

Availability and Utilization of Paperless Technology among Staff of Technical Colleges in Osun State, Nigeria

Jonathan O. Oke¹, & Lydia Y. Oludele^{2*}

¹*Department of Vocational and Technical Education, Faculty of Education, Ekiti State University, Ado-Ekiti, Ekiti State, Nigeria.*

²*Department of Office Technology and Management Osun State Polytechnic, P.M.B. 301, Iree, Osun State, Nigeria.*

**Email: yemisioludele70@gmail.com*

Abstract

Utilizing paperless technologies in educational institutions is gaining broader popularity in developing countries. The study investigated the extent of adoption of paperless technologies in Technical Colleges in Osun state by their availability and utilization. The sample for the study consisted of 179 administrative and technical staff randomly selected from the technical colleges in Osun state, Nigeria. Two research questions guided the study while two hypotheses were tested at five percent level of significance. A well-validated questionnaire with a reliability coefficient of 0.78 was used for data collection. Data collected were analyzed using simple mean to answer the research questions, while the hypotheses were tested using t-test. The study found that Personal computers, overhead projectors, iPads and internet are slightly available in Government Technical Colleges in Osun state, with small extent usage of the few available ones. It was also found that teaching and administrative staff do not significantly differ in their ratings on availability and extent of utilization of paperless technologies in the colleges. The study concluded that when paperless technologies are readily available and well utilized, the colleges will enjoy the benefits associated with utilization of these technologies. The study recommended that necessary paperless technologies be provide for effective teaching/learning activities in the technical colleges in Osun state.

Keywords: Paperless technology; Staff performance; Technical colleges

1. Introduction

In the last few decades, new technologies have constantly made their way into the society. Paperless technology and its capabilities at improving organizational effectiveness are becoming prominent in the technological evolution. The quest for application of paperless technologies started in the 20th century and coincided with the introduction of Personal Computer. The arrival of new Information and Communication Technology on the world stage has caused a change in the traditional model of managing documents and communication within organizations (Orantes-Jimenez et al., 2015). With the rapidly growing technology, the sophistication of modern hardware and software, and with the increasing access to internet services, many offices and educational institutions worldwide are transiting to digital system and paperless technologies are growing in popularity. More and more organizations, business and educational institutes, are realizing the use of paper as an expensive and inefficient way of managing information, and are therefore turning to electronic document management. Franklin and Smith (2015) opined that using electronic and paperless devices is essential in teaching large number of students to deal with difficulties such as complex assessment procedures, time restrictions and those associated

with record-keeping in teaching-learning activities. This growing popularity of paperless technology makes switching a necessity, especially for educational institutions like technical colleges, to compete favorably in the modern electronic world.

2. Literature Review

Paperless Technology

The terms "paperless," "electronic," and "digital" are often used interchangeably to describe work which previously was done with paper, but which now has been adapted to information and communication technology (ICT) devices and software (Yusuf et al. 2021). Paperless technologies include all electronic and digital tools used to move from paper to electronic form of document management and communication processes. Paperless techniques include work culture where the use of paper is greatly reduced and minimized through the use of digital and computerized systems. Paperless technologies are enabling technologies that support in the electronic administration of documents. Leading paperless technologies in the developing countries, according to Oke and Oludele (2022) include cell phones, computers and internet. Also, technologies required for paperless operation, in their view, are electronic tablets, iPads, scanners, electronic facsimile machine, e-mailing technology and Optical Character Reader (OCR) software which is required to convert hard copy document to text document for editing purposes as well as smart board/interactive white board and overhead projector. Also, cloud storage which provides more secured back up is readily available. With electronic faxing, an organization no longer need paper-using fax machines as incoming faxes are converted to digital images and sent directly to e-mail boxes. This is considered more secure as paper copies can be lost or left on the fax machine for everyone to see. Other approaches to creating paperless classroom including the use of iPads instead of paper books and pens, and supplementing the iPads with whiteboard software as well as using overhead projector. Literature has consistently indicated how the use of paperless technology could improve the time-consuming traditional processes of teaching-learning activities. Smart boards or interactive whiteboard (IWB) system is designed to provide a platform to boost the interactivity of lessons. Shi et al. (2012), in their study, found that IWB have obvious advantage in reinforcing students' motivation and engagement in learning. They opine that IWB is capable of attracting and retaining students' attention and concentration during teaching/learning process and thus enhancing learning outcomes.

