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Digital Technology Adoption and School Leadership in the Post-Pandemic Era: Insights from High School Leaders

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Abstract: Integrating digital technologies into the educational landscape seems to be a defining factor for learning and leading in the pandemic and post-pandemic era. Hence, this study examines the impact of digital technology adoption on school leadership and management in the post-pandemic era, focusing on high school leaders' experiences in Oyo State, Nigeria. The theoretical framework is anchored on the Technology Acceptance Model (TAM), which elucidates factors influencing technology adoption through perceived usefulness, perceived ease of use, and attitude toward usage. The study used a descriptive research design and sampled 227 high school leaders across three senatorial districts, collecting data via a validated questionnaire. The reliability index of the instruments is as follows: school leaders' digital technology adoption (α =0.85), digital media tools' usage (α =0.95), and professional development opportunities (α =0.84). Results indicate a positive influence of digital technology on school leadership and management, enhancing communication, virtual administration, performance monitoring, and breaking spatial-temporal barriers. WhatsApp, Email, Google Forms, and Zoom were identified as the most frequently used digital media tools, while professional development in digital technologies was provided to a moderate extent for 58.2% of high leaders. The findings demonstrate the need for more extensive professional development programs by indicating a considerable investment in school leaders' digital competency development, but not all-encompassing. Recommendations include enhancing the quality and frequency of training, promoting diverse digital tools, tailoring professional development to specific needs, and implementing regular assessment and feedback systems to improve digital technology integration in schools.

Keywords: Digital technology adoption, school leadership, technology acceptance model, post-pandemic era.

1. Introduction

Global upheavals and disturbances, such as the COVID-19 pandemic, have been viewed as challenging in modern times due to their effects on everyday living (Mahlaba, 2022; Opesemowo et al., 2022; Opesemowo et al., 2024). The COVID-19 pandemic signalled a turning point in the history of humankind, profoundly disrupting the standard order and compelling institutions to navigate and adapt to digital technologies rapidly. Governments, businesses, and educational institutions were compelled to adjust to digital platforms to minimise interruptions in response to the pandemic. Meanwhile, educational disruptions were mitigated by institutions in developed nations that swiftly transitioned from face-to-face pedagogical instructions to virtual modes in response to the dictates of the Fourth Industrial Revolution (4IR) using tools such as robotics, virtual reality, artificial intelligence, and intelligent tutoring. For most developing nations, such as Nigeria, transitioning to the online environment proved challenging, but COVID-19 provided a unique chance to advance on a new digital path (Maphosa & Maphosa, 2023). It suffices to say that the pandemic expedited the global digital revolution in education and sped up digital technology for leadership and remote instruction (Cucinotta & Vanelli, 2020; Mhlanga & Moloi, 2020). The digital mileage recorded today would probably not have been attainable, if not impossible, in the absence of the pandemic. Put

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another way, the pandemic was occasioned by the adoption of remote teaching and learning, especially in African nations (Okunlola et al., 2024).

In the current educational landscape, schools worldwide are undergoing a transition to hybrid learning environments. This shift, prompted by the pandemic, has highlighted the crucial role of digital technology tools in sustaining the educational system and emphasised the need for innovative school leadership in the post-pandemic era. Ogle (2002) asserts that the digital era has brought forth an unprecedented range of technology tools available to school leaders, including communication tools, security systems, administrative management software, and instructional support software. As a result, school principals now have access to a wealth of data and computational capacity that was previously unattainable due to the increased integration of technology into teaching, learning, and interactions between educators and students (Sorensen, 2019). Consequently, the integration of digital technology tools appears to be a defining factor for the current and future landscape of learning and leadership. In the post-pandemic era, high school leaders must stay informed about digital transformations as the world adapts. Okunlola et al. (2024) posit that the pandemic has placed unique responsibilities on digital leaders, and the post-pandemic period will impose even more digital roles and obligations on school leaders. Digital leaders will need to keep pace with emerging digital revolution tools to foster growth and development in the educational ecosystem.

