



SKILLS NEEDED BY OTM EDUCATORS FOR THE MAINTENANCE OF OFFICE MACHINES IN POLYTECHNICS IN OGUN STATE

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Abstract

This study explored skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. Three research questions were raised and three null hypotheses were tested for the study. Descriptive survey research design was adopted. The entire population of 53 OTM educators in the four public polytechnics in Ogun State were studied without sampling. A validated five point rating scale questionnaire containing 26 items was used for data collection. Cronbach alpha was used to obtain reliability coefficients of 0.86, 0.77 and 0.71 for the different clusters with an overall coefficient of 0.78. The instrument was administered to the respondents with the help of four research assistants. Mean and standard deviation were used to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. Findings of the study revealed that preventive, corrective and predictive skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on preventive, corrective and predictive skills needed for the maintenance of office machines based on years of teaching experience. The study concluded that preventive, corrective and predictive skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. The study recommended among others that educational stakeholders and curriculum planners should integrate preventive, corrective and predictive maintenance skills into OTM programme so that OTM educators and students can learn and acquire the requisite skills needed for prolonging the reliability and functionality value of office machines in the classroom.

Keywords: Polytechnic, Maintenance, Office Technology and Management, Office Machines

Introduction

Polytechnic is one of the higher educational institutions in Nigeria that is designed to produce graduates that will transform the technological and engineering goals of the nation. One of specialized programmes offered in Nigerian polytechnics is Office Technology and Management (OTM). Historically, OTM programme was designed by the National Board for Technical Education (NBTE) to replace the Secretarial Studies programme which had been on stream since 1989. Office technology and management became the new name for the former secretarial studies programme offered in Nigerian polytechnics as approved in 2004 by the National Board for Technical Education (NBTE) which is the supervisory body for polytechnics in Nigeria (Ile & Okafor, 2021). OTM was introduced into Nigerian tertiary institutions because the curriculum contents of secretarial studies were no longer relevant to digitalization outlook of the 21st century office.

In order to enable students understand the dynamics of today's office occupations, the components of OTM programme in Nigeria is structured into office technology, office application, business administration and management, numeric, general studies and Students Industrial Work Experience Scheme (SIWES). An objective exploration of Nigerian polytechnics shows that human capital management, small business management, principles and practice of meetings, career development, citizenship education, consumer education, records management, business law, psychology and office management are some of the major courses offered in OTM programme. In addition, Oguejiofor and Nwogu (2014) and Iro (2016) included information and communication technology packages such as word processing, networking technology, graphics, database management system, computer technology, webpage design, multimedia technology and desktop publishing are taught in the programme.

Office technology and management prepares students for office occupations such as secretaries, executive secretaries, administrative assistants, and function in other similar titles describing jobs similar or overlapping those of the traditional secretary such as office coordinator, executive assistant, office manager and administrative professionals (Omowumi, 2014). This implies that OTM students in polytechnics will not be able to understand the workings of office occupations when they are not exposed to office machines before graduation. Office machines are mechanical and electronic devices they aid office works and increase workers' productivity. Office machines are essential for functioning of a modern office (Mashau & Andrisha, 2016). According to Igwe, Utebor and Olannye (2021), office machines are the technical devices and tools used by various organizations for everyday tasks, such as managing clients, fulfilling orders, analyzing sales records and conducting communication.

Before the advent of the 21st century, Armah (2015) averred that office machines included typewriters, duplicators, perforators, intercoms, file trays, filing cabinets and drawers, calculators, copying machines, franking and tabulating machines, billing machines, payroll machines, addressing and mailing machines as well as punched card machines among others. In today's workplace, Oteng and Seidu (2016) posited that office machines include Apple i-phones, personal computers, scanners, printers, photocopiers, electronic mails, teleconferencing, 3d image video conferencing, desktop publishing system and robotics among others. The fragile nature and expensive outlay of office machines necessitates the culture of maintenance among OTM educators and students in polytechnics. Office machines can only continue to remain in operational condition over a long period of time with proper maintenance.