Digital signature (e-signature) is another paperless technology. Digital signature is a form of electronic signature (Lunttila, 2019). It is a digital equivalent of a handwritten signature or stamped seal, but with far more inherent security, integrity and authenticity (Zhu and Li, 2008). It has same legal significance as the traditional form of signing documents. According to Lunttila (2019), utilization of digital signature have environmental advantages linked to decrease in need for paper and transportation. It helps save time spent on tedious administrative procedures and thus increases productivity. Through the use of digital signature, educational institutions can effortlessly facilitate the administrative process of enrolling students regardless of geographical dispersion and also accelerate students' registration process.

Kuriakose and Luwes (2016) identified clicker technology as a paperless tool relevant to classroom situation. Through the use of clickers, questions can be relayed to the students on a question paper or through PowerPoint Microsoft office presentations and responses from students can be displayed instantly on the projection screen. These are wireless handsets with each unit possessing a unique signal to enable responses from each individual student to be identified and recorded. Clickers paperless technology can be very useful for both formative and summative assessment in educational institutions.

PDF annotation application is another paperless technology that turns literacy and numeracy classroom activities into an interactive experience. PDF Annotator is a window program that lets user mark up and revise existing PDF document on their screen and user can even insert handwritten comments in the document while revising (Wolfe, 2002). It allows students and teachers save documents in the cloud, lets teachers edit and save in just few seconds and students can see these changes and make annotations of their own. Annotation technologies generally seem to increase student-teacher dialogue over written products. This makes it easier for both teacher and students to keep track of the learning documents, making giving feedback on students' work a much more efficient process.

Adoption of Paperless Technology in Educational Institution

Developing countries are characterized with lack of enough skills, tools and machines. In the view of Ayakwah et al. (2021), developing countries lag in terms of technology adoption and utilization. The use of modern technologies is not well adopted in developing countries and the backward state of technology results in low productivity, high cost and waste of time. Digital technologies are seen to be less diffused and less commonly adopted into the classrooms in developing countries. In a study conducted to investigate the level of adoption of paperless communication and information management system, Yusuf, et al. (2021), 380 staff and students of University of Ilorin, Nigeria were sampled as respondents to questionnaire designed to collect data. The study revealed that respondents mostly agreed that they adopted paperless communication tools like excel-based template and that they also adopted paperless communication in carrying out a lot of tasks. This study, however did not identify most of the modern paperless technologies available for use in educational institutions.

Utilization of Paperless Technology and Technical Education

In an action study conducted by Franklin and Smith (2015) amidst 250 pre-service teachers in PDHPE across SCU campuses, impact of utilizing mobile paperless technologies like iPads on educational process was investigated. The teachers were reported not to be so familiar with the use of iPads and were therefore provided with introductory training to participate in the study which was conducted in four phases. Results from the findings of the study indicated that using iPads would enhance and simplify assessment in teaching-learning processes. Utilization of iPads to access online rubrics was found successful in streamlining assessment process by providing pre-service teachers with immediate and explicit feedback. Using paperless technology in educational institutions makes materials easily accessible through the internet, improves communication between students and teachers and makes assessment and grading transparent and more efficient (Isaeva and Yoon, 2016). With paperless learning environment, Technical College students can be more

engaged. It seems contemporary students do not enjoy reading and receiving instructions on paper anymore. For some students, using pen and paper is not necessarily the best way for them to approach the writing process. Most students of this age prefer typing on tablets, using touch-screen device, and other digital materials. Since majority of today's students are already familiar with the use of tablets and smart phones, using paperless technology for teaching/learning activities makes learning and practical instructions much easier and the teaching more result-oriented.