The twenty-first century has witnessed a widespread adoption and application of digital technologies in various sectors (Kumi-Yeboah et al., 2020; Robinson & Hullinger, 2008). Consequently, education leaders must recognise the necessity of technology adoption to be effective and efficient in today's educational climate (Obiora & Uche, 2024). These digital technologies encompass all electronic tools, systems, equipment, and educational resources, such as mobile computing, cloud computing, online gaming, multimedia, and 3D printing (Kumi-Yeboah et al., 2020). Similarly, Autio et al. (2018) describe digital technology as a network that includes fixed-line and wireless networks, transmission systems, cloud-based services, sensors, computer software, and devices like smartphones. However, Livingstone et al. (2017) argue that digital technology should encompass more than just gadgets or services. Therefore, the field of study known as digital technology encompasses the development and use of digital or computerised tools, processes, systems, and other equipment (Uzuegbunam, 2021). Additionally, unlike analogue media, which employs tangible elements such as text, music, video, and pictures, digital technology encodes information or data using numbers, algorithms, or binary codes (Siapera, 2018). These technologies have recently gained popularity as instrumental tools for administrative support (Seyal, 2012). Consequently, adopting digital technology will require strategic planning, effective leadership, and the systematic integration of new technologies into the contemporary educational framework to ensure digital progress in educational institutions (Power & Heavin, 2018).

However, digital leadership involves much more than just providing hardware and software; it also involves aligning goals with organisational structures, utilising technical tools, and developing the workforce's ability to make the entire shift seem smooth and significant (Cortellazzo et al., 2019). The significance of school principals' leadership in integrating technology into the classroom has been emphasised; however, there are currently only loose recommendations for carrying out and sustaining the transition process (Ruloff & Petko, 2021). The role of school leaders in integrating technology into education is so fundamental because school leaders serve as digital leaders. Meanwhile, the pandemic period attests to the fact that school leaders were inexperienced and untrained during extraordinary times (Buric, 2020). This suggests weak guidelines or none in some clime for integrating technology into education during the pandemic. Lien et al. (2022) equally corroborate that few standard operating protocols could be followed during the epidemic. Therefore, school administrators had to use their judgment. This impeded the smooth adoption of these digital tools.

However, prior to the COVID-19 pandemic and its aftermath, there appeared to be no established blueprint guiding the adoption or integration of technology in education in Nigeria. In contrast, guidelines for effective school leadership in the United States of America (USA) did exist prior to the pandemic, providing administrators and educational leaders with strategies for incorporating technology into education (Ruloff & Petko, 2021). This striking contrast highlights the significant disparity in digital adoption and its progress between developed and developing nations. In the USA, the International Society for Technology in Education (ISTE), a nonprofit organisation, introduced the ISTE Standards, which serve as the standard for the adoption and use of technology in education. The ISTE standards (2018) offer an innovative teaching, learning, and leadership framework. In summary, the ISTE Standards provide the following guidelines for the integration of technology in education.

The ISTE Standards demonstrate how leaders can leverage technology to enhance equity, inclusivity, and digital citizenship practices. Leaders involve others in formulating a vision, developing a strategic plan, and establishing an ongoing evaluation process to transform education using technology. Leaders foster a culture that empowers teachers and students to utilise technology in innovative ways to enhance teaching and learning. Leaders assemble teams and implement systems to support the use of technology in learning, ensuring its continued improvement. Lastly, leaders role-model and encourage continuous professional development for both themselves and others (ISTE, 2018: p.7). Consequently, Nigeria would require an equivalent set of standards, comparable to the ISTE Standards, to effectively integrate technology into education and school leadership.

Okeke (2019) argued that despite the government's adoption of Information and Communication Technology (ICT) policies and the provision of ICT infrastructure in schools, the situation in Nigeria differs. School principals in Nigeria still do not fully appreciate the value of technological leadership in enhancing classroom teaching and learning. As a result, there is a new concept in school leadership known as "technology leadership," which emphasises the importance of principals promoting the use of ICT for teaching and learning, a practice that is uncommon in Nigeria but prevalent in industrialised nations.

