Shared Seasoned International Journal of Topical Issues
VOL.12 NO.1, JULY 2024, New York City. ISSN: 2630-7290

FACILITY PLANNING FOR EFFECTIVE TEACHING OF AUTOMOBILE TECHNOLOGY IN TECHNICAL COLLEGES IN AKWA IBOM STATE – NIGERIA

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ABSTRACT

The study determined the facility planning skills for effective teaching of automobile technology in Technical Colleges in Akwa Ibom State. Three specific objectives, three research questions, and three research hypotheses guided the study. Survey research design was adopted for the study. The population of the study consisted 48 Technical Teachers and 66 workshop instructors in nine technical colleges in Akwa Ibom State. The sample size made up of 36 technical teachers and 50 workshop instructors drawn through simple random sampling technique. The researcher – developed instrument called Facility Planning Skills for Effective Teaching Questionnaire was used to collect data for the study. The instrument was validated by three experts in the Faculty of Education, University of Uyo. The reliability of the instrument established with Cranach alpha formula was 0.81. Mean and t-test statistics were used for data analysis. Finding of the study revealed that all the identified physical facility planning skills, maintenance skills, safety skills are required for effective teaching of automobile technology in Technical College in Akwa Ibom State. Besides, no statistically significant difference exists in the mean responses of the technical teachers and workshop instructors on the need for the identified faculty planning skills. It is recommended among others that the identified skills for facility planning should be included in the automobile technology curriculum for Technical Colleges in Akwa Ibom State.

Keywords: Facility, Planning, Skills, Effective Teaching, Automobile Technology, and Technical Colleges

Introduction

Facilities in technical colleges are very essential for the teaching of skills to students. School facilities refer to the educational resources provided in school for teaching and learning purposes. According to Rundell (2009), facilities include building, space, a piece of equipment that are provided at a place for people to use. Facilitates in schools can be defined as the entire school plant which school administrators, teachers and students harness, allocate and utilize for smooth and efficient management of any educational institution, for the main objective of bringing about effective and purposeful teaching and learning experiences (Asiyai, 2012). Facilities in schools are physical resources that facilitate effective teaching and learning. These facilities include classrooms block, laboratories, workshops, libraries, equipment, consumable, electricity, water, visual and audio-visual aids, tables, desks, chairs, storage space, playground and toilets (Akinsolu, 2004). Technical education facilities can be seen as devices developed, designed, procured or acquired to assist technical teachers in tran smitting organized knowledge, skills and attitude to learners within the instructional activities directed towards acquisition of skills.

Technical Colleges in Akwa Ibom State need well equipped workshops and conducive school environments to enable the trainees acquire the relevant saleable skills. These efforts can be achieved through objectively and sound strategic plan. Strategic facility planning is a continuous and systematic process where decisions are made about intended future outcomes, how the outcomes are to be accomplished and how success is measured and evaluated. Strategic facility planning has been used extensively by most organizations to ensure that future outcome can be achieve within a specified time period. The application of strategic planning in an educational environment facilities on institution to play a major role in the national development (Chukwedo and Abiodun, 2014).

The strategic facility planning process according to (Glagda, 2002) can be defined as the process by which a facility management organization envisions its future by linking its purpose to the strategy of the overall organization and the developing goals, objectives and action plans to achieve that future goals.

Facility planning is an activity that determines how tangible fixed assets can best support the activity process. Facility planning most be an on-going activity in any organization or institution that plan to keep abreast of development in its fields; it can increase plant productivity and reduce cost by reducing or eliminating all activities that are unnecessary or wasteful. Besides, the employer may avoid usage conditions and losses in both money and manpower resulting from the industrial shop accident by incorporating vital health and safety measures into the initial face (Usoro, 2018). Usoro, 2018 added that other factors that motivates investment in new facilities or the altering of investment in old facilities which continually under considerations include: fire protection, security and convenient of the handicapped students.

Facility planning encompasses three key outputs; namely, strategic facility plan, master plan and annual facility plan often referred to as approved budget or generally as tactical plan. Strategic facility plan identifies the type, quantity and location of spaces required to fully support the organizations business initiative and should be frames within the organizations vision. The strategic facility plan includes three primary components. These include:

(a) An understanding of the organization's culture and core values,
(b) An analysis of how the existing and new facilities must manifest that culture and core values within the physical space or support for changing;
(c) An indepth analysis of existing facilities.

