

Technology Innovation and Database Administration Skills Required By Computer Technicians for Effective Computer Systems Maintenance in Federal Universities in South-South Nigeria

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Abstract

Original Research Article

The study investigated technology innovation and database administration skills required by computer technicians in maintaining computer systems in Federal Universities in South-South, Nigeria. Two specific objectives, two research questions and two hypotheses were postulated to guide the study. The Survey Design was adopted for the study. The population of the study consisted 357 Computer Technicians and Lecturers who are currently employees in the six selected Federal Universities in South-South, Nigeria; University of Uyo, University of Calabar, University of Benin, University of Port Harcourt, Federal University of Otuoke and Federal University of Petroleum Resources, Effurun. The sample for the study consisted 189 comprising 131 Computer Technicians and 58 Lecturers drawn from the total population. The sample was selected using simple random sampling method. The instrument titled “Technology innovation and database administration Skills Required Questionnaire (TIDBASRQ)” with 80 items was developed by the researcher and used to elicit data from the respondents for the study. The instrument was subjected to face and content validation by three research experts; subsequently a reliability co-efficient of 0.89 was obtained using Cronbach alpha reliability formula. The data obtained were analyzed using mean to answer the research questions and independent t-test to test the research hypotheses at 0.05 level of significance. The findings of the study revealed that, there was a significance difference in the mean responses of Computer Technicians and Lecturers in Technology Innovation and Database Administration Skills. However, lack of innovation skills among Computer Technicians led to not being reliant enough on advance technology to maintain, secure, and optimize IT infrastructure effectively in the University settings. It was recommended that Computer Technicians in Federal Universities in South-South, Nigeria should endeavour to update their knowledge in various technology innovation and database administration skills required for modern computer maintenance, the management of universities should give concern attitude to the provision of emerging IT infrastructure resources in the areas of computer maintenance to enhance skills system maintenance, the National Universities Commission (NUC) in collaboration with the Teachers Registration Council of Nigeria (TRCN) should create and implement a national framework for ICT technical skills development across Federal Universities in the region and the commission should partner with institutions such as Cisco Networking Academy and decide whether to make it mandatory requirements for all university ICT support staff and technicians to undergo professional development every 2 to 3 years in order to key into the IT advanced era.

Keywords: Emerging Technology, Skills, Computer Technicians, Computer Maintenance.

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Introduction

Technology innovation has become a major driving force in the advancement of educational systems across the world, particularly in higher institutions where digital technologies are increasingly used for teaching, learning, research, and administration. In Nigeria, federal universities have adopted various technological innovations such as cloud computing, database management systems, e-learning platforms, virtualization, cybersecurity applications, and networked communication systems to improve efficiency and productivity. These technological changes have significantly increased the demand for skilled computer technicians capable of maintaining computer systems and managing institutional databases effectively. Consequently, database administration skills have become essential competencies required of computer technicians in modern universities.

Technology innovation refers to the introduction and application of new technological tools, techniques, and systems aimed at improving organizational operations and service delivery. According to Rogers (2003), innovation involves the adoption of ideas, practices, or technologies perceived as new by individuals or organizations. In the context of higher education, technological innovation enhances information processing, communication, record keeping, and decision-making processes. Federal universities in South-South Nigeria depend heavily on computerized systems for students' registration, examination processing, staff records, library services, and online learning activities. The increasing reliance on digital systems therefore requires computer technicians to possess adequate technical and database management skills for efficient system maintenance.

Database administration skills involve the knowledge and competencies required to design, install, configure, secure, monitor, and maintain databases within an organization. Such skills include proficiency in Structured Query Language (SQL), data backup and recovery, troubleshooting, database security, performance optimization, and system updating. Elmasri and

Navathe (2016) noted that effective database management is crucial for ensuring data integrity, security, accessibility, and organizational efficiency. Similarly, Coronel and Morris (2019) emphasized that database administrators play important roles in safeguarding institutional data and ensuring the smooth operation of information systems. In universities where large volumes of academic and administrative data are generated daily, poor database administration may result in data loss, system failure, security breaches, and operational inefficiency, therefore effective utilization of Robotic Process Automation strengthens database administration skills and improves computer technicians' efficiency in maintaining modern computer systems.

