

REQUISITE FOR WORKSHOP EQUIPMENT AND MATERIALS MANAGEMENT IN TECHNOLOGY EDUCATION WORKSHOPS IN HIGHER INSTITUTION OF LEARNING IN MINNA METROPOLIS, NIGER STATE

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Abstract

The study determined workshop equipment and materials management in technology education workshops of higher institution of learning in Minna metropolis, Niger state. The study covered Federal University of Technology, Minna and Niger State College of Education, Minna, Niger State. Three research questions and one Null Hypothesis guided the study. The study adopted the survey research design and a population of 7 tool store keepers and 4 technologists were used for the study. There was no sampling since the population wasn't much. Management of workshop equipment and materials questionnaires (MWEAMO), interview and checklist were utilized for data collection. Data collected were analyzed using mean and standard deviation. The result of analysis revealed that tool store keepers and technologists exhibit management practice such as stocking, storage, ordering and safety in technology education workshops. Recommendations made in the paper include non- governmental organizations and donor agencies should assist schools in the provision of modern facilities needed in technology education workshops and government should provide funds for purchase and maintenance of equipment in technology education workshops in the institutions mentioned above since some of the equipment are obsolete.

Keywords: Workshop, Equipment, Materials, Management.

Introduction

The needs for management of technology education institutions facilities cannot be over emphasized. These facilities consist of building, equipment and materials. Others include furniture and toilet facilities, lighting, acoustics, storage facilities and packing lot. It is disgusting to say that equipment and materials in the workshops are not properly managed. Technology teachers have theoretical knowledge with less practical skills for teaching technology trades and subjects as compared to teachers in advanced countries (Erickson & Curl, 2002). This indicates that technology teachers do not use technical workshop for activities with the available equipment, apparatus and materials.

Technology education institutions facilities management is the application of technical and scientific method in planning, organizing, decision making, coordination and controlling the physical environment of learning for the actualization of the educational goals and objectives. This involves among other things, collective decision making in relation to renovation and modernization of old plant, provision of equipment for academic and non-academic activities, maintenance of all facilities and review of management practice and processes. Therefore, proper management of equipment and materials in the workshop becomes essential especially in technology education so that students can have access to machines, tools and materials when needed to practice and acquire the needed skills towards the development of the nation. Hence, effective and efficient management of workshop equipment and materials in technology education institutions should be given adequate attention so that the products (students) will be useful to themselves and the society at large. According to Ugonobo (2008), workshop activities entails learning with understanding and at the same time engage in a process of constructing items. Hence, the availability of resources has no value for academic objectives until they are actually utilized in workshop activities. According to Okek and Adeboye (2007), the objectives of utilizing technical workshop resources in the technology education institutions include.

1. To stimulate and sustain learners interests
2. To encourage active participation of the learners.
3. To facilitate assimilation of facts.
4. To enhance understanding of technical lessons.
5. For recall stored information.
6. To expose students to opportunity for acquisition of technical skills.

The achievement of the above objectives requires that management of technical workshop become very crucial in our technology education institutions. Akubue (2010) noted that if the resource management is ineffective, the relationship between added resources and outcome is unclear. Workshop management is regarded as those complex activities that involve planning, organizing, directing and coordinating human and material resources of technical workshop in a conducive manner to technical investigations (Fagbemi, 2006). Fagbemi further opined that the common fault in teaching and learning is as a result of insufficient workshop materials. Fagbemi (2006) also reported that there is a diminishing use of technical workshop and teachers now use the conventional classroom for teaching theory and practical activities. However, in most workshops where the materials are adequately provided, its proper management is not guaranteed. Ezendu (2010) viewed management as effective utilization and coordination of resources such as capital, plant, materials and labour to achieve defined objectives with maximum efficiency. Management is also the process of reaching organizational goals by working with people and organizational resources. Peters (2008) viewed management of resources as the process of setting and achieving goals through the execution of five management functions namely planning, organizing, staffing, directing and controlling as well as utilization of human, financial and material resources. Management according to Adeboye (2007), Akubue (2010) and Ugonabo (2008) entailed organizing, planning, designing, arranging, setting, remodeling and innovating. These functions however, is lacking in our technology education workshops. This invariably has affected students' performance not only in examinations but also in the application of theoretical knowledge to practical task.