Facility master plan provides a framework for the physical environment that incorporate the buildings. The development of a master plan start with alternative organizational configurations, often referred to as scenarios, to accommodate the needs that are identified in the strategic plan. Strategic planning skills therefore connotes the needed competencies required for planning as well as effective utilization of facilities for teaching of automobile technology in Technical Colleges.

Teaching and learning in Technical education is meant to prepare individuals to face the world of work effectively and efficiently, with little or no difficulties. This type of education is usually obtained formally at the secondary and tertiary institutions in Nigeria. One of such secondary institutions is the technical college. Technical colleges, according to Nwachuukwu, Bakare and Jika (2011), provide students through training with relevant and adequate knowledge, skills and attitude for employment under the guidance of a teacher in a related occupation. According to Federal Republic of Nigeria (2013), trainees completing technical college programme shall have three options which include; secure employment set their own business to be able to employ others and become self-employed and pursue further education. Strategic planning is one of such skills needed to be acquired for effective utilization of facilities in Technical education.

The importance of facility planning in technical college cannot be underestimated as it is a critical stage producing the nations craftmen and advanced craftmen. Some of the objectives of facility planning may include: helping in achieving the programme goals and objective, for effective utilization of people, equipment, materials, space and energy, to minimize capital investment, even as the programme progresses, to provide safely, job satisfaction and conducive environment and to establish quality control. Effective facilities are necessary in Technical Colleges in Nigeria.

In any form of planning, there are procedures to follow to the predetermined goals, thus, it is important to adopt appropriate procedures or methods for effective facilities planning. As suggested by Ezeji (2005), the procedures for planning industrial arts facilities include; establishment of a local industrial arts committee, the composition of the committee is determined by the local situation and the estimated size of the programme to be developed and the committee should include primarily industrial arts teachers, the local supervisors and state or university consultant. In addition, the committee should provided with reference materials such as accreditation standard, evaluation criteria, outline for preparing educational specifications, and estimate of construction funds. The procedure also involves the establishment of a schedule for committee meetings and the completion of its tasks and charging the committee to write and submit the educational programme and facility specifications for the programme.

Adequate knowledge of facility planning is deemed necessary for effective utilization in technical education instruction in schools. Some of the strategic planning skills include physical facility skills, maintenance skills and safety skills among others. According to (Osama, 2010). A safety practice skill is an important component of strategic planning skills for effective utilization of facilities. Safety practice skills help to reduce accidents in the workplace when it is properly carried out by the students and other users as well as make the machines and tools to be more effective and durable. Accident and damages of facilities can be prevented through prompt and regular observation of precautionary measures in addition to adequate compliance with rules. Okrie (2011) defined skill as a manual dexterity through repetitive performance of an operation. Some of these safety skills include protecting hands with gloves and wearing safety shoes when carrying out operation with tools and machines stopping power tools or machines before cleaning or making adjustments, switching off the power machine and tool after operation.

Maintenance skills are also required for effective utilization of facilities for automobile instructions. Maintenance, according to Osama (2010) is the total participation in addition to maximizing equipment effectiveness. Willmott (2011) viewed maintenance as an operation adopted to engender a company's wide approach towards achieving a standard of performance in manufacturing in terms of overall effectiveness of equipment, machines and processes. Some of the maintenance skills include changing of oil in machines, replacement of worn-out parts, better housing of facilities, adhering to manufacture's instruction among others. The idea behind the maintenance of facilities is to make the parts and machines ready to perform optimally and to the required work within the time frame without or with less wastage. The need for good maintenance strategy become bigger in the present time because of the adoption of automation and large scale mechanization, high plant availability, to obtain better product quality and long life-span of the equipment. According to Ebong (2009), maintenance of science and technical workshop equipment in schools and colleges can be categorized under routine maintenance. Preventive maintenance and corrective maintenance. As a matter of fact, the enforcement of maintenance strategies by technical teachers and on students would in no small measure enhance accident prevention. It is necessary therefore that safety rules and regulations in storage, use and care of materials are taught to students.