Therefore, raising individuals who are well-equipped for the contemporary digital era is a paramount issue that today's school leaders must address. Consequently, there is an increasing recognition of the crucial roles that school administrators play in digital leadership (Karakose et al., 2021). In order to effectively manage the growth of digital technologies in schools, provide appropriate gu n nn idance, and facilitate the adoption and utilisation of technology in the instructional environment, school leaders must also address any deficiencies in their technological knowledge and skills (Aksal, 2015; Antonopoulou et al., 2020; Karakose et al., 2021). Thus, school leadership is indispensable for achieving digital transformation in high schools. While digital technologies are of utmost importance, leadership specifically related to technology is necessary to attain organisational objectives in Nigerian schools. Consequently, this study explores the disparity between the adoption of digital technology and school leadership, particularly in the context of the post-pandemic era.

To accomplish this objective, three research questions were formulated:

- What is the influence of digital technology adoption on school leadership and management in the post-pandemic era?
- What digital media tools are the most commonly used among high school leaders in the post-pandemic era?
- To what extent do high school leaders provide with professional development opportunities in digital technologies in the post-pandemic era?

2. Literature Review

The following literature review covers the adoption of digital technology in school leadership, the use of digital media tools in school leadership, and professional development opportunities related to school leadership.

2.1 Digital technology adoption and school leadership

The goals of school leadership, which is a transformational leadership approach, are to advance educational institutions, bring about beneficial changes, and help stakeholders and students realise their full potential (Al.Oraifan, 2021; Omodan, 2022). In achieving this, Obiora and Uche (2024) contend that technological adaptations are what Nigerian society needs to continue to innovate and advance education. Reaching a critical milestone in digital technology adoption in school leadership would be difficult to realise unless the principals lead from the front by demonstrating digital technology capacity. On this, Thannimalai and Raman (2018) argue that the school principal's leadership is crucial to the success of technology integration in education and would not achieve much unless the school leaders take ownership of technology adoption.

The benefits of digital technology adoption in school leadership led Ruloff and Petko (2021) to study school principals' educational goals and leadership styles for digital transformation in upper secondary schools. The study used an exploratory research type based on interviews with nine principals of upper secondary schools in Central Switzerland. The study reveals that transformational leadership is linked to quicker adoption of digital technologies.

Another study by Scully et al. (2021) investigated digital learning in secondary schools before and during the Covid-19 epidemic. The study's outcome showed that 72 secondary school principals have a favourable attitude toward technology and align with suggestions for digital learning best practices. This positive disposition attests to the adoption of digital technology by principals in school leadership.

In addition, the study by Karakose et al. (2021), who examined teachers' perspectives on school principals' digital leadership roles and technology capabilities during the COVID-19 pandemic, is highly instructive. The study, which involved 89 Master's degree holders in teaching, discovered that principals promoted a digital learning culture, supported digital transformation, and used digital tools appropriately. The study recognised three areas of digital leadership abilities: technology usage, management skills, and individual talents. These findings show that principals lead as digital leaders in school leadership and attest to high school leaders' propensity for digital technology adoption.

2.2 Digital media tools and school leadership

The era of digital technology has led to an unparalleled variety of digital tools that school principals can employ in their many capacities. Perhaps school leaders are embracing it due to social media, which offers a plethora of free tools (Jones & Kennedy, 2022). In the observation of Obiora and Uche (2024), technology is becoming more prevalent and is here to stay to ensure that Nigerian education develops pragmatically; leaders in both the educational system and the schools must make the most of its applications. A study by Powers and Green (2016), which surveyed principals' perspectives on social media in schools, found that principals use social media for communication and instructional leadership. In a similar vein, Monteiro et al. (2023) investigated education in an emergency, focusing on school management and digital technologies to determine the primary obstacles school administrators experienced during COVID-19 and how they overcame them using digital technology. It was discovered that they had problems with communication, growing disparities, and a lack of resources and training, but Microsoft Office apps were the most often used digital tools, followed by cloud, Microsoft Teams, email, and school websites. Another study that demonstrated the influence of digital media in organisational leadership is that of Bartosik-Purgat

and Bednarz (2020) who conducted an investigation on the usage of new media tools, lists the most widely used new media technologies, and looks at how much each depends on a specific location. The major findings underline the importance of businesses' websites and Facebook pages for organisational activities. In a related study, Bond et al. (2018) investigated higher education use and perceived digital media, it was found that ICT skills are becoming increasingly crucial in the workplace, making digitalisation in higher education (HE) a critical problem. Another study that established a correlation between social media and school leadership is that of Kimena (2022) who found that WhatsApp is the most extensively utilised platform, followed by Facebook, Zoom, Google Meet, and Google Classrooms. These studies affirmed the application and influence of digital media tools in school leadership.