Robotic Process Automation (RPA) is a type of technology that automates software robots, commonly referred to as 'bots', to complete very repetitive and rule-based tasks in a digital environment. They simulate the way people work on computers to complete business functions, such as data entry, processing transactions, monitoring systems and generating reports without people having to do the work (Grover, 2021). When coupled with other emerging technologies, RPA is a game changer in computing maintenance. In the context of computer maintenance, this can range from routine diagnostics and software updates to more complex tasks like system monitoring and automated troubleshooting. Traditionally, computer maintenance has relied heavily on manual processes, such as checking system logs, applying software patches, or responding to error notifications. RPA changes this by enabling automated scripts to carry out these tasks with speed and consistency. According to Grover (2019), robotics automation processing can improve process efficiency by up to 80%, while also reducing human error in repetitive tasks as well as streamlining data recovery tasks.

Data recovery is a way to keep your cloud data cycle from total data loss by losing the remaining copies of your data, restoring the copies of your data lost, and preserving your redundancy level. In this phase of the cloud data cycle, various methods and policies are applied to reliability of data and comply with the end-

user of the storage solution (Hennessy and Patterson, 2019). As technology continues to advance at a rapid pace, the need for skilled computer technicians is becoming more and more important. The skill of recovering lost data is invaluable. The lost data is an obstacle for everyone - individual users as well as businesses. The rapid advancement of technologies like cloud computing, SSDs and IoT devices has created a need for data recovery technicians to enhance their skills (Stallings, 2021). A significant part of data recovery knows various data storage mechanisms. Data recovery technicians need to understand the differences between various data storage systems (HDDs), solid-state drives (SSDs), hybrid drives, and cloud storage. Recognizing this distinction is crucial for the development of solid recovery areas and the advancement of the recovery strategies of data storage systems (Grover, 2021).

The combination of technology innovations, such as the Internet of Things (IoT) and Artificial Intelligence (AI), Robotic Process Automation (RPA), with data recovery has particularly revolutionized the maintenance processes. The operational data created by the IoT devices and systems is of the highest volume and velocity. This operational data is cloud-stored, cloud-analytics integrated, and also offer distributed data access in real time. Predictive maintenance of the IoT systems is possible as a result of remote and real-time maintenance operational data cloud storage and integrated cloud analytics (Lee, Bagheri, and Jin, 2016). The sensor data of a hardware system stored in the cloud can be used by an AI algorithm to predict the hardware failures or performance bottlenecks. Furthermore, cloud storage is the solution to computer maintenance update and configuration management. The IT administrators can deploy system and device data updates rapidly with the distributed cloud storage and integrated cloud images, patches, and configuration files. Automating updates allows improvements in security and operational efficiency, Gill and Grance, (2022). With the rise of mobile computing and IoT, new technician roles will be needed.

Computer technicians are expected to possess modern technological competencies to

effectively maintain computer systems and support institutional operations. The rapid advancement in information and communication technology (ICT) has changed the traditional roles of technicians from mere hardware maintenance personnel to professionals capable of handling software management, networking, cybersecurity, and database administration. According to UNESCO (2021), digital transformation in higher education requires technical personnel with advanced ICT competencies to sustain technological infrastructure and support institutional development. In South-South Nigeria, many federal universities still face challenges such as inadequate technical manpower, insufficient training opportunities, obsolete facilities, and poor maintenance culture, which negatively affect the performance of computer systems and institutional productivity.