Kuriakose and Luwes (2016) conducted a study on the use of clickers paperless technology in the classroom situation among engineering students enrolled at Central University of Technology (CUT). The students' perception on the use of clickers paperless technology for assessment were sought. The study employed descriptive statistics involving quantitative analysis. The study found that use of clickers for formative assessment was perceived to be user friendly although there were various anxieties among the students on the use of clickers. faculties for introducing clickers into the curriculum is that that the traditional passive learning paradigm of information delivery by the lecturer to his students is no longer adequate for adept functioning in a knowledge-based economy. Technological advancements have produced a new generation of student learners who are savvy in using technology to meet their needs. In fully harnessing and optimizing the talents of this new cohort of students a paradigmatic shift to active learning supported by cutting edge technologies is needed – an educational approach that focuses on self-directed learning with emphasis on active inquiry, application and synthesis of information and autonomous learning.

Utilization of paperless technology saves time. Innovation in paperless system is to equip staff with right technology that will increase their productivity by saving time. Lunttila (2019) opined that adoption of paperless technology saves employees' time that could have been used in filing, organizing and searching for paper document. Applying paperless technology saves time both for teachers and the admins. Traditional system of printing all our classroom learning materials can be both chaotic and inefficient. Time used in printing and stapling of handouts and tests, in filling forms and handling letters, etcetera could have been used in developing students and working on bigger school projects. Larger percentage of time in school could be used for reporting and managing student services, which could have been used in professional development if paperless technologies are being utilized. When paperless technologies are utilized, more time is available to focus on supporting students. Converting eye-watering amount of paperwork to digital files means having information at one's fingertips and having more time to spent on strategic work. Paperless technology saves employees' hour. Utilization of paperless technology in educational institutions improves teacher's assessment and evaluation process. Traditionally, students bring assignments to class, teacher takes the piles of students' work to his/her office/home, assesses and writes comments by hand, and teacher takes the pile of students' work back to the classroom for distribution. With paperless technology, giving feedback on students' work becomes a much more efficient and easier process.

Paperless technologies, when applied to teaching-learning processes, would prepare students for highly automated work environment. According to Gupta (2015), adaptation of paperless process makes organisations' products to gain and retain competitive advantage in the dynamic electronic world. When students are exposed to prevailing technologies, they are provided with basic skills and competence to succeed in the increasingly technology-savvy world. The greatest preparation for students generally and technical

education students in particular, would be to digitalize their learning experiences. Digitalization of their learning activities would increase their competitiveness (Obukhova et al., 2020). By involving student more and more with paperless technology, they are hence prepared in a way for a highly automated work environment.

Technical education, according to David (2014), has a vital role to play in technological advancement in any country. Citing UNESCO, David defined technical education as education designed to prepare technicians at upper secondary level and also to prepare engineers and technologists for higher management positions at university level. Technical education is also seen as education that aims at providing trained manpower in applied science and technology; training young men and women to have understanding of increased complexity of technology; and providing technical skills necessary for industrial development among others (David, 2014).

Although adoption and use of modern technology is one of the basic characteristics of developing countries, Laryea (1999) earlier opined that paperless technologies are not being adopted and used systematically and effectively as expected. He reported that most developing countries have virtually no IT infrastructure. However, the growing popularity of paperless and digital technology in developing country like Nigeria makes compliance a necessity for institutions targeting improved performance. With technical colleges aiming at training young men and women to have understanding of increased complexity of technology, and preparing students for jobs involving applied modern technology, effective utilization of paperless technologies is of great importance. It is against this background that the study seeks to determine the availability of paperless technology in the technical colleges and the extent to which staff members put them into use.

3. Statement of the Problem

It is noteworthy that for more than four decades, discourse on the concept of paperless technology has been intense. This is becoming more and more intense considering the effect of current pandemic (COVID-19) situation on educational sector. Although the projection was to achieve total paperless operations within one or two decades of technological revolution, it seems some developing countries still have a long way to go as far as adoption of paperless technologies are concerned. It was conspicuously noted that while many campuses were Wi-Fi enabled and both students and staff make use of paperless technologies like tablets, iPads, laptop and smartphones among others to capture learning during the COVID-19 pandemic lockdown of 2020, technical colleges students in Osun state, Nigeria were almost totally disconnected from academic activities while the lockdown lasted. It seems these technologies are not available or not being well utilized where available. Considering the numerous benefits of paperless technology, it is expected that institutions such as Technical Colleges that aim at preparing students for jobs involving applied modern technology will comply with application of these paperless technologies to keep up with the modern technological realities. It is against this background that the study sought to find out the paperless technologies that are available in the Technical Colleges in Osun state with the extent of their usage in the said colleges.