2.3 Professional development opportunities and school leadership

Botha (2012) posited that the effectiveness of schools in promoting student learning is often attributed to the professional development of school leaders. Peterson (2002) conducted an article examining the significance of professional development programs for principals and identified various sources of information for professional development, including associations, institutions, government agencies, and not-for-profit organisations. It was emphasised that professional development should cater to the needs of experienced school administrators who have completed current programs but still desire to enhance their knowledge in specific areas. This may include activities such as reading and discussion groups, study groups, advanced seminars like the CASL Coaching Experience, lectures by distinguished practitioners, participation in national conferences or academies, or opportunities to work as coaches, facilitators, or trainers themselves. To stay current, professional development programs should also integrate the latest information technologies, such as online courses, live streaming, online forums, and phone coaching. Mashaya et al. (2022) conducted a study on professional development for school leaders to investigate how it could facilitate effective teaching and learning. The study employed a mixed-method approach, collecting data that was analysed using content analysis for qualitative data and SPSS version 20 software to analyse quantitative data. Findings from the study indicated that school leaders acquired leadership skills and organisational management through professional development and training. Şenol (2020) further elucidated the role of professional development in school leadership, arguing that the evolving nature of globalisation necessitates ongoing professional development for educational leaders. Therefore, by participating in purposefully designed professional development programs, leaders can remain up-to-date with current practices and apply newly acquired skills.

3. Theoretical Framework

The study is lensed via the Technology Acceptance Model (TAM). In the 1980s, as personal computer usage increased, studies on technology adoption gained significant attention (Marikyan & Papagiannidis, 2023). Consequently, Davis (1986) developed the technology acceptance model (TAM). TAM aims to explain people's decisions about whether or not to use a specific technology when completing a given assignment. Several researchers have extended and modified TAM. The Theory of Reasoned Action (TRA) represents the origin of TAM (Ajzen & Fishbein, 1980). Fred Davis adapted the TRA and proposed the TAM (Wallace & Sheetz, 2014). Today, TAM has become an essential framework for comprehending factors influencing people's decisions to embrace or reject technology. Numerous studies demonstrate the model's broad applicability to various technologies and people (Venkatesh et al.,2003).

According to TAM (Figure 1), three factors—perceived usefulness, perceived ease of use, and attitude toward using—can explain why users are motivated (Granić & Marangunić, 2019). Perceived usefulness is the degree to which a person believes using a particular technology enhances performance, while the degree to which a person feels that utilising a specific system requires no effort is known as perceived ease of use (Marikyan & Papagiannidis, 2023). In addition, TAM

describes technology acceptance as a three-step process in which external factors (features of the system design) elicit cognitive responses (perceived usefulness and ease of use), which in turn stimulate an effective response (intention and attitude toward using the technology), thereby influencing use behaviour (Davis, 1989; Marikyan & Papagiannidis, 2023).