Maintenance is the care and precautions taken for the care of office machines to enhance its functional value in polytechnics. Anh and Skrzypek (2018) defined maintenance as taking specific approved steps and precautions to care for a piece of machinery, equipment or facility to ensure that it attains its maximum life. Maintenance can increase profits in three directions; it decreases running costs, increases capability and elongates the lifespan of assets (Legát, Mošna, Aleš&Jurča, 2017). Alio, Oluka and Idakwo (2021) submitted that maintenance involves all technical and other procedures performed in order to retain the original working condition of a machine or its parts to prolong its value. According to Tijani (2016), maintenance types include preventive, corrective and predictive.

Preventive maintenance, according to Ado (2014), involves the inspection of critical parts of a machine to identify potential cleaning, adjustment and lubrication which can reduce wear and tear and the risk of breakdown. Enemu, Ejikeme and Edward (2016) stated that preventive maintenance involves actions of routine removal of operational elements which could initiate trouble to machines before they cause real harm. It is designed to preserve and enhance reliability of office machines by replacing faulty components before they actually fail. The key principles in preventive maintenance are that it is pre-planned and routine (Legát, Mošna, Aleš&Jurča, 2017) and this is done by scheduling maintenance at regular intervals of weekly, monthly and quarterly. To carry out preventive maintenance on office machines, OTM educators must possess the skill for reviewing and updating changes in the operational systems of office machines, skill for conducting weekly routine maintenance activities for office machines, skill for cleaning dirt found in office machines and skill for inspecting office machines before and after use among others.

Corrective maintenance is the type of maintenance given to office machines when they have already developed fault. According to Iwarere and Lawal (2018), corrective maintenance is known as breakdown maintenance because it is the kind of maintenance given to machines when they cannot function. Fakomogbon (2014) asserted that there are four important steps in corrective maintenance. They include fault detection, fault isolation, fault elimination and verification of fault elimination through adjusting, aligning, calibrating, reworking, removing, replacing or renovation. In order to perform corrective maintenance works on office machines, OTM educators must possess the skill for replacing damaged parts of office machines; skill for repairing damaged parts of office machines; skill for verifying the type of repairs needed for faulty office machines and skill for identifying tools needed to fix failure of office machines among others.

Predictive maintenance is carried out when trouble shooting signals in office machines are observed. According to Alome, Ogumah and Uduafemhe (2018), predictive maintenance involves watching out for danger signal such as unusual noise, danger light indicators, inefficiency of performance and arresting the situation promptly before there is any major breakdown. The common premise of predictive maintenance is anchored around regular monitoring of the actual mechanical conditions, operating efficiency and other indicators of the operating conditions of office machines (Igwe, Utebor&Olannye, 2021) to ensure maximum interval between repairs and minimize the number and cost of unscheduled outages created by failures. To conduct predictive maintenance tasks on office machines, OTM educators must possess the skill for regular monitoring of mechanical and electrical conditions of office machines, skill for detecting problems affecting the operational efficiency of office machines, skill for identifying signs of breakdown of office machines and skill for carrying root-cause analysis of failure of office machines and so on.

The skills needed by OTM educators for the maintenance of office machines could be influenced by the years of teaching experience OTM educators in polytechnics. Years of teaching experience refers to the professional experiences gathered by OTM educators over the years in polytechnics. In this study,

years of teaching experience is categorized into more experienced and less experienced OTM educators. More experienced OTM educators are educators with more than 10 years of professional experience and less experienced OTM educators are educators with less than 10 years in service. Given their years of professional service, one can assume that more experienced OTM educators are in a better position to know skills needed for maintenance more than their less experienced counterparts. This assumption needs to be supported by empirical evidence. It is against this backdrop that the researcher sought to ascertain the skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State.