Furthermore, the increasing threats of cyberattacks, data corruption, and system vulnerabilities have made database administration skills more relevant in educational institutions. Computer technicians who lack adequate technological and database management competencies may find it difficult to cope with emerging digital innovations in university environments. Therefore, there is a growing need to identify the technology innovation and database administration skills required by computer technicians for effective maintenance of computer systems in federal universities in South-South Nigeria. This study is important because it will help identify the relevant competencies needed to improve system reliability, enhance institutional efficiency, and promote sustainable technological development in Nigerian universities.

Statement of the problem

For Computer Technicians at Federal Universities in South-South Nigeria, the effective maintenance and repair of computers amidst technology innovations is a growing challenge. Managers of computer maintenance units need to understand the specific technology innovations that require new skill sets in order to determine the emerging technology innovations that are most critical for training Computer

Technicians at Federal Universities to increase their Computer Maintenance and repair capacity at the university computer systems level. This is critical for maintaining the effectiveness, safety, and utility of the university computer systems. Enhanced training of these Computer Technicians is vital to improve the standard of service provided. This analysis provides the most critical training, which is the basis of this analysis concerning the development of technology innovations for computer systems in Federal Universities in South-South Nigeria. As innovations have taken computer maintenance to a higher level involving much more than hardware fault isolation to include functions such as memory alignment, benchmarking of CPUs, firmware updates of data chips, data recovery, configuration of networks, and system operations which include updates and backups, the need to carry out this research is indisputable.

Given the difficulties computer technicians face in solving intricate computer maintenance problems, it is crucial to evaluate what specific skills computer technicians require to maximize their potential. The lack of program updates in computer training worsens the situation. The aim of this study is to focus on the technologies that are currently important to computer maintenance computing, including the cloud, artificial intelligence, IoT and others. In this regard, the study will determine the level of competence of the existing technicians and the training requirements that will enable them to easily cope with the changes. The study is important to the extent that it will assist in the formulation of efficient and specific training and education plans to improve the computer skills of technicians. Computer maintenance services will improve, and universities will have the necessary IT systems for the computer-based education service to work. The computer technicians in the Federal Universities in South-South Nigeria have a major shortfall in the skills that are associated with the use of new technologies. There is an increase in the use of new technologies in the universities, but computer maintenance staff lacks the necessary skills to provide the services that are required.

Research shows that computer technicians at Nigerian universities face the challenges posed by the ever-changing nature of

new technology innovations. Therefore, it is essential to explore what specific innovation skills are required of computer technicians at Federal Universities in South-South Nigeria. This study aims to contribute to this discourse by identifying technology innovations skills computer technicians are expected to have at Federal Universities in South-South Nigeria.

Purpose of the study

This study aims at identifying the technology innovation and database administration skills set needed by computer technicians to perform effective computer system maintenance at Federal Universities in South-South Nigeria. More specifically, the study aims at identifying the technology innovation and database administration in:

- i. Robotic process automation skills needed by computer technicians for effective computer system maintenance at Federal Universities in South-South Nigeria.
- ii. Data recovery skills needed by computer technicians for effective computer system maintenance at Federal Universities in South-South Nigeria.

Research Questions

The following research questions will be formulated to direct the focus of the study:

- i. What technology innovation and database administration skills in robotics processing automation are required by Computer technicians for effective computer system maintenance in Federal Universities in South-South Nigeria?
- ii. What technology innovation and database administration skills in data recovery are required by computer technicians for effective computer system maintenance at Federal Universities in South-South Nigeria?

Research Hypotheses

The following null hypotheses are formulated to guide the study and will be tested at the .05 level of significance.

HO₁: There is no significant difference in the mean responses of computer technicians and computer experts on technology innovation and database administration skills in robotics processing automation required by computer technicians for effective computer system maintenance in Federal Universities in South-South Nigeria.

HO₂: There is no significant difference in the mean responses of computer technicians and computer experts on the technology innovation and database administration skills in data recovery required by computer technicians for effective computer system maintenance in Federal Universities in South-South Nigeria.