Research has demonstrated that TAM has become a preeminent scientific paradigm for examining how well students, instructors, and other stakeholders adopt learning technologies (Davis, 2011). Hence, high school leaders now need to contend with incorporating digital technology to improve student results and maintain learning continuity in the post-pandemic age. The Technology Acceptance Model (TAM) offers a robust framework for comprehending the elements influencing these leaders' choices in adopting and successfully integrating digital technologies into their educational institutions. On perceived usefulness, high school leaders would embrace digital technology to enhance the quality of instruction and student achievement once it is perceived to serve useful purposes in teaching, learning, and administrative purposes. They could, for example, think about how a new learning management system (LMS) might improve student engagement, increase administrative efficiency, or offer improved analytics on student performance. Leaders are inclined to embrace technology if they feel that implementing these tools would significantly enhance the optimal performance of the school system. On perceived ease of use, digital technologies' perceived usability plays a critical role in their adoption. High school leaders would need to have faith that the new systems are simple to use and don't require a lot of technical know-how or lengthy training. A principal may be more likely to adopt a new online grading system, for instance, if it works well with current systems and is easy to use and maintain. On attitude toward using digital technologies, high school leaders' decisions to adopt them are primarily influenced by their general attitudes regarding these tools. Positive experiences with technology can foster a more positive attitude, such as successful prior usage or obvious advantages from technology use. Offering pilot trials, success stories, and demonstrations of the real benefits of technology to leaders might help foster a positive mindset. On the other hand, resistance may result from prior unpleasant experiences. To promote favourable attitudes and widespread adoption, educational policymakers and technology providers can design and offer digital technologies that emphasise their utility and simplicity of use in the post-pandemic period.

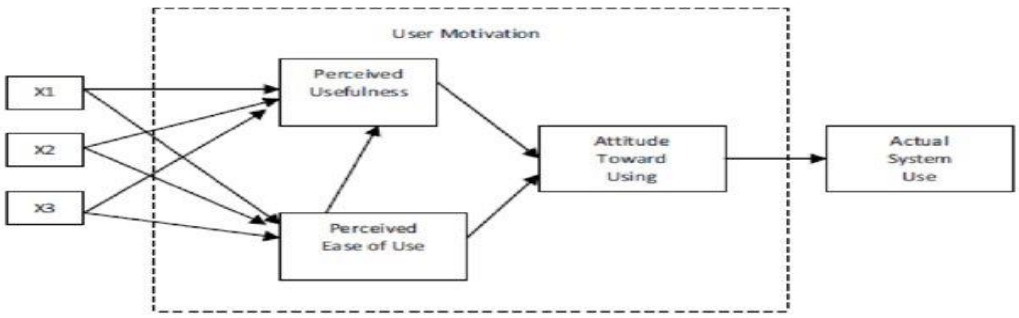

Figure 1: *Technology acceptance model (Davis,1986)*

4. Materials and Methods

This study utilised a descriptive research design, a methodological design that seeks to provide a comprehensive and precise depiction of phenomena in their natural state (Cohen et al., 2018). This helps to investigate the impact of digital technology adoption on school leadership in the post-pandemic era. A multi-stage selection procedure was adopted to select respondents across Oyo State's three senatorial districts in Southwestern Nigeria. In the first stage, ten local government areas were purposively selected across the three senatorial districts, while in the second stage, ten secondary schools were randomly selected for the study. In the last stage, a total enumeration of high

school leaders, including the head of department, vice principal, and principal, was employed. Two hundred and twenty-seven respondents, including four principals, 29 vice principals, and 194 heads of department, returned the completed questionnaire.

The instrument used for this study was a researcher-designed questionnaire consisting of three separate instruments: the School Leaders' Digital Technology Adoption Questionnaire (SLDTAQ), the Digital Media Tools' Usage Questionnaire (DMTUQ), and the Digital Technology Professional Development Questionnaire (DTPDQ). These instruments were utilised to collect data, with sections A, B, C, and D included in the questionnaire. Section A contained demographic data of the respondents, while sections B, C, and D contained a total of 29 items. To ensure validity and reliability, the instruments were piloted with 40 high school leaders from two secondary schools not involved in the study. Cronbach Alpha (α) was used to measure the internal consistency of the items and determine the reliability of the instruments. The obtained reliability index was as follows: school leaders' digital technology adoption (α = 0.85), digital media tools' usage (α = 0.95), and professional development opportunities (α = 0.84) at a significance level of 0.05. Finally, the validated instruments were administered by the researcher and two research assistants to the respondents in the selected schools, in a face-to-face setting.

The data was analysed using descriptive statistics for research questions and the respondents' socio-demographic variables. Descriptive statistics employed include simple percentages, means, and standard deviations. The researcher obtained permission from the Oyo State Teaching Service Commission and sought permission from principals of all high schools used for the study in Oyo State, Nigeria. The study's participants were kept anonymous and were given the option to withdraw at any moment. Thus, the study complied with all ethical requirements.