Facilities planning determine how an activities tangible fixed assets best support achieving the activities objectives. This includes activities such as facilities location, facilities design, facilities layout or plan layout. According to Lowa State University (2010), facilities planning is responsible for managing changes to an institution's facilities to enable the institution's department to meet its mission and goals. The effort includes all the project activities to bring about improvements to existing space and to construct new building, including pre-planning analysis, building programming, design and construction. Ezeji (2005) stated that true facilities planning must identify the programme philosophy, specific objectives, teacher and pupil activities, enrollments to be served, physical layout. Financial resources, course context and laboratory equipment before these are convection into graphic form.

As reviewed so far, it is obvious that there is need for effective and efficient facilities planning in automobile technology with emphasis on technical colleges technology. It reveals that individuals who are involved in facilities planning should acquired some specific skills in physical facilities planning, safety and maintenance. The planning process usually undergo by government alone should be discouraged so that the primary users of these facilities have significant impact in contribution to planning processes, especially in workshop facilities.

Statement of the Problem

Technical Colleges in Akwa Ibom State, despite being equipped with facilities for technical education programmes including automobile technology are faced with significant challenges in effectively utilizing and maintaining these facilities due to lack of skills in planning and utilization. This has resulted in underutilization, deterioration and malfunctioning of the facilities, ultimately hindering the effective teaching and learning of automobile technology. The teaching of automobile technology in Technical Colleges in Akwa Ibom State seems to be ineffective due to inadequate facilities, outdated equipment and insufficient resources, stemming from a lack of effective facilities planning strategies. This deficiency hinders the quality of instruction and students' learning outcomes. It is against this

backdrop that this study was conducted to determine the facility planning skills required for effective teaching of automobile technology in technical colleges in Akwa Ibom State.

Purpose of the Study

The main purpose of the study was to determine the facility planning skills required for effective teaching of automobile technology in Technical Colleges in Akwa Ibom State.

Specifically, the study sought to:

1. Determine the physical facility planning skills required for effective teaching of automobile technology in technical colleges.
2. Determines the maintenance facility planning skills required for effective teaching of automobile technology in technical colleges.
3. Determine the safety facility planning skills required for effective teaching of automobile technology in technical colleges.

Research Questions

1. What are the physical facility planning skills required for effective teaching of automobile technology in technical colleges?
2. What are the maintenance facility planning skills required for effective teaching of automobile technology in technical colleges?
3. What are the safety facility planning skills required for effective teaching of automobile technology in technical colleges?

Research Hypotheses

1. There is no significant difference in the mean responses of technical teachers and workshop instructors on the physical facility planning skills required for effective teaching of automobile technology in technical colleges.
2. There is no significant difference in the mean responses of technical teachers and workshop instructors on the maintenance facility planning skills required for effective teaching of automobile technology in technical colleges
3. There is no significant difference in the mean responses of technical teachers and workshop instructors on the safety facility planning skills required for effective teaching of automobile technology in technical colleges.

Research Method

Research Design

The study employed a survey research design. This is suitable because it sought the opinion of the representatives of the entire population on the skills required in facility planning so as to generalize the findings to all the technical teachers in Akwa Ibom State.

Area of the Study

The area of the study was Akwa Ibom State. Akwa Ibom State is in the coastal region of the south-south geopolitical zone of Nigeria; precisely, the Niger-Delta Area of Nigeria.

Population of the Study

The population of the study consisted of 114 respondents, comprising 48 technical teachers and 66 workshop instructors from all the nine Technical Colleges in Akwa Ibom State.

Sample and Sampling Technique

The sample size for the study comprised 86 respondents, made up of 36 technical teachers and 50 workshop instructors from the nine Technical Colleges in Akwa Ibom State. The sample was selected using simple random sampling technique.

Instrumentation

The researcher – developed instruments called, "Facility Planning Skills for Effective Teaching Questionnaire (FPSETQ) was used to collect data for the study. The questionnaire was a five point scaled instrument of very highly required (VHR), highly required (HR) moderately required (MR), less required (LR) and not required (NR) and the scales were rated 5,4,3 2 and 1 respectively.

Validation of the Instrument

The instrument was validated by three experts two from Automobile Technology unit of Industrial Technology Department and one from Test and measurement unit of Department of Educational Foundations, Faculty of Education, University of Uyo. The inputs and corrections made were used in the modification of the instrument.

Reliability of the Instrument

Data was obtained from 30 respondents, who were not part of the study and Cronbach's Alpha method was used to determine the reliability of the instrument. A coefficient of 0.81 was obtained, which indicated the suitability of the instrument.