Research Method

The research implemented Survey Research Design. This research was carried out in the Federal Universities located in South-South Nigeria, particularly the Federal Universities of Otuoke, Petroleum Resources in Effurun, Port Harcourt, Uyo, Calabar, and Benin. The study's participants included 357 computer techs and lecturers employed at the six Federal Universities in South-South Nigeria. The computer technicians were viewed as practitioners in the maintenance of computers and use of technology innovations, while the lecturers were adjudged to be, experts in skills pertinent to innovations. The lecturers were the benchmarks, while the computer technicians' were to respond to the benchmark set by the bench makers in this study. Sample size consisted of 189 participants out of 357 computer technicians and lecturers in six Southern Federal Nigerian Universities. Taro Yamane formula was used to calculate the study sample. The researcher employed purposive random sampling method to derive the sample of the study.

The researcher designed an instrument called the "Technology innovation and database administration Skills Required Questionnaire (TIDBASRQ)", which served the purpose of collecting the data needed for the study. The TIDBASRQ instrument was targeted for both

computer technicians and lecturers. The computer technicians answered the skill possessed ratings and the lecturers answered the skill required ratings. The instrument was divided into two clusters that contained the statements for the independent sub variables. Cluster "one" aimed to find out the respondents' views on technology innovation and database administration skills for robotics process automation. Cluster "two" aimed to find out the views of respondents on technology innovation and database administration skills for data recovery. Each Cluster consisted of ten items. The responses were based on a Likert Scale. The rating scale was designed to measure the respondents' perceptions about the skills required as follows: Very Lowly Required (VLR) 1 point, Lowly Required (LR) 2 points, Average Required (AR) 3 points, High Required (HR) 4 points and Very High Required (VHR) 5 points.

Research instruments were distributed to a sample of 189 computer technicians and lecturers from six selected Federal Universities in South-South Nigeria. Questionnaires were distributed to each respondent of this study. Data from the collected questionnaires was used for the analyses. The analysis of collected data was done with the aid of mean statistics to formulate responses to the research questions. The mean of each skill that computer technicians possessed was denoted by ($\bar{X}_P$) and the mean of each skill that was expected by the experts was represented by ($\bar{X}_E$). The mean difference ($\bar{x}$), that is, ($\bar{X}_N$) was calculated to show the acquisition gap which had the potential to be either positively or negatively valued. The independent t-test was employed to evaluate the eight null hypotheses at 0.05 level of significance.

Results and Discussion

Research Question One

What technology innovation and database administration skills in robotics processing automation are required by Computer technicians for computer maintenance in Federal Universities in South-South Nigeria?

Table 1.1: Acquisition gap analysis on technology innovation and database administration skills in robotics processing automation required by Computer Technicians in Federal Universities in South-South Nigeria

S/N	Robotics Processing Automation Skills	$\bar{X}P$	$\bar{X}E$	$\bar{X}N$	Remark
1	Robotics programming skill	2.91	4.31	1.40	Required
2	AI skill for predictive maintenance	3.11	4.51	1.40	Required
3	ML skill for anomaly detection	3.01	4.21	1.20	Required
4	Computer vision skill	2.72	4.02	1.30	Required
5	Automation for repetitive tasks	3.81	4.41	0.60	Required
6	Collaborative robots technique	2.52	3.22	0.70	Required
7	Sensors integration skill	3.90	4.10	0.20	Not Required
8	Robotics cybersecurity skill	3.21	3.31	0.10	Not Required
9	Data analysis from sensors	4.01	4.21	0.20	Not Required
10	Integration with emerging tech	3.12	4.42	1.30	Required

Source: Field Work (2025)

Key $\bar{X}P$ = Mean of Skill Possessed by computer technicians $\bar{X}E$ = Mean of Expected Skill Required, $\bar{X}N$ = Mean of Acquisition Gap

The result presented in table 1.1 above revealed that, seven (7) Robotics Processing Automation skills are highly required by Computer technicians in Federal Universities as the skills showed significant gaps ranging from 0.60 to 1.40, representing the consensus of both technicians and lecturers about the critical need for these skills in modern computer maintenance. The most substantial gaps appeared in AI for predictive maintenance (1.40), robotics programming (1.40), and integration with emerging technologies (1.30), computer vision (1.30), and machine learning for anomaly detection (1.20). These results highlight the growing importance of intelligent automation and AI-driven solutions in university maintenance operations. On the other hand, three

(3) of the skills in items thirty-seven (37), thirty-eight (38) and thirty-nine (39) showed minimal gaps ranging from 0.10 to 0.20, suggesting that sensor integration, robotics cybersecurity, and sensor data analysis skills are either adequately covered in current training or less prioritized in the present university maintenance context.

