

**PRINCIPALS' INFORMATION AND COMMUNICATION
TECHNOLOGY LITERACY AND DIGITAL TRACKING OF
SECONDARY SCHOOL ACTIVITIES IN OSUN STATE**

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Abstract

This study focused on the assessment of principals' information and communication technology (ICT) literacy on digital tracking of Osun state secondary schools' activities. This aimed to reveal the extent of the ICT literacy which the school principals possessed and the stages that required to be developed for the school activities using digital tracking. All principals (444) in public secondary schools in Osun State constituted the population for this study. Out of this population, a sample size of 167 principals was randomly selected at their annual meeting of 2022. An adapted instrument, titled Principals Tracking Secondary School Operations with ICT Devices (PTS2OICT) was used to elicit data from the respondents. The completed instruments were gathered, collated and analysed using descriptive (mean), and Pearson bivariate correlation statistic. The finding from the study revealed that the Osun state secondary school principals had good ICT literacy to aid digitalization of school activities. It further showed that there is statistically significant relationship between the secondary school principals' ICT literacy and their monitoring of activities with ICT devices at ($r = 0.691$, $p = 0.01$). The study concluded that though the principals possessed ICT literacy but will still be required to be trained on Internet usage that will enhance their digital management of school activities.

Keywords: Principal, ICT Literacy, Digital Tracking, Secondary School, School Activities, Correlation

Introduction

The globe is never static but dynamic. In view of this dynamics, the previous analogue system of the world is gradually turning influenced digitally. Every field of studies like medicine, agriculture, banking, environmental, education as well as individuals, professional organizations and experts in various fields are not left out without being digitized (Aliu, Aliu, & Gashi, 2023; Kara et al., 2023; Rolfes et al. 2023). In education, research has shown that computer devices are being used to drive teaching and learning in classrooms (Olusegun, Uranta, Ukhurebor, Jokthan, Bello & Nalwadda, 2023). Likewise, operations of school managers in this present Information and Communication Technology (ICT) age have taken a new dimension. In that the oversight functions of school managers like monitoring, supervision, accessing and dissemination of information, enrolment or admission exercises, document production, registration of candidates for external examinations, record keeping among others can no longer be manually supported. This is because these functions of school principals are fast becoming more complex and vaster and can no longer be handled manually. As such, the only option left for the school principals is to be adequately equipped with digital competencies that will empower them to execute their managerial operations in this current era in Osun State, Nigeria. To this end, this paper explores the ICT literacy with which Osun State school principals would digitally track teachers, learners as well as other relevant activities within the learning settings. To achieve this main goal, this study tends to briefly review previous literatures on concepts like ICT, digital or ICT age, various activities characterising ICT age, the current state of Nigerian school managers in digital age, and different activities of school managers that required digitization.

Digital Age

Various scholars have defined Information and Communication Technology (ICT) with different perspectives based on their field of studies. For instance, researcher like (Omiola & Abdulsalam, 2022; Unaida, Lukman, & Fakhrah, 2022) viewed ICT as a set of divers' technological tools and resources which could be utilized to communicate, create, disseminate, store, and monitor information. ICT is generally taken to mean technologies that support communication via computers. This could mean accessing and using Internet or Local networks, email, and World Wide Web technologies to transmit information to other individual(s).

Since the inception of ICT, eras were being defined in terms of technology, like ICT age or "digital age". Though, these terms could be used interchangeably. The term means the period involving "dramatic change in technology" (Gross, Katz, & Ruby, 2003, p. vii). It can be said that the era used technology to support the way people communicate and interact in their everyday and working lives (Cebollero,

Mørch, Piccinno, & Valtolina, 2013). This paper then argued that digital age is the current environment in which digital media and technologies are complexly present within all spheres of life.

However, it should be noted that digital era is the period in which technology useability is attached to the time an individual entered into this world. In this regard, digital generation is categorised in respect of year of entry into this world (Bohnert & Gracia, 2021). The digital generation is classified into six, namely: Silent Traditionalists, born from 1925–1945; second, Baby Boomers, born from 1945–1965; third, Gen X, born from 1965–1980; fourth, Millennials, born from 1980–1995; fifth, Gen Z, born from 1995–2010; and last, Gen Alpha, born 2010 to this day (Iqbal & Trevisan, 2022; Thomason, Weeks, & Galperin, 2022). According to Prensky (2001), these generations can be reclassified into major two major categories; digital immigrants, and digital native.