Statement of the Problem

An investigative visitation of public owned polytechnics in Ogun State by the researcher revealed that office machines are not readily used for teaching and learning, and students are not properly exposed to the practical operations of office machines and their parts in the classroom. This situation means that graduates of OTM programme in polytechnics will not be able to operate simple and sophisticated office machines and their parts in the workplace. Thus, there is an urgent need for OTM educators to acquire requisite maintenance skills for ensuring the usability and functionality of the few available office machines in order to prepare students for the practical activities of today's office. Thus, identifying the skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State is the crux of this study.

Purpose of the Study

The main purpose of this study is to skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. Specifically the study sought the;

1. Preventive skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State
2. Corrective skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State
3. Predictive skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State

Research Questions

The following research questions guided the study:

1. What are the preventive skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State?
2. What are the corrective skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State?
3. What are the predictive skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on preventive skills needed for the maintenance of office machines based on years of teaching experience
2. OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on corrective skills needed for the maintenance of office machines based on years of teaching experience
3. OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on predictive skills needed for the maintenance of office machines based on years of teaching experience

Method

This study adopted descriptive survey research design. The entire population of 53 OTM educators in the four public polytechnics in Ogun State were studied without sampling. The instrument for the data collection is a structured and validated questionnaire that is divided into two different sections. Section A of the instrument contained personal information of the respondents and Section B is made up of questionnaire items generated from the literature reviewed which are clustered into three parts; B1-B3. B1 contained nine items on preventive skills needed by OTM educators for the maintenance of office machines, B2 contained eight items on corrective skills needed by OTM educators for the maintenance of office machine sand B3 contains nine items on predictive skills needed by OTM educators for the maintenance of office machines.

The questionnaire is structured on a five point rating scale of Very Highly Needed (VHN), Highly Needed (HN), Moderately Needed (MN), Slightly Needed (SN) and Not Needed (NN). A pilot test was conducted to establish the internal consistency of the instrument by administering it to 10 OTM educators in polytechnics in Osun State which were not part of the study and the data collected were analyzed using Cronbach alpha was used to obtain reliability coefficients of 0.86, 0.77 and 0.71 for the different clusters with an overall coefficient of 0.78. The researchers administered the instrument to the respondents in their offices with the help of four research assistants. Out of the 53 copies of the questionnaire administered, only 48 copies (representing 91 percent) were successfully retrieved and used for data analysis.

Mean and standard deviation were used to answer the research questions and determine the homogeneity or otherwise of the respondents' views. The decision on the research questions was based on the real limits of numbers. Therefore, items with mean ratings of 1.00 - 1.49 are rated Not Needed (NN), those with 1.50 - 2.49 are Slightly Needed (SN), items with mean ratings of 2.50 - 3.49 are Moderately Needed (MN), 3.50 - 4.49 are rated Highly Needed (HN) and mean ratings of 4.50 - 5.00 are Very Highly Needed (VHN). For testing the null hypotheses at 0.05 level of significance, t-test was employed.

Results

Research Question 1

What are the preventive skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State?

Table 1

Respondents' mean ratings on the preventive skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State

S/N	preventive maintenance skills	X	SD	Remarks
1	Ability to inspect office machines for signs of wear after use	4.31	.66	Highly Needed
2	Ability to inspect office machines for signs of overheating while in use	4.24	.83	Highly Needed
3	Ability to inspect office machines for signs of deterioration before use	4.09	.42	Highly Needed
4	Ability to clean dirt on office machines with link free rags	3.87	.71	Highly Needed
5	Ability to apply chemical agents to protect office machines from rust			
5	Ability to adhere to manufacturer's instruction in servicing office machines	4.35	.53	Highly Needed
6	Ability to lubricate moving parts of office machines to avoid wear and tear			
7	Ability to carry out regular tests on the functionality of different components of office machines	4.01	.80	Highly Needed
8	Ability to check the operating system of office machines on regular basis	3.89	.49	Highly Needed
9		4.13	.62	Highly Needed
		3.76	.84	Highly Needed

Data in Table 1 show that the nine items listed on preventive skills were highly needed by respondents with mean ratings ranging from 3.76 to 4.35. The cluster mean score of 4.07 indicates that preventive skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. The standard deviations for all the items are within 0.42 to 0.84. This shows that the respondents are not wide apart in their ratings.