Research Question Two

What technology innovation and database administration skills in data recovery are required by Computer technicians for computer maintenance in Federal Universities in South-South Nigeria?

Table 1.2: Acquisition gap analysis on technology innovation and database administration skills in data recovery skills required by Computer Technicians in Federal Universities in South-South Nigeria

S/N	Emerging Data Recovery Skills	$\bar{X}P$	$\bar{X}E$	$\bar{X}N$	Remark
1	AI-driven data recovery automation	2.83	4.53	1.70	Required
2	AI-driven data integrity techniques	2.92	4.32	1.40	Required
3	AI-driven data recovery extraction	2.71	4.21	1.50	Required
4	AI-driven data recovery authenticity	2.62	4.02	1.40	Required
5	EaseUS data recovery wizard	3.83	4.23	0.40	Required
6	Data carving techniques	3.52	4.42	0.90	Required
7	Create disk images	4.01	4.11	0.10	Not Required
8	RAID configurations tool	3.92	4.02	0.10	Not Required
9	Autopsy data recovery tool	3.23	3.33	0.10	Not Required
10	Test disk recovery tool	3.70	3.80	0.10	Not Required

Source: Field Work (2025)

Key $\bar{X}P$ = Mean of Skill Possessed by computer technicians $\bar{X}E$ = Mean of Expected Skill Required, $\bar{X}N$ = Mean of Acquisition Gap

The result presented in table 1.2 above revealed that, six (6) technology innovation such as data recovery skills are highly required by Computer technicians in Federal Universities as the skills showed significant gaps ranging from 0.40 to 1.70, representing the consensus of both technicians and lecturers about the critical need for these competencies in modern computer maintenance. The most substantial gaps appeared in AI-driven data recovery automation (1.70), AI-driven data recovery extraction (1.50), and AI-driven data integrity techniques (1.40). These results highlight the growing importance of AI-powered solutions in university data recovery operations. On the other hand, four (4) of the skills in items forty-seven (47), forty-eight (48), forty-nine (49) and fifty (50) showed minimal gaps ranging from +0.1, suggesting that

disk imaging, RAID configuration, and conventional recovery tool skills are either adequately covered in current training or less prioritized in the present university maintenance context.

Research Hypothesis One

H₀₄: There is no significant difference between the mean responses of Computer technicians and Experts on the technology innovation and database administration in Robotics Processing Automation skills required by computer technicians for computer maintenance in Federal Universities in South-South Nigeria.

Table 1.3: T-test analysis of the difference between the mean responses of Computer technicians' rating and Experts' rating on technology innovation and database administration in robotics processing automation skills required by computer technicians for effective computer maintenance

S/N	Robotics Skills	Processing Automation	$\bar{X}_P$	$\bar{X}_E$	$\bar{X}_N$	t-value	p-value	Decision
1	Robotics programming skill		2.91	4.31	1.4	7.85	0.000	Reject
2	AI skill for predictive maintenance		3.11	4.51	1.4	8.12	0.000	Reject
3	ML skill for anomaly detection		3.01	4.21	1.2	6.95	0.000	Reject
4	Computer vision skill		2.72	4.02	1.3	7.25	0.000	Reject
5	Automation for repetitive tasks		3.81	4.41	0.6	3.75	0.000	Reject
6	Collaborative robots technique		2.52	3.22	0.7	3.15	0.002	Reject
7	Sensors integration skill		3.90	4.10	0.2	1.05	0.295	Accept
8	Robotics cybersecurity skill		3.21	3.31	0.1	0.45	0.653	Accept
9	Data analysis from sensors		4.01	4.21	0.2	0.95	0.343	Accept
10	Integration with emerging tech		3.12	4.42	1.3	7.45	0.000	Reject