The digital immigrants are the people born or raised in an era when the world was yet to start turning toward a technology society. This generation is also known as Gen X, Baby Boomers, and Silent Traditionalists (Thomason et al., 2022). The digital immigrants are set of people who were not born exactly in the technology age but occasionally use ICT devices. These might be parents and teachers of present-day children and youth who desired to communicate in the same language with these students (Kurt, Güniç, & Ersoy, 2013). It is necessary to know that digital immigrants had to learn how to adapt to digital world. As such, digital immigrants are generally slower to leverage with technological devices. This is because digital immigrant is not as knowledgeable in technology usage as digital natives.

Digital natives know no other world than that of technology. They dream and play with technology irrespective of where they live and study (urban or rural). This age belongs to the groups who are “native speakers” of the digital language, like Internet, computers and video games Prensky (2001). The digital native belongs to three categories of generations, namely: Millennials (born from 1980–1995); Gen Z (born between 1995–2010); and Gen Alpha (born 2010 to the present day). The children of this generation are typically more fluent in digital discussions. This is because they were born and raised in the digital era. It is imperative to know that technology is integral part of the digital natives. This is because they can quickly adapt to the evolving technology. Digital natives can learn how to use any new technologies within the shortest possible time with ease (Kurt et al., 2013).

Impact of ICT on School Principals' Administrative Performance in Nigeria

Observation revealed that most school principals in the third world countries are digital immigrants. Since majority of school administrative activities in this current era require digital skills, the Nigerian school managers are therefore not to be left out in the change that is occasioned by digitization. A good number of studies have been conducted nationally and regionally to reveal the state of school managers in relation to digitization of operations.

A study by Olowo, Adelokun, Akinola, and Subair (2021) investigated ICT skills use on administrative effectiveness of Osun State schools' principals. The authors found that the principals were highly effective in their administrative duties as such demonstrated moderate skills in the use of ICT. Additionally, unstable power supply of electricity and limited funding hampered the principals utilizing their ICT skills to deploy ICT in administrative activities. It was also found that a significant relationship existed between the ICT skills and administrative effectiveness of the principals. The authors concluded that the principals' use of ICT skills positively contributed to administrative effectiveness in the schools. This implies that the principals in Nigerian schools should acquire and utilize the ICT skills to enable them function effectively in their administrative assignments as well as to compete with their counterparts globally. The question that begs for answer now is that would the moderate ICT competency of the principals be able to face the rigor of school management in this digital age?

To provide better insight to the forgoing question, a study previously conducted in Ilorin, Kwara State by Tijani, Ayoku, and Adeseke (2020) which examined the impact of ICT on secondary schools' principals' administrative performance in the metropolis. At the end of the study, the authors concluded that secondary school principals in Nigeria are not yet ready for technological advancement or development. One would pause to ask, why are the principals not ready? Literature alluded that four key factors drive integration of ICT into school system, namely; teachers' affection, curriculum, ICT facilities in the schools and teachers ICT competency. We all know that ICT facilities and adequate skills to drive the resources are germane problems. However, a good number of studies have recommended that improved training should be organized for school administrators and personal laptops should be provided to enhance practical-oriented training and skill acquisitions (Ogunshola & Adeniyi, 2017; Olowo et al., 2021; Tijani et al., 2020). Furthermore, Chuktu and Eton (2020) claimed that school principals in this 21st century lacked ICT literacy required to effectively manage their schools with digital devices. This then informed reasons why many secondary school managers were not utilizing ICT facilities for administrative processes like admission processes, information retrieval from ministry of education and dissemination to parents. Majority were found of risking their lives in an unsecured environment to

travel far distance to get information from the ministry. In Kenya, a study conducted Obungu (2016) by revealed that majority (55%) of secondary school principals had under gone ICT training while some (45%) indicated contrary. It is however noted that most qualitative findings are not detailed enough regarding training of personnel. For instance, in an interview conducted by Chepkonga (2015) in Kenya to understand views of public secondary schools' principals regarding ICT training that the school heads had ever attended. The author of the study found that although most of principals were trained but the training was only basic which resulted in most of them having inadequate ICT skills that could empower them to confidently deploy ICT into school management. This situation may likely be experience of Nigeria secondary school principals regarding ICT training.