Objectives of the study

Main objectives of the study include:

1. To find out the paperless technologies that are available in the Technical Colleges in Osun state, Nigeria
2. To determine the extent to which paperless technologies are being utilized by the staff of Technical Colleges in Osun state, Nigeria

Research questions

1. What paperless technologies are available in Technical Colleges in Osun state, Nigeria?
2. To what extent do staff utilize paperless technologies in Technical Colleges in Osun state, Nigeria?

Research hypotheses

H₀1: Technical and administrative staff do not significantly differ in their mean ratings on paperless technologies available in the Technical Colleges in Osun state, Nigeria

H₀2: Technical and administrative staff do not significantly differ in their mean ratings on the extent to which paperless technologies are utilized in the Technical Colleges in Osun state

4. Methodology

The study adopted quantitative method of survey design. The study was delimited to both technical/teaching and administrative staff of Technical Colleges in Osun state, Nigeria. There are nine (9) Government Technical Colleges (GTC) in Osun state. The population of the study consists of the thirty-six (36) administrative and two hundred and twenty (220) technical/teaching staff of the nine technical colleges. The total of twenty-five (25) administrative and one hundred and fifty-four (154) technical/teaching staff (i.e. 70% of the total population) were randomly sampled across all the nine colleges. A set of questionnaire with items structured in 4-point Likert-type rating was used for data collection to elicit responses to the questionnaire items. The instrument was subjected to face and content validity, while test-retest method which yielded correlation co-efficient of 0.78 was used to determine the reliability of the instrument. All the 25 copies of the questionnaire distributed to the admin staff and 153 out of 154 distributed to the teaching staff were returned duly completed. The data collected was analyzed using simple mean measure of central tendency to answer the research questions, while the hypotheses were tested using t-test for independent samples at 0.05 level of significance.

5. Results

Table 1: Available paperless technologies in technical colleges in Osun state

S/N	Paperless technologies	VMA	A	SA	NA	X	Decision
1.	Personal computers	4	82	85	7	2.47	Slightly available
2.	Internet	3	45	119	11	2.22	Slightly available
3.	iPads and tablets	-	2	151	25	1.87	Slightly available
4.	Electronic fax machine	-	-	29	149	1.16	Not available

5.	Smart board/Interactive whiteboard	-	-	20	158	1.11	Not available
6.	Scanners	-	-	40	138	1.22	Not available
7.	Optical character reader software	-	-	23	155	1.13	Not available
8.	Digital signature	-	-	30	148	1.17	Not available
9.	Overhead projector	-	12	140	26	1.92	Slightly available
10.	PDF annotation software	-	-	27	151	1.15	Not available
Grand mean						1.54	Slightly available

Notes: very much available (VMA) – 4, available (A) – 3, slightly available (SA) – 2, not available (NA) - 1

The results presented in Table 1 showed personal computers, internet, iPads and overhead projector are slightly available in the Government Technical Colleges in Osun state with means ranging from 1.87 to 2.47. Other paperless technologies such as e-fax, interactive whiteboard scanners, OCR, digital signature and PDF annotation software are not available with their mean responses ranging from 1.11 to 1.22.

Table 2: Extent of utilization of paperless technologies

S/N		VGE	GE	-SE	VSE	X	Decision
1.	Personal computers	1	88	89	-	2.51	Great extent
2.	Internet	5	101	54	18	2.52	Great extent
3.	iPads and tablets	37	50	78	18	2.54	Great extent
4.	Electronic fax machine	7	24	85	62	1.87	Small extent
5.	Smart board/Interactive whiteboard	-	5	86	87	1.54	Small extent
6.	Scanners	-	8	110	60	1.71	Small extent
7.	Optical character reader software	-	9	83	86	1.57	Small extent
8.	Digital signature	-	6	32	140	1.25	Very small extent
9.	Overhead projector	-	23	75	80	1.68	Small extent
10	PDF annotation software	-	6	65	107	1.43	Very small extent
Grand mean						1.86	Small extent

Notes: very great extent (VGE) – 4, great extent (GE) – 3, small extent (SE) – 2, very small extent (VSE) - 1

Table 2 revealed that Technical Colleges' staffs make use of personal computers, internet and iPads/Tablets to a great extent with mean responses of 2.51, 2.52 and 2.54 respectively. E-fax, smart board, scanners, OCR and overhead projector have small extent utilization with means ranging between 1.54 to 1.87. While digital signature and PDF annotation software have very small extent utilization with means of 1.25 and 1.43 respectively.