Source: Field Work (2025) $\alpha = 0.05$ significance level

Table 1.3 shows the summary of independent t-test statistical analysis revealing significant differences between Computer technicians and Experts for several technology innovation and database administration in robotics processing automation skills. For seven out of the ten skills, the null hypothesis was rejected ($p < 0.05$), indicating experts consistently rated these skills as more critical than current technician assessments suggested. The largest disparities occurred in AI skills for predictive maintenance ($t=8.12$, $p<0.05$), robotics programming skills ($t=7.85$, $p<0.05$), and integration with emerging technologies ($t=7.45$, $p<0.05$), all showing substantial gaps with highly significant p-values. Three skills showed no statistically significant difference between groups: sensors integration skills ($t=1.05$, $p=0.295$), robotics cybersecurity skills ($t=0.45$, $p=0.653$), and data analysis from sensors ($t=0.95$, $p=0.343$), where the null hypothesis was accepted. This alignment suggests these particular skills may either be

adequately addressed in current training or are genuinely less prioritized in the university maintenance context.

Most of the notable results ($p<0.05$) led to the rejection of the null hypothesis. This means there is statistically significant difference in the mean perception of computer technicians and computer experts about emerging skills in robotic process automation that computer technicians need to have for the computer maintenance role in Federal Universities in South-South Nigeria. This shows that field experts expect more sophisticated robotic process automation skills than what is supposed to be required for computer technicians. This is particularly the case for the interpersonal machine learning (anomaly detection) ($t=6.95$, $p<0.05$), computer vision ($t=7.25$, $p<0.05$), and automation for repetitive tasks ($t=3.75$, $p<0.05$), and cooperative/collaborative robots ($t=3.15$, $p<0.05$) skills.

Research Hypothesis Two

H₀₅: There is no significant difference between the mean responses of Computer technicians and Experts on the technology

innovation and database administration skills in Data Recovery required by computer technicians for computer maintenance in Federal Universities in South-South Nigeria.

Table 1.4: T-test analysis of the difference between the mean responses of Computer technicians' rating and Experts' rating on technology innovation and database administration in data recovery skills required by computer technicians for effective computer maintenance

S/N	Emerging Data Recovery Skills	$\bar{X}_P$	$\bar{X}_E$	$\bar{X}_N$	t-value	p-value	Decision
1	AI-driven data recovery automation	2.83	4.53	1.7	8.25	0.000	Reject
2	AI-driven data integrity techniques	2.92	4.32	1.4	7.65	0.000	Reject
3	AI-driven data recovery extraction	2.71	4.21	1.5	7.95	0.000	Reject
4	AI-driven data recovery authenticity	2.62	4.02	1.4	7.35	0.000	Reject
5	EaseUS data recovery wizard	3.83	4.23	0.4	2.15	0.033	Reject
6	Data carving techniques	3.52	4.42	0.9	5.45	0.000	Reject
7	Create disk images	4.01	4.11	0.1	0.55	0.583	Accept
8	RAID configurations tool	3.92	4.02	0.1	0.45	0.653	Accept
9	Autopsy data recovery tool	3.23	3.33	0.1	0.35	0.726	Accept
10	Test disk recovery tool	3.70	3.80	0.1	0.65	0.516	Accept

Source: Field Work (2025)

$\alpha = 0.05$ significance level

Table 1.4 shows the summary of independent t-test statistical analysis revealing significant differences between Computer technicians and Experts for several technology innovation and database administration in data recovery skills. For six out of the ten skills, the null hypothesis was rejected ($p < 0.05$), indicating experts consistently rated these skills as more critical than current technician assessments suggested. The largest disparities occurred in AI-driven data recovery automation ($t=8.25$, $p<0.05$, mean gap +1.70), AI-driven data recovery extraction ($t=7.95$, $p<0.05$, mean gap +1.50), and AI-driven data integrity techniques ($t=7.65$, $p<0.05$, mean gap +1.40), all showing substantial gaps with highly significant p-values.