ICT Integration in School Management

The management process generally follows the steps of planning, organizing, leading, and controlling (Santika, 2021). Literature (Chuktu & Eton, 2020) has pointed out that ICT devices play significant effect in school management. In that it helps the school managers, in this case, school head or principal (Hills, 2017) to perform the roles of planning, organizing, leading, and controlling. In this digital era, school principals have to shift from the traditional or conventional way of discharging their responsibilities to allow ICT be an integral part of everyday business. The regular routine of school principal includes; keeping up-to-date records of teachers and students, admission processes, information retrieval from ministry of education as well as information dissemination to stakeholders. All these can be made ease with the aid of the deployment of computer related devices.

Looking at the whole of national and international communities, modem societies now depend heavily on automation of information processing. In this automation, computers are at the centre and play increasing roles of automated communication, digital supervision, digital record keeping, digital registers of staff and students. With computer connected to other modem devices, messages (voice, data and graphics), are exchanged via satellite all over the world.

Teacher activities tracking in school is necessary in this digital age. Literature defined tracking as the act or process of following something or someone (Collins Dictionary, 2018). In this case, tracking could be regarded as process of monitoring or coordinating school system administratively. To effectively monitor, supervise or control school operations in this digital age, School Management application packages are required. The application package could be regarded as an indigenous software deigned to perform a local assignment. This suggested school management software by Adeleye (2021) is to ease school principals on effective school operations. The application will help in digitizing all school operations. For this to happen, experts in the field of computing could be commissioned to study all secondary school administrative operations in the state to incorporate them in a

single software called school management software. Some of the features that the application could capture may include; teachers' clock-in and clock-out, student daily registers in school, students' personal records, staff records, admission, examination registration, inventories, email among others.

Literature points out that many secondary school principals are still not engaging ICT facilities in school admission procession. The manual mode of processing admission is still in operation. This procedure is evident in some principals' constant usage of information dissemination to parents as well as message reception from the Education Ministry about admission procedures. As such, a good number secondary school principals still use manual method of message delivery to parents. It was noted in Mohamoud (2020)'s study that school principals in Mogadishu city never used ICT devices for school management activities. It can then be argued that this might negatively impacted the administrative effectiveness of the school principals if persisted. In Chuktu and Eton (2020) study of secondary school principals' use of ICT for record keeping as well as admission processes, they found that students' admission processes include advertising admission for each school year, buying admission form and script grading, admission shortlisting using E-transacts as well as online registration procedure (Chuktu & Eton, 2020). Other identified open online admission processes are; collection of candidate applications through the web portal, collection of application fee, review of application form and notification of admission status (Adeleye, 2021; Chuktu & Eton, 2020).

In addition, modern device like biometric machine could be used in tracking the inflow of both teachers and students into the school. This modern technology recognizes, matches and keeps records of teachers and students' fingerprints. In this case, one has to sign in by putting his or her finger into the machine, and the machine records the time, day, and hour one has signed in (Mgonja & Makulilo, 2022). In a study by Masegenya and Mwila (2023), found that 85% of the Tanzania school teachers agreed that ICT devices are being used in supervising their classroom activities.

Considering the ancient Babylonians' 3500 BC where record keeping was on clay tablets and the writings were on the clay tablets passed to Kings and Princes (Palaima, 2000). Also, in the typical rural African setting, dissemination of information was through the Town Crier. After the clay tablet, came the scroll. It is on record that the first copy of scriptures written in Greek and Hebrew was written on scroll. As Empires became stronger, the art of printing was invented to enable easy communication of news to far places. Printing was one of the most effective media of communication for a long time. With advent of fourth industrial revolution, came series of Information Transmission Technologies. Effective record keeping is an essential and integral part of school managers' duty. Nwangwu (2013) argued that effective record keeping is vital to educational development.

Chuktu and Eton (2020) examined secondary school principals' utilization of ICT for administrative effectiveness in Calabar South Local government area of Cross River State. The authors found that principals' used ICT for record keeping and admission processes. The study recommended that provision should be made to train school principals in innovative ICT.