Method of Data Analysis

Mean and t-test statistics were used in answering research questions and testing hypotheses respectively.

Result / Discussion

Research Question

What are the physical Facility Planning Skills required for Effective Teaching of Automobile Technology in Technical Colleges in Akwa Ibom State?

Tables 1: Mean Rating of the Physical Facility Planning Skills required of the Technical Automobile Technology Teachers

S/N	Items of Physical Planning Skills	Mean $\bar{X}$	SD	Remarks
1	Determine the building sizes and shapes.	4.15	1.13	Highly Required
2	Estimate the number of furniture needed.	4.03	.86	Highly Required
3	Determine the materials, tools and equipment required.	4.10	.98	Highly Required
4	Identify the storage facilities needed in the workshop.	4.05	.84	Highly Required
5	Plan the site for building the school workshop.	3.61	.72	Highly Required
6	Prepare office specification for staff	3.48	1.28	Moderately Required
7	Design the structure of the school workshop.	2.42	1.14	Less Required
8	Prepare tools/equipment specifications for the workshop.	4.17	.94	Highly Required
9	Prepare guidelines for assessing availability of facilities.	4.11	.73	Highly Required
10	Make projection of facilities for handicapped students.	3.68	.89	Highly Required
11	Categorize the equipment by auxiliary space.	4.12	.97	Highly Required
12	Make update for facilities to keep abreast of development.	3.50	.81	Highly Required

Data analysis in table 1 reveals the mean values of the physical facilities planning skills required of the Automobile Technology teachers. The mean values ranging from 3.50 to 4.17 shows that ten of the

items of the identified skills are highly required (HR) of the automobile technology teachers while one item with the mean value of 3.48 is moderately required the one with the mean value of 2.42 is less required. The results show that these skill are needed for effective teaching of automobile technology in Technical Colleges.

Research Question 2

What are the maintenance facility planning skills required for effective teaching of automobile technology in Technical Colleges in Akwa Ibom State?

Tables 2: Mean Rating of the maintenance facility planning skills required of the Technical Automobile Technology Teachers

S/N	Items of Maintenance Facility Planning Skills	Mean $\bar{X}$	SD	Remarks
1	Carryout preventive maintenance practices	4.02	0.84	Highly Required
2	Predict equipment failure in the workshop	4.15	1.12	Highly Required
3	Replacing faulty equipment/parts	4.08	0.93	Highly Required
4	Renovate existing facilities regularly	3.98	1.14	Highly Required
5	Lubricate moving parts of machines	4.10	0.88	Highly Required
6	Change oil regularly	3.89	0.97	Highly Required
7	Check facilities periodically	4.13	0.85	Highly Required
8	Replace safety guards when necessary	3.98	1.21	Highly Required
9	Attending to emergency repairs	3.84	1.01	Highly Required
10	Maintain the hydraulic system well	4.01	0.96	Highly Required

Table 2 shows the mean value of 3.84 and above regarding maintenance facility planning skills required for effective teaching of automobile technology. The result indicates that the skill are required for maintenance of facilities in automobile technology workshop.

Research Question 3

What are the safety facility planning skills required for effective teaching of automobile technology in Technical College in Akwa ibom State?

Tables 3: Mean Rating of the Safety Facility Planning Skills required of the Technical Automobile Technology Teachers

S/N	Items of Safety Planning Skills	Mean $\bar{X}$	SD	Remarks
1	Keep the workshop clean and tidy.	4.20	1.10	Highly Required
2	Wear protective equipment in the workshop.	4.18	0.92	Highly Required
3	Select the right tools for a job	4.23	0.82	Highly Required
4	Use insulated hand tools for any electrical work.	4.10	0.84	Highly Required
5	Keep the body away from the rotating parts of the machine.	4.04	0.83	Highly Required
6	Switch off the socket outlet before machine connected.	3.98	1.11	Highly Required
7	Disconnect machine immediately the work is done.	3.90	0.92	Highly Required
8	Give a tool to a colleague through the handle.	3.91	0.88	Highly Required
9	Never adjust any machine while running.	4.15	0.73	Highly Required
10	Roll up loose sleeves before operating powers machine.	4.03	0.92	Highly Required

Table 3 shows that the mean score values of 3.90 and above regarding safety facility planning skills required for effective teaching of automobile Technology. All the identified safety skills are highly required for the teaching automobile technology in Technical Colleges in Akwa Ibom State.