Research Question 2

What are the corrective skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State?

Table 2

Respondents' mean ratings on the corrective skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State

S/N	Corrective maintenance skills	$\bar{X}$	SD	Remarks
10	Ability to use the appropriate software to remove viruses affecting office machines	3.91	.53	Highly Needed
11	Ability to remove foreign objects responsible for internal breakdown of office machines	4.10	.86	Highly Needed
12	Ability to repair damaged parts of office machines	3.76	.55	Highly Needed
13	Ability to replace worn out parts of office machines	4.22	.72	Highly Needed
14	Ability to verify the specific type of repairs for office machines	4.22	.72	Highly Needed
14	Ability to carry out diagnostic analysis on the breakdown of office machines	3.84	.53	Highly Needed
15	Ability to overhaul parts of office machines functioning below capacity	4.18	.84	Highly Needed
16	Ability to uninstall harmful programs that affects the functionality of office machines	4.03	.79	Highly Needed
17		3.87	.81	Highly Needed

Data in Table 2 show that the eight items listed on corrective skills were highly needed by respondents with mean ratings ranging from 3.76 to 4.22. The cluster mean score of 3.99 indicates that corrective skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. The standard deviations for all the items are within 0.53 to 0.86. This shows that the respondents are not wide apart in their ratings.

Research Question 3

What are the predictive skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State?

Table 3

Respondents' mean ratings on the predictive skills needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State

S/N	Predictive maintenance skills	X	SD	Remarks
18	Ability to recognize signs of breakdown of office machines	4.27	.46	Highly Needed
19	Ability to locate the root causes of continuous breakdown of office machines	4.03	.68	Highly Needed
20	Ability to detect why office machines are over-heating	3.99	.37	Highly Needed
21	Ability to isolate problems arising from breakdown Of office machines	3.78	.58	Highly Needed
22	Ability to identify parts of office machines that			Highly Needed
24	require system update			Highly Needed
25	Ability to interpret displayed messages arising			Highly Needed
26	from system failure of office machines	4.16	.71	Highly Needed
27	Ability to detect the foreign elements that	4.00	.43	Highly Needed
	affect the normal operations of office	3.81	.69	Highly Needed
	machines Ability to track the operational	3.96	.35	
	conditions of office machines to avoid	3.64	.70	
	electrical overloads			
	Ability to forecast on the functionality of components			
	parts of office machines			

Data in Table 3 show that the eight items listed on predictive skills were highly needed by respondents with mean ratings ranging from 3.64 to 4.27. The cluster mean score of 3.96 indicates that predictive skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. The standard deviations for all the items are within 0.35 to 0.71. This shows that the respondents are not wide apart in their ratings.

Hypothesis 1

OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on preventive skills needed for the maintenance of office machines based on years of teaching experience

Table 4

t-test analysis of mean ratings of OTM educators polytechnics in Ogun State on preventive skills needed for the maintenance of office machines

Years of teaching	N	X	SD	df	t-value	p-value
Decision experience						
1 – 10	30	76.907.52	46	1.02	0.211	Not Significant
11 and above	18	64.375.89				

Table 4 shows that the p-value is 0.211, which is greater than the significance level of 0.05(p-value>0.05).