Information dissemination is another key duty of school managers. It has been carried out mainly by manual approaches. However, information dissemination with the invention of electronics was a welcome development due to its advantages over printed materials: Radio, television, telex, telephone, facsimile and video-conferencing. These media have the immediate advantage of disseminating information to a larger audience and feedback could be attained almost at the same time. In this digital age, school principals could adopt different social media platform to disseminate their information to teachers, students, parents as well as other stakeholders. Examples of these social media are Facebook (2.74 billion users), YouTube (2.29 billion users), WhatsApp (2 billion users), Facebook Messenger (1.3 billion users), Instagram (1.22 billion users), WeChat (1.21 billion users), TikTok (689 million users), Twitter among, Telegram and host of others (Alebiosu, 2021). These social media tools are no longer optional in school administrative activities but are to be seen as integral components of effective management in digital age of school leadership (Cox & McLeod, 2014).

Conclusively, based on the forgoing, it can be concluded that the functions of school managers are indeed complex and vaster than what they can handled manually. The nature of our environment, the insecurity challenges and high level of crimes that plagued our society had left no option for the school principals in Osun State than to be adequately equipped with digital competencies and ICT resources that will fully launch their managerial operations in this current era.

Research Question

What ICT literacy do Osun state secondary school principals possessed to digitalized secondary school management?

Hypothesis

There is no significant relationship between the principals' level of ICT literacy and tracking school activities with the use of ICT devices.

Methodology

This study adopted a survey research design that was guided by TPACK. The design was employed to gain greater understanding of how Osun state secondary school principals could digitally track school activities. The sample of the study consisted of 167 (38%) principals drawn randomly from the entire population of

440 public secondary school principals in the state using simple random sampling technique.

A designed instrument, titled Principals Tracking Secondary School Operations with ICT Devices (PTS2OICT) adapted from the scale of Dallas County Community College District (2014)'s study was used to elicit information from the principals. The instrument consisted of eight sections, A to H. Section A contained six items on demographic information of the principals. Section 'B' contained five items with scale ranging from 0 to 2, '0'= 'No Knowledge', '1'= 'Limited Knowledge', and '2'= 'Knowledgeable'. This scale was used for section B to H. However, the items in 'B' are to measure the principals' ability to use computer file management. Likewise, Section C consisted of eight items which measured the principals' ability to use Internet facilities. Section D consisted of 10 items which measured the principals' ability to access information and disseminate information with the use of email. Also, section E consisted of 10 items which assessed the principals' record keeping with use electronic spreadsheets. Section F consisted of eight items which measured the principals' ability to produce documents with word processors. Section G consisted of six items which assessed the principals' knowledge on concepts of information technology. Finally, section H consisted of six items which measured the principals' ability to track or monitor activities in school premises with the aid of ICT tools.

The instrument was administered to the principals during their annual general meeting in 2022. The completed instrument was collected, and analysed using mean, and Pearson bivariate correlation statistic. The results of the analysis are presented in the next section of this paper.

The study obeyed ethical principles that protect all research participants rights. It was made known to participants that they should voluntarily participate and that their participation would be on anonymity, confidentiality, and the results would be communicated to them. However, they should feel free to opt out at any point of the study without penalty.

Results

What ICT literacy do Osun state secondary school principals possessed to digitalized school management?

With respect to the question above, seven variables were used to categorize the ICT literacy possessed by the school principals. The mean score of each of the variables was taken to respond to the research question. The data gathered from the respondents were analyzed using mean. A bench mark of 1.0 was used for the mean rating. The result was as presented in Table 1.

Table 1

Secondary school principals ICT literacy

Factors of ICT Literacy	Mean
File Management	1.16
Use of Internet	0.90
Accessing and dissemination of information with use of E-mail	1.13
Record Keeping with use of spreadsheet	1.13
Document production with use of MSWord	1.17
Basic Concepts of Information Technology (IT)	1.07
Tracking School Activities with ICT devices	0.75

From Table 1, the result shows that out of seven factors, five mean scores, File Management (1.16), Accessing and dissemination of information with use of E-mail (1.13), Record Keeping with use of spreadsheet (1.13), Document production with use of MSWord (1.17), and Basic Concepts of Information Technology (1.07) were adjudged higher than the bench mark mean score. While use of Internet (0.90) and Tracking School Activities with ICT devices (0.75) were considered a little below the bench mark score. The finding indicated that the principals have ICT literacy for file management, access and disseminate information using email, keep school records with the use of spreadsheet, use MSWord to document files, and have basic concepts of IT. However, they lacked the skills to use internet for tracking school activities. Based on this finding, it could be said that the principals had good ICT literacy to aid digitalization of school activities in the study area.