Management of workshop equipment and materials in technology education workshops in higher institution of learning is concerned with ensuring that available equipment and materials are properly organized and utilized to achieve educational objectives in technical subjects. However, many research studies were conducted to investigate the effectiveness of technical workshops with reference to the students' achievement. Facilities management is a process that makes sure buildings and other technical systems support the operations of an organization. The International Facilities Management Association (2011) described facilities management as the practice of co-ordination of the physical workplace with the people and the work of the organization. It integrates the principles of administration, architecture, behavioural science and technology. Over the years, teaching of technical subjects has changed due to societal needs and issues. Most of these changes demand effective inquiry/problem solving which is resourced based. An effective management of workshop equipment and materials connotes the form of workshop management which ensures that the objectives of technology education are achieved. In other words, the workshop management practices should ensure that the students are equipped to live effectively in our modern age of science and technology.

Purpose of the Study

The purpose of the study is to determine workshop equipment and materials management in technology education workshops in higher institution of learning in Minna metropolis, Niger State. Specifically, the study determines:

1. The extent tool store keepers and technologists exhibit the management practice in ordering equipment for workshops.
2. The factors that influence the management of workshop equipment and materials.
3. The possible strategies for enhancing the management of workshop equipment and materials.

Research Questions

The following research question posed guided the study

1. To what extent do tool store keepers and technologists exhibit the management practice in ordering equipment for workshops?
2. What are the factors that influence the management of workshop equipment and materials?
3. What are the possible strategies for enhancing the management of workshop equipment and materials?

Hypothesis

There is no significant difference in the mean responses between the tool store keepers and technologists on factors that influence the management of equipment and materials for workshops.

Methodology

The descriptive survey research design was adopted for this study. The study was carried out in Minna metropolis using Federal University of Technology, Minna and Niger State College of Education, Minna. The population of the study comprised of all the tool store keepers and technologists involved in the management of technology education workshops. The population was seven (7) tool store keepers and four (4) technologists, giving a total population of eleven (11). Two instruments were used for data collection. The first instrument for data collection was management of technical workshop equipment and materials. The second was a checklist developed by the researchers to collect information directly from the technology education workshops of the two higher institutions. The checklist indicated the availability or non – availability of technical workshop equipment and materials in the workshops. The internal consistency of the instrument was determined using Cronbach Alpha formula. The reliability co-efficient was found to be 0.86.

The researchers distributed the questionnaires to the respondents with the help of a research assistant. The data obtained from the respondents were used to answer research questions. Mean and standard deviation were used to answer research questions while chi-square statistics was used to test the hypothesis at 0.05 level of significance. Any item with a mean score of 2.50 and above was considered as acceptance while those below the mean score of 2.50 were rejected.

Results

Research question 1:

To what extent do tool store keepers and technologists exhibit management practices in ordering equipment and material for workshop?

Table 1 mean and standard deviation of tool store keepers and technologies' management practices for ordering equipment and materials for workshops? N=11

S/N	Items Statement	Tool Store Keepers		Decision	Technologists		Decision
		Mean	Std. dev		Mean	Std. dev	
1	Relate what is being ordered to the relevance of workshop.	2.98	0.85	High extent	2.80	0.77	High extent
2	Obtain quotation of items to form more than one supplier	3.05	0.94	High extent	2.41	0.86	High extent
3	Ensure priority placement on items that are being ordered	2.93	0.92	High extent	2.41	0.86	Low extent
4	Give the supplier enough time to supply the item	2.95	0.91	High extent	2.63	1.01	High extent
5	Consider the overall quality of items before ordering	2.96	0.86	High extent	2.68	1.00	High extent
6	Ensure that items are functional and structurally correct as ordered	3.26	0.78	High extent	2.77	1.05	High extent
7	Make sure that the cost of items ordered are received by qualified technical teachers for proper checking	2.94	1.02	High extent	2.61	0.86	High extent
8	Ensure that the items are needed for the students' use	3.17	0.92	High extent	2.62	0.80	High extent
9	Make sure that he cost of items are related to its quality.	3.00	0.93	High extent	2.40	0.96	Low extent
		3.03	0.90	High extent	2.64	0.91	High extent

The result presented in table 1 reveals management practices exhibited by tool store keepers and technologists in ordering for equipment and materials for workshops. The mean score for tool store keepers range from 2.93-3.17 and technologists range from 2.40-2.80. Although, on items 3 and 9 technologists mean score are below the mean of 2.50 and considered low extent.