This indicates that OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on preventive skills needed for the maintenance of office machines based on years of teaching experience. The null hypothesis of no significant difference between the two groups is, therefore, not rejected/

Hypothesis 2

OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on corrective skills needed for the maintenance of office machines based on years of teaching experience

Table 5

t-test analysis of mean ratings of OTM educators polytechnics in Ogun State on corrective skills needed for the maintenance of office machines

Years of teaching	N	X	SD	df	t-value	p-value
Decision experience						
1 – 10	30	71.086.29	46	1.10	0.137	Not Significant
11 and above	18	66.755.81				

Table 5 shows that the p-value is 0.137, which is greater than the significance level of 0.05(p-value>0.05).

This indicates that OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on corrective skills needed for the maintenance of office machines based on years of teaching experience. The null hypothesis of no significant difference between the two groups is, therefore, not rejected.

Hypothesis 3

OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on predictive skills needed for the maintenance of office machines based on years of teaching experience

Table 6

t-test analysis of mean ratings of OTM educators polytechnics in Ogun State on predictive skills needed for the maintenance of office machines

Years of teaching experience	N	$\bar{X}$	SD	df	t-value	p-value	Decision
1 – 10	30	83.468.23	46	0.781	0.403	Not Significant	
11 and above	18	79.807.04					

Table 6 shows that the p-value is 0.308, which is greater than the significance level of 0.05(p-value>0.05).

This indicates that OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on predictive skills needed for the maintenance of office machines based on years of teaching experience. The null hypothesis of no significant difference between the two groups is, therefore, not rejected

Discussion of findings

The study revealed that preventive skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. This finding is in consonance with Igwe, Utebor and Olannye (2021) which reported that preventive maintenance skills are needed for effective maintenance of office technologies in different organizations. The researcher believed that preventive maintenance skills are highly needed by OTM educators they will help educators to delay the breakdown of office machines and significantly reduce the severity of any breakdown that might occur before and after use in the classroom.

The study revealed that corrective skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. This finding is in agreement with Chukwuedo and Nwachukwu (2014) which found that corrective maintenance skills are important skills needed for effective fixing and rectifying of office machines and its components in educational institutions. The researcher is of the opinion that corrective maintenance skills are highly needed by OTM educators they will help educators to repair and restore the functionality of office machines when there is a complete breakdown before and after use in the classroom.

Also, the study discovered predictive skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State. The findings concur with Iorliam (2015) who discovered that educators highly require predictive maintenance skills for maintenance of office machines. The researcher believed that predictive maintenance skills are highly needed by OTM educators they will help educators to quickly notice trouble shooting signals in any of the parts of office machines before they cause major breakdown before and after use in the classroom.

Finally, the outcome of the study revealed OTM educators in polytechnics in Ogun State do not differ significantly in their mean ratings on preventive, corrective and predictive skills needed for the maintenance of office machines based on years of teaching experience. This means that OTM educators, irrespective of their years of teaching experience in polytechnics collectively agree that preventive, corrective and predictive skills are needed for keeping office machines in working condition for instructional engagements in polytechnics. The findings support the reports of Ado (2014) and Osaghale

(2014) which reported that maintenance skills does not only prevent the sudden failure of instructional materials but also prolong their lifespan for effective usage in the classroom.

Conclusion

The place of office machines in teaching and learning OTM courses cannot be overstressed. The inadequacy of office machines and the continuous breakdown and deterioration of few existing machines for teaching OTM courses in tertiary institutions calls for the acquisition of maintenance skills among educators. Based on the results of the study, it was concluded that preventive, corrective and predictive skills are highly needed by OTM educators for the maintenance of office machines in polytechnics in Ogun State.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Management of polytechnics should see the need to send OTM educators for refresher courses in the area of maintenance to enable them minimize the rate of breakdown of office machines in polytechnics.
2. Educational stakeholders and curriculum planners should integrate preventive, corrective and predictive maintenance skills into OTM programme so that OTM educators and students can learn and acquire the requisite skills needed for prolonging the reliability and functionality value of office machines in the classroom.
3. Manufacturing and servicing companies should from time to time visit OTM educators in polytechnics and inform them about the necessary practical preventive, corrective and predictive maintenance skills for maintaining office machines in the classroom.

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