There is no significant relationship between Osun State secondary school principal ICT literacy and school management with ICT

To test this hypothesis, the data collected from the secondary school principals were subjected to Pearson bivariate correlation statistic. The result of the analysis was presented in Table 2.

Table 2.

Relationship between school principals ICT literacy and management of school activities with ICT devices

		ICT Literacy Level	Tracking School Activities with ICT devices
Literacy Level	Pearson Correlation	1	.691**
	Sig. (2-tailed)		.000
	N	151	151
Tracking School Activities with ICT devices	Pearson Correlation	.691**	1
	Sig. (2-tailed)	.000	
	N	151	151

** . Correlation is significant at the 0.01 level (2-tailed).

From the result of the analysis in Table 2, which tested the hypothesis that there is no significant relationship between school principals ICT literacy and tracking of school activities with the use of ICT devices. The result showed that there is statistically significant relationship between the secondary school principals' ICT literacy and their monitoring of activities with ICT devices ($r = 0.691$, $p = 0.01$).

Discussion

This paper assessed the ICT literacy with which Osun State secondary school principals possessed to digitally track school activities; and investigated the relationship between the principals ICT literacy and tracking school activities with the use of ICT devices in Osun state. This was with the aim to unravel the status of ICT literacy that the school principals in Osun State secondary schools possessed to digitally track activities. In addition, to predict other ICT literacy stages that are required to be developed for effective digital tracking in Osun State secondary schools. Thus, this paper found that the Osun state secondary school principals had the ICT literacy to electronically manage files, access and disseminate information using email, use spreadsheet to keep school records, document files with the use

MSWord, and possessed basic concepts of IT. However, it was revealed in the findings that, the principals lacked the required skills to use Internet for tracking of school activities. This implies that the principals are limited in major skill to track school activities electronically as pictured in PCK (Koehler et al., 2013). In other words, the principals' knowledge to transmit computer skills to teachers in schools is lacking. This might be due to the principals' personal characteristics like age, area of specialization, access to ICT facilities among others. This finding confirmed the assertion of Tijani et al. (2020) who concluded that principals in Kwara state are not yet ready to fully deploy technology in secondary schools. Contrary to the assertion of Tijani et al. (2020), the findings by Chuktu and Eton (2020) revealed that principals in Calabar, Cross Rivers state of Nigeria utilized ICT for administrative activities like record keeping and admission processes. The principals used ICT for publicity, sales of admission form and script grading, admission shortlisting through E-transacts and other registration processes. This implies that the school principals in Calabar South Local Government Area are more skilful in use of Internet facilities to process school activities than their counterpart in this current paper.

The finding of this study revealed that there is statistically significant relationship between the secondary school principals' ICT literacy and tracking of school activities with ICT devices ($r = 0.691$, $p = 0.01$). This implied that without adequate ICT literacy in the use of the ICT devices, the principals cannot track school activities technologically. It can then be argued that the principals required TPACK to digitally track any school activity. The finding is related to that of Choge (2019) who found statistically significant and positive strong correlation between Kenya primary school head teacher's ICT literacy and ICT integration in human resource data management ($r = 0.821$, $p = 0.02$).

Conclusion

In summary, this study focused on the assessment of principals' ICT literacy on digital tracking of secondary schools' activities in Osun state. Based on the findings of the study, the school principals possessed ICT literacy in the use of electronic files management, accessing and disseminating information via email, use spreadsheet to keep school records, files documentation with the use MSWord, and had basic concepts of information technology. However, the principals were limited in the required skills to use Internet for to deploy tracking tools for other school activities. This limitation had implications for school security, promptness and presences of classroom teachers as well as students in schools, and others. It is therefore imperative that Osun state school principals' internet skills be developed to meet their counterparts in other part of the world. Moreso, further studies should consider designing and implementation of indigenous management software for the principals in the state

Recommendations

Based on the major findings of this study, it was recommended that:

- i. Secondary school principals internet skills should be developed to track school activities electronically.
- ii. Workshop should be organized to train the principals in the use of Internet for managerial activities
- iii. Teachers training institutions on educational management should incorporate ICT skill development into their curriculum
- iv. indigenous management software for secondary school principals should be designed

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