Research Question

What are the factors that influence the workshop equipment and materials management?

Table 2:
Mean and standard deviation of tool store keepers and technologists on the factors that influence workshop equipment and materials management.

S/N	Items statement	Tool Store Keepers			Technologists		
		Mean	SD Dev.	Decision	Mean	SD Dev.	Decision
1	Over populated classes	3.13	0.93	Accepted	3.03	0.88	Accepted
2.	Lack of fund	3.56	0.82	Accepted	3.42	0.76	Accepted
3	Lack of infrastructure for keeping tools and materials.	3.54	0.82	Accepted	3.29	0.71	Accepted
4	Inadequacy of quality and quantity of workshop equipment/materials	3.33	0.84	Accepted	3.29	0.64	Accepted
5	Short time period for technical classes	3.21	0.97	Accepted	3.03	0.76	Accepted
6	Carelessness of workshop users	3.02	1.02	Accepted	3.00	0.72	Accepted
7	Too many courses to teach by teachers	2.92	1.06	Accepted	2.92	0.95	Accepted
8	No separate time for practical	3.17	0.97	Accepted	2.92	0.95	Accepted
9	Excessive use of available resources by staff	3.06	1.01	Accepted	2.89	0.84	Accepted
10	Inadequate number of workshop assistances/technologists.	3.17	0.99	Accepted	2.92	0.88	Accepted
11	Unqualified or in -experienced workshop assistant/technologist	3.03	0.96	Accepted	3.06	0.83	Accepted
12	Inferior instructional materials	3.01	0.96	Accepted	2.92	0.88	Accepted
13	Strenuous workshop rules and regulations	2.69	1.03	Accepted	2.76	0.83	Accepted
14	Lack of space and well ventilated workshop	2.94	0.99	Accepted	2.89	0.79	Accepted
15	Lack of storage facilities	3.01	1.02	Accepted	3.19	0.76	Accepted
16	Lack of security services	2.96	1.03	Accepted	3.02	0.78	Accepted
Cluster Mean		3.12		Accepted	3.04		Accepted

Table 2 indicates that all the factors enumerated influence the management of workshop equipment and materials based on the mean ratings of tool store keepers and technologists. However, tool store keepers had higher cluster mean when compared to technologists.

Research Question

What are the possible strategies for enhancing the management of workshop equipment and materials?

Table 3:

Mean and standard deviation of tool store keepers and technologists on the strategies for enhancing the management of workshop equipment and materials. N = 11

S/N	Items statement	Tool Store Keepers			Technologists		
		Mean	SD Dev.	Decision	Mean	SD Dev.	Decision
1	Constant cleaning of used equipment	3.63	0.72	Accepted	3.07	0.80	Accepted
2.	Appropriate storage of used materials	3.62	0.69	Accepted	3.02	0.72	Accepted
3	Proper handling of workshop materials	3.65	0.63	Accepted	3.18	0.73	Accepted
4	Prompt repair of faulty machines/tools and materials.	3.61	0.72	Accepted	3.18	0.92	Accepted
5	Being safety cautious in the workshop.	3.49	0.78	Accepted	2.90	1.03	Accepted
6	Improvisation of materials	3.11	0.94	Accepted	2.83	0.99	Accepted
7	Replacement/repair of damage workshop materials.	3.55	0.71	Accepted	3.02	0.70	Accepted
8	Constant monitoring of use of materials.	3.33	0.77	Accepted	3.11	0.87	Accepted
9	Proper documentation of workshop materials	3.45	0.73	Accepted	2.97	0.80	Accepted
10	Training of staff and students	3.59	0.64	Accepted	3.17	0.96	Accepted
11	Organizing student during practical.	3.49	0.76	Accepted	3.01	0.79	Accepted
12	Providing accurate record of workshop resources.	3.40	0.78	Accepted	3.06	0.68	Accepted
13	Prompt supervision of students during practical.	3.63	0.61	Accepted	3.98	0.64	Accepted
14	Evaluating human/material resources in the workshop.	3.37	0.70	Accepted	2.88	0.73	Accepted
15	Provision of fund for workshop equipment and materials.	3.48	0.70	Accepted	2.93	0.97	Accepted
16	Reduction of work load for technicians/technologists	3.29	0.83	Accepted	2.80	0.88	Accepted
17	Increasing the time for workshop practice.	3.27	0.92	Accepted	2.84	0.81	Accepted
18	Organising workshop on management of technical workshops.	3.50	0.73	Accepted	2.99	0.86	Accepted
19	Provision of adequate workshop space	3.59	0.61	Accepted	2.81	0.94	Accepted
Cluster Mean		3.48		Accepted	2.99		Accepted

