plan	50	30	20	-	40	3.40	8
11	Lack of maintenance manual	60	20	20	-	40	3.50	6
12	Absence of practice of building maintenance survey	55	30	20	-	35	3.60	5

S/N	Factors	(5)	(4)	(3)	(2)	(1)	Mean score	Rank
13	Lack of buildability and maintainability analysis	60	20	20	-	40	3.50	6
14	Lack of Computerization of Maintenance Management System (CMMS)	50	20	20	-	50	3.10	9
15	Poor funding and delay in releasing of maintenance funds	70	50	20	-	-	4.40	1
16	Non-incorporation of users needs into design	-	70	40	15	15	3.45	7
17	Lack of preparation of building maintenance model	35	65	-	15	25	3.70	4

Source: Researchers field survey 2020

Opinions on the Factors Leading to Maintenance Problem

Table 4 represents ranking of seventeen (17) significant factors leading to maintenance problems of buildings. The result revealed that function and use of buildings, poor funding and delay in releasing of funds for maintenance are major factors. They ranked first among the factors with mean scores of 4.40, followed by lack of training and retraining of maintenance staff, lack of building maintenance culture with mean scores of 4.30. Design error, poor workmanship, poor selection of materials, natural deterioration due to age and environment all ranked 3rd, with mean scores of 4.00. Lack of preparation of building maintenance model ranks 4th on the list with mean score of 3.70. Ranked 5th among the factors are shortage of skilled craftsmen, inadequate maintenance tools and absence of practice of building maintenance survey with mean score of 3.60%, followed by lack of maintenance manual and lack of buildability and maintainability analysis. They ranked 6th in the list with mean scores of 3.50. Non-incorporation of users need into design ranked 7th with mean score of 3.40. lack of Computerization of Maintenance Management System (CMMS) ranks least with a mean score of 3.10. This implies that computerization of maintenance management system is not a major factor leading to maintenance problems of buildings in the selected institutions.

Hypothesis

H₀: Poor maintenance of physical facilities does not affect academic activities in the study area

The result of the correlation coefficient for the hypothesis, as displayed using SPSS version 20 indicates that the Pearson Product Moment Correlation Coefficient is 0.411 showing that Poor maintenance of physical facilities does affect academic activities in the study area.

Decision Rule: From the computation above, the probability value at 0.011 is less than 0.05 significant level. Therefore, we reject the null hypothesis and accept the alternative hypothesis which states that Poor maintenance of physical facilities does not affect academic activities in the study area.

5. SUMMARY OF FINDINGS AND RECOMMENDATION

Summary of key Findings

(1) The result of the correlation coefficient for the hypothesis, as displayed using SPSS version 21 indicates that the Pearson Product Moment Correlation Coefficient is 0.411 showing that Poor maintenance of physical facilities does affect academic activities in the study area.

(2) The study revealed that the nature and types of buildings in the institution comprised of laboratories, workshops, hostel blocks, lecture theaters, classroom blocks, auditorium, libraries, clinical sciences building, offices and others. It also showed that most of the buildings were not effectively managed and maintained.

(3) The study revealed that, Lack of maintenance culture, poor design and construction, function and use of buildings, wear and tear, fungal/termite attack, poor funding and aging are some of the factors responsible for deterioration of buildings in the institution.

(4) Maintenance department is not part of the design and supervision team at inception and completion of new projects.

(5) The maintenance department does not prepare maintenance manual, survey, buildability and maintainability analysis, maintenance plan and models.

(6) The study revealed that the maintenance staff lacks the necessary commitment in the management and maintenance of buildings in the selected institutions.

Recommendations

Based on the findings of the research, the following recommendations are made as effective and efficient means of improving maintenance of buildings in the study area.

1. It is recommended that foundation for building maintenance culture should be practiced at the grassroots levels, in various family homes, schools, offices, in order to provide the bedrock for our children and youths to appreciate and practice maintenance of basic things found in various homes and schools.

2. There is need to intensify the maintenance of buildings in the study organization. This shows, that the maintenance staff should be more committed in the management and maintenance of buildings in the selected institutions.

Emphasis should be placed on staff training and continuous skills development programmes for maintenance staff, at least to keep up with advancement in technology in the tertiary institutions in Ekiti state.

3. Construct pavements and drainage channels around buildings. Widen and clear blocked existing drainage channels.

4. Provide sufficient and adequate public conveniences, waste disposal dumpsites and incinerators.

5. Appoint qualified and experienced maintenance craftsmen in the institution

6. The maintenance team should be part of the design and construction team of tertiary institutional buildings.

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