H₀1: Technical and administrative staff do not significantly differ in their ratings on availability of paperless technologies in the Technical Colleges in Osun state

Table 3: t-test of mean difference in availability

Group	N	Mean	SD	Df	t	Sig.	Decision
Technical/Teaching staff	153	1.5418	0.15	176	-0.297	0.330	Not significant
Admin staff	25	1.5520	0.17				

Note: P>0.05

The Table 3 above showed P-value of 0.330 which is greater than the 0.05 alpha level indicating no significant difference in the mean ratings of technical and administrative staff on the availability of paperless technology in Government Technical Colleges in Osun state.

H₀2: Technical and administrative staff do not significantly differ in their ratings on the utilization of paperless technologies in the Technical Colleges in Osun state

Table 4: t-test of mean difference in extent of utilization

Group	N	Mean	SD	Df	T	Sig.	Decision
Technical/ Teaching staff	153	1.8458	0.31	176	-1.536	0.0749	Not Significant
Admin Staff	25	1.9520	0.35				

Note: P>0.05

Table 4 revealed a P-value of 0.7 49 which is greater than 0.05 alpha level. Therefore, there is no significant difference in the mean ratings of technical and administrative staff on the utilization of paperless technologies in the technical colleges.

6. Discussion of Findings

On availability of paperless technologies in the Government Technical Colleges (GTC) in Osun state, it was found that personal computers, internet, iPads and overhead projectors are slightly available. This corroborate Oke and Oludele (2022) that the leading technologies in the developing countries like Nigeria include cell phones, computers and internet. Electronic fax machine, smart board/interactive whiteboard, and optical recognition software as well as digital signature and PDF annotation software are not available in the technical colleges in Osun state. Generally, paperless technologies are slightly available in the technical colleges. This is likely to be the reason why technical colleges students in Osun state were almost totally disconnected from academic activities while the COVID-19 pandemic lockdown of 2020 lasted in the State.

The extent of utilization of paperless technologies in the GTC in Osun state was found to be small. Only personal computers, internet and iPad/Tablets are being utilized in the colleges to a great extent. This corroborate Ayakwah et al. (2021) that use of modern technologies is not well adopted in developing countries and that the developing countries are lagging in term of adoption and utilization of paperless technologies. This finding also conforms with the earlier findings of Laryea (1999) that paperless technologies are not used systematically and effectively in higher education system.

The hypotheses testing significant difference in the mean ratings of technical and administrative staff revealed that both technical/teaching and administrative staff do not significantly differ in their ratings on the availability and the extent to which the available ones are being utilized. The ratings to a large extent are consistently reliable and this enhanced the confidence in the results.

7. Conclusions

Based on the findings, it could be concluded that paperless technologies are slightly available in Government Technical Colleges in Osun state and the college staff utilize the available paperless technologies to a small extent. These show that when paperless technologies are very much available, staff will make use of them to a great extent. And this, is expected, will lead to attainment of the educational objectives in the Technical Colleges. For policy and strategy recommendations, (i) the government should make every effort to provide paperless technologies necessary for effectiveness of staff in the technical colleges,

(ii) the monitoring board for technical education should give priority to making right technologies available for both teaching and non-teaching staff of Government Technical Colleges in the state, (iii) management of Government Technical Colleges should afford staff training opportunities on contemporary paperless technologies necessary for e-learning in order to make learners technologically competent to contribute meaningfully to national development, and (iv) staff of Government Technical Colleges should appreciate the new trends in e-learning/paperless technology as it affects their job performance and therefore intensify efforts at personal development in this direction.

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