The result presented in table 3 shows that all the items mentioned are the strategies for enhancing the management practice of workshop equipment and materials as rated by the tool store keepers and technologists. However, tool store keepers had a cluster mean of 3.48 while technologists had a cluster mean of 2.99. Tool store keepers and technologists mean rating are satisfactory since their mean scores are greater than the weighted mean of 2.50.

Hypothesis

There is no significant difference in the mean responses between tool store keepers and technologists on the factors that influence management of workshop equipment and materials.

Table 4:
Summary of t-test on factors that influence management of workshop equipment and materials

\bar{X}_1	SD ₁	\bar{X}_2	SD ₂	df	t-cal	t-cri
3.12	0.92	3.04	0.75	9	0.87	1.83

Key: \bar{X}_1 = Tool store keepers; \bar{X}_2 = Technologists
 N_1 = Number of tool store keeper 7; N_2 = Number of technologists =4; level of significance
 $P < 0.05$

From the result in table 4, the t-calculated is less than t-table value which means there is no significant difference. The null hypothesis was accepted. this means there is no significant difference in the mean responses between tool store keepers and technologists on factors influencing management of workshop equipment and materials.

Discussion of Findings

The findings of the study shows that over populated classes, lack of funds, lack of infrastructure, inadequacy of quantity and quality of workshop equipment and materials, short – time/periods for technical classes, carelessness of workshop users, too many courses to teach/learn by staff and students, no separate time for workshop practice; excessive use of available staff and students, excessive use of available staff and resources, inadequate number of workshop assistants and technologists, unqualified and inexperienced workshop assistant, inferior instructional material, strenuous workshop rules and regulations, lack of space and well ventilated workshop, lack of storage facilities and security services are factors that influence management of workshop equipment and materials. The findings are inline with the study of Ejiekome (2010) which discovered that in Lagos State most facilities in the school are in the state of despair, no ventilation in classrooms and some building are poorly structured, rainstorms and wind destroyed available school facilities. The findings of this study also showed that the tool store keepers and technologists had cluster mean of 3. 48 and 2.91 in the strategies that will enhance the management practice of workshop equipment and materials. On this issue, tool store keepers had a slight higher cluster mean than the technologists. Furthermore, the study shows that constant cleaning of used equipment, appropriate storage of materials, proper handling of workshop materials, prompt repair of machine, tools/materials, being safety cautious in the workshop, improvisation of materials, replacement and repair of damaged workshop materials, constant monitoring of use of materials, proper documentation of workshop materials, training of staff and students, organizing students during workshop resources, providing accurate record of workshop resources, prompt supervision of students, evaluating human/material resources, adequate provision of fund for the provision of workshop equipment and materials, reduction of workload of technicians/technologists, increasing the time for practice, organizing workshop on management of workshop and equipment and provision of adequate workshop space are the strategies for enhancing the management practice of workshop equipment and materials as rated by technicians/technologists. These findings agree with that of Ejiekame (2010) in his survey of the management and practice of workshop facilities in Enugu State. The study revealed that schools in Enugu state encountered problems in the management practice of school facilities by way of shortage of funds, absence of storage facilities and lack of qualified technical personnel.