Tables 4: Mean analysis of responses of Technical teachers and workshop Instructors on physical facility planning skills

Variables	n	$\bar{X}$	SD	df	Tcal	Tcri	Decision
Technical Teachers	48	36.81	9.91				
				112	1.02	1.96	NS
Workshop instructors	66	33.94	10.78				

NS = Not significant at 0.05 alpha level

Data analysis in table 4 reveals that the calculated t-value of 1.02 is less than the critical t-value of 1.96 at degree of freedom of 112 and 0.05 level of significance, hence, the null hypothesis accepted. Therefore, there is no significant difference in the mean responses of technical teachers and workshop instructors on the physical facility planning skill for effective teaching of automobile technology in Technical Colleges.

Research Hypothesis 2: There is no significant difference in the mean responses of technical teachers and workshop instructors on the maintenance facility planning skills for effective teaching of automobile technology in Technical Colleges.

Tables 5: Mean analysis of responses of Technical teachers and workshop instructors on maintenance facility planning skills

Variables	n	$\bar{X}$	SD	df	Tcal	Tcri	Decision
Technical Teachers	48	37.18	12.81				
				112	1.64	1.96	NS
Workshop instructors	66	35.08	13.54				

NS = Not significant at 0.05 alpha level

Data analysis in table 5 indicates that the calculated t-value of 1.04 is less than the critical t-value of 1.96 at df of 112 and at 0.05 level of significance. Hence, the null hypothesis is accepted. Therefore, there is no significant difference in the mean responses of technical teachers and workshop instructors on the maintenance of facility planning skills for effective teaching of automobile technology in Technical Colleges.

Research Hypothesis 6: There is no significant difference in the mean responses of technical teachers and workshop instructors on the safety facility planning skills for effective teaching of automobile technology in Technical Colleges.

Tables 6: Mean analysis of responses of Technical teachers and workshop instructors on safety facility planning skills

Variables	n	$\bar{X}$	SD	df	Tcal	Tcri	Decision
Technical Teachers	48	43.18	6.27				
				112	1.68	1.96	NS
Workshop instructors	66	41.06	9.46				

NS = Not significant at 0.05 alpha level

Data analysis in table 6 shows that the calculated t-value of 1.68 is less than the critical t-value of 1.96 at df of 114 and 0.05 level of significance. Hence, the null hypothesis is maintained. Therefore, there is no significant difference in the mean responses of technical teachers and workshop instructors on the safety facility planning skill for effective teaching of automobile technology in Technical Colleges.

Discussion of Findings

The result in table 1, showed all the items that were required highly moderately and lowly for effective teaching of automobile technology. The mean responses of the technical teachers and workshop instructors were not statistically significant. The findings of the study go in line with the work of Chukwuedo and Abiodan (2014) that it is required of the teachers in one level or the other to project the number of workshops and classes, select the required workshop furniture, project facilities for the handicap and prepare guideline for assessing facilities availability.

The results in table 2, revealed that all the items were highly required for effective teaching of automobile technology. In support of the findings, Osama (2010) observed that the total productive maintenance is very necessary for the overall facilities. Table 3 results indicated that all the items identified were significant for strategic facility safety skills. The findings agree with that of Osama (2010) that safety practice skill keep to reduce accident in the workplace when it is properly carried out by the students and other users, as well as make the machines and tools to be more effective and durable.

Conclusion

Facility planning is a critical phase in the development process of technical education. Facilities are very necessary for the teaching of skills in automobile technology to students. Without facility planning, technical education is not likely to have a stable foundation for pursuing and attaining its goals and objectives.

Facility planning skills such as physical facility planning skills, maintenance planning skills and safety planning skills are highly needed for the teaching of automobile technology. The possession of these skills by automobile technology students would increase their knowledge in the skill areas and subsequently reduce manpower shortages and inadequate skills.

Recommendations

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

1. Seminars and workshops on facility planning should be organized by the state government to update the knowledge of technical teachers.
2. Curriculum experts should include all the identified facility planning skills in the automobile technology curriculum.
3. Government should provide adequate facilities and equipment for the teaching of automobile technology in Technical Colleges.

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