Four skills showed no statistically significant difference between groups: creating

disk images ($t=0.55$, $p=0.583$, mean gap +0.10), RAID configuration tools ($t=0.45$, $p=0.653$, mean gap +0.10), autopsy data recovery tool ($t=0.35$, $p=0.726$, mean gap +0.10), and test disk recovery tool ($t=0.65$, $p=0.516$, mean gap +0.10), where the null hypothesis was accepted. This alignment suggests these particular skills may either be adequately addressed in current training or are genuinely less prioritized in the university maintenance context.

Most of the important findings ($p<0.05$) led to the null hypothesis being disproved. This means that the null hypothesis can be disproved, and the mean responses from computer technicians and experts about the innovation such as data recovery skills needed by computer technicians for computer maintenance in Federal Universities in South-South Nigeria differ.

When compared to the computer technician competencies, experts expect data recovery skills to be at a higher level, especially in the Artificial Intelligence (AI) driven techniques for data retrieval ($t=7.35$, $p<0.05$, mean gap +1.40), data carving ($t=5.45$, $p<0.05$, mean gap +0.90), and in EaseUS data recovery wizard ($t=2.15$, $p<0.05$, mean gap +0.40) wizard skills.

Discussion of Findings

The findings of this study are discussed based on the specific purposes of the study

The results show a lack of robotic processing automation skills with regards to advanced computer maintenance and support services. In addition, results from the t-test show a mean response gap between computer technicians and experts in robotic processing automation skills for computer maintenance and support services. A possible explanation for the acquisition gaps could be that computer technicians are not sufficiently equipped with the innovation technological skills to support and maintain a modern computer system. Therefore, in order for computer technicians to maintain and support a modern system, they need to be sufficiently equipped with the robotic processing automation skills.

The findings of this study are in support of Ekunke's study in 2016, which states that students are not motivated to attend a university to study a specific discipline, or to pursue a certain vocation, but to satisfy a requirement that provides them with a credential to obtain employment. The acquisition gap in robotic processing automation skills identified in this study is also in support of Eko's study in 2017, who noted that a large number of computer students focus on the softer side of the discipline, which is coding, and that is the fusion of computer engineering and computer science. The results of this study suggest that for computer technicians to close the acquisition gap caused by their insufficient knowledge of robotic processing automation, the specialists must re-train them at the university level, which simulates the organization they are later employed by.

The computer technicians' level of data

recovery skill acquisition is concerning when compared to the general level of acquisition for the computer maintenance responsibilities, and the testing of the average number of responses of the computer technicians and the computer experts on the data recovery skills applicable to the modern computer maintenance responsibilities of the computer technicians showed that data recovery skills have a gap. These differences can mean that computer technicians are not yet sufficiently proficient or nowhere near the expertise of the computer experts. If computer technicians acquire the data recovery skills lacking, modern computer systems maintenance will be greatly limited.

The findings are congruent with Salleh's (2018) assertion of the need for data recovery systems, computer maintenance systems, etc. skills such as test systems, recovery, and knowledge of voltmeters, ammeters, and other skills, including the ability to test the functionality of the CPU, OS, and motherboard. Thus, it implies that computer technicians ought to cultivate and advance their skills in a range of emerging data recovery automation through AI data recovery, AI data recovery integrity, AI data recovery extraction, and AI data recovery authenticity, to facilitate the enhancement of their abilities to formulate data recovery skills of high quality in modern systems.