The findings of this study show the mean responses of tool store keepers and technologists on the extent of exhibiting management practices in ordering equipment and material for workshop .Tool store keepers and technologists cluster mean are satisfactory to a large extent that available resources will help in achieving the objectives of technology education. This finding is in agreement with the study conducted by Okeke (2011) who found out that there is a significant relationship between adequacies of laboratory equipment and students' academic achievement in science subjects. The finding also agrees with Ugonabo (2008) and Mogbo (2008) who reported a significant correlation of workshop equipment on the academic achievement of students in metalwork. However, the present studies have proven that available workshop resources will help in achieving the objectives of technology education. These objectives will only manifest in academic achievement of technology education students.

Conclusion

On the basis of the data analyzed in this study, it was concluded that tool store keepers and technologists exhibit management practices of ordering, stocking, storage and safety in managing workshop equipment and materials. It was disclosed that tool store keepers and technologists agreed that all the factors mentioned influenced the management of workshop equipment and materials. Tool store keepers and technologists are in concomitant with the items listed as strategies for enhancing management of workshop equipment and materials. Availability of workshop resources helps in the achievement of objective of technology education as indicated by tool store keepers and technologists.

Recommendations

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

1. The management of technology education workshops in higher institution of learning in Minna metropolis should train and retrain workshop personnel such as tool store keepers and technologists since some of them lack the skill in managing this modern equipment. This will ensure quality control and management practice of workshop equipment and materials in technology education workshops.
2. The management of technology education institutions in Minna metropolis should endeavour to provide adequate funds for purchase and maintenance of equipment in the workshops since some of the equipment are obsolete.
3. Non – government organizations and donor agencies should assist technology education institutions in Minna metropolis in providing modern ICT facilities needed in the workshops for adequate teaching and learning of technical subjects.

References

- Adeboye, F. O. (2007). An investigation into the extent of school facilities in secondary schools in Epe Local Government of Lagos State. Unpublished M. Ed Thesis, university of Ilorin, Nigeria.
- Akubue, A. U (2009). Practical measures for the administration of quality science. *International Journal of Educational Research*. 2.23-49.
- Akubue, A. U. (2010). *Classroom organization and management*. Ibadan Wisdom Publishers.
- Ejiekeme, C. N (2010). Evaluation of physical and material resources management by secondary school principals in Onitsha Education Zone. Unpublished M. Ed Thesis, Faculty of Education, University of Nigeria.
- Peters, G. (2008). *The practice of management*. New York: Harper and Row.
- Erickson, G. & Curl, D. (2002). *Fundamentals of teaching with audiovisual technology*. New York: Macmillan Books.
- Ezendu, F. O. (2010). The use of local materials in the teaching of Chemistry. Paper presented at the 4th Annual Conference of the science Teachers Association of Nigeria held at Benin City, 17th June, 2010.
- Fagbemi, K. A. (2006) Technical education towards improved performance of automobile technology training in Nigeria, *Journal of Science, Technology and Mathematics Education*, 1, 122.
- Federal Government of Nigeria (2004) *National Policy on Education* (4th Edition) Lagos. NERC Press.
- Harris, G. A. (2011). Factors militating against the effectiveness of teacher education in Cross River State. An unpublished B. Sc. Thesis. University of Lagos, Lagos.
- Mogbo, M. I. (2008): Formative evaluation. A model for instructional material development and Revision. *Journal of Industrial Teacher Education*. 18(3) 2 – 13.

Okeke, A. and Adebayo S. (2007) *Principle of development, selection, evaluation, storage and retrieval of instructional materials*. Nigeria University Trust Publishers.

Okeke, S. S. (2007) Factors affecting the teaching and learning of introductory Technology in secondary schools in Kogi State. Unpublished Thesis: Department of Vocational Teacher Education, University of Nigeria, Nsukka.

Okeke, T. (2011) Factors affecting the tendency in the teaching profession as perceived by Graduate teachers. *The Journal of Nigeria Educational Research Association*, 61 (2). 39.

Ugonabo, C. U. (2008) Emerging issues and problems of vocational technical education. *National Vocational Association Journal* 3, (3), 12.