Summary

The focus of this research is the determination of technology innovation and database administration skills needed for the maintenance of computers by Computer Technicians in Federal Universities located in South-South Nigeria. In line with this, two specific objectives, two research questions, and two null hypotheses were formulated, and then tested at the 0.05 significance level. The study adopted Survey Assessment Design, and the study was conducted in six Federal Universities located in South-South Nigeria. 357 Computer Technicians and Lecturers, employees of the six Federal Universities in South-South Nigeria were the population. The study sample of 189 were 131 Computer Technicians and 58 Lecturers, and the sample was selected using the purposive random sampling technique.

An instrument named, technology innovation and database administration skills Required Questionnaire (TIDBASRQ), was constructed by the researcher for the purpose of data collection. The study instruments were directed to both Computer Technicians and Lecturers. The Computer Technicians rated the skills acquisition, and the Lecturers rated the skills required. The instrument contained two clusters as the statements were dependent on the sub variables. The respondents in cluster “one” were requested to provide information on technology innovation and database administration in robotics Process Automation skills while cluster “two” requested information on technology innovation and database administration in data recovery skills. All items used in the questionnaire are derived from the technology innovation and database administration and PC maintenance curriculum for computer science developed by the National University Commission (NUC). The internal consistency reliability for the instruments using the Cronbach Alpha technique for the emerging required technology skills were 0.89 and 0.94. The questionnaires were administered to the respondents by the researcher assisted by office assistants. The mean was used to answer the research questions and the independent t-test was used to test the two null hypotheses at 0.05 level of significance.

From the data that was collected and analysed in the study, the following findings were made in relation to the purpose of the study.

- (i) Computer Technicians at Federal Universities in South-South Nigeria require new innovation and database administration skills in robotics processing and automation for contemporary computer maintenance.
- (ii) Computer Technicians at Federal Universities in South-South Nigeria require new innovation and database administration skills in data recovery for contemporary computer maintenance.
- (iii) The average responses from computer technicians and experts regarding the innovation skills of robotics processing and automation that computer technicians need for computer maintenance in Federal Universities in South-South Nigeria are

significantly different.

- (iv) The mean responses of computer technicians and experts differ significantly regarding

innovation and database administration in data recovery skills needed by computer technicians for computer maintenance at Federal Universities in South-South Nigeria.

Conclusion

Most of the computer technicians at Federal Universities in South-South Nigeria still do not know how to manage and maintain contemporary computing systems, which reflects their lack of innovation and technological skills. This lack of skills remains a challenge because computer systems in South-South Nigeria Federal Universities are incomparable to the systems in more recognized institutions of higher learning.

It is important to note that Sub-Saharan Africa is home to the fastest growing economies, which is why the demand for innovation and technological skills is at an all-time high. Even for the purposes of maintaining computing systems at the Federal Universities in the South-South region, computer technicians will still be required to have known how to perform high-level functions, including, optimization of robotic processes, high-level analytics, cloud computing, advanced computing maintenance, and sophisticated network systems.

Recommendations

Based on the outcome of this study, the following recommendations have been made:

- (i) Computer technicians at Federal Universities in the South-South zone of Nigeria should upskill and broaden their competencies in handling modern computing equipment and technology maintenance and repairs, particularly in the areas of: robotic processing automation and data recovery. Modern educational institutions have to be equipped to support educational advancement with the latest technology. Therefore, there is an increasing need for computer technicians to possess the up-to-date skills required to protect, maintain, and

improve the efficiency of the educational institutions' information technology (IT) infrastructures.

(ii) Management at the Federal Universities in South-South Nigeria should prioritize the provision of emerging information technology (IT) resources to support the development of maintenance and systems maintenance skills.

(iii) The National Universities Commission (NUC) and the Teachers Registration Council of Nigeria (TRCN) should develop and launch a customized national ICT technical skills framework for the Federal Universities in the South-South zone of Nigeria.

(iv) The National Universities Commission (NUC) should collaborate with Cisco Networking Academy, Microsoft Learn, and CompTIA and set a requirement that all university ICT support staff and technicians must have their competencies updated through professional development regularly.

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