5. Presentation of Results

Below is the presentation of the results, beginning with a description of the participants' demographic characteristics, followed by answers to the research questions.

5.1 Demographic characteristics of the participants

The socio-demographic characteristics of the school leaders who participated in this study showed that 52.4% of the participants were males, while 47.6% were females. Additionally, 85.5% of the school leaders sampled were Heads of Departments (HODs), 12.8% were Vice Principals, and 1.8% were Principals. Moreover, 37.0% of the participants were within the age range of 21 – 30 years; 24.2% were within 41 – 60 years of age; 22.9% were between 31 – 40 years of age, while 15.9% of the school leaders sampled were within the age range of 21 – 30 years. In addition, 41.0% of the school leaders held a Bachelor's Degree; 37.9% of them were Master's degree holders, while 21.1% acquired other educational qualifications. Furthermore, 25.1% of the school leaders had 21 years and above experience; 21.1% were within 16 – 20 years of experience; 20.7% were within 0 – 5 years of experience; 17.6% were within 10 – 15 years of experience, while 15.4% were within 6 – 10 years of experience.

5.2 Answering research questions

Research Question 1: What is the influence of digital technology adoption on school leadership and management in the post-pandemic era?

School leaders' responses on the influence of digital technology adoption on school leadership and management were subjected to item-by-item analysis using mean statistics, which were further subjected to weighted mean. Given that the questionnaire items were structured in a four-response type, a cut-off mean value of 2.50 was used as the baseline for decision-making. Since the influence of adopting digital technology tools on school leadership and management could be positive or negative, a weighted mean score equal to or above 2.50 signified a positive influence. Conversely, a

score below 2.50 indicated a negative influence. The statistics of participants' responses are shown in Table 1.

Table 1: *Influence of digital technology adoption on school leadership and management*

SN	Items	Mean	S. D
1	Digital technologies enhance school leadership and management.	3.14	0.784
2	Digital technologies ensure ease of communication with teachers and students.	3.24	0.715
3	Digital technologies aid in the virtual administration of schools.	3.06	0.753
4	Digital technologies help communicate student progress to parents.	3.12	0.786
5	Digital technologies assist in computing and analysing student performance.	3.23	0.711
6	Digital technologies aid virtual/remote meetings.	3.12	0.786
7	Digital technologies help monitor performance in real-time.	3.12	0.678
8	Digital technologies help to manage schools without barriers of space and time.	2.96	0.803
	Weighted Mean	**3.12**	
	Remark	**Positive Influence**	

As revealed in Table 1, the influence of digital technology adoption on school leadership and management was positive. Thus, digital technologies enhance school leadership and management by ensuring ease of communication with teachers and students, aiding in the virtual administration of schools, helping in communicating student progress with parents, assisting in computing and analysing student performance, aiding virtual/remote meetings, helping in monitoring performance in real-time, and helping to manage schools without barriers of space and time.

Research Question 2: What digital media tools are the most commonly used among high school leaders in the post-pandemic era?

Given that the questionnaire on the usage of digital media tools by high school leaders contained 14 items structured in four response types, responses on the usage were subjected to item-by-item analysis using mean statistics. A cut-off mean value of 2.50 was used as the baseline for decision-making. Thus, items with a mean score equal to or above 2.50 were classified as "frequently used," while those with a mean score below 2.50 were classified as "not used." The statistics of participants' responses are shown in Table 2.

Table 2: *Frequency of digital media tools usage*

Digital Technology Tools	Mean	Std. Dev	Rating
WhatsApp	2.95	1.621	1st
Email	2.90	1.598	2nd
Google forms	2.82	1.403	3rd
Zoom	2.69	1.310	4th
PowerPoint	2.58	1.110	5th

Skype	2.40	1.005	6th
Microsoft Excel	2.38	1.002	7th
Microsoft Teams	2.30	0.985	8th
Facebook	2.18	0.974	9th
Blackboard	2.00	0.944	10th
Linkedln	1.90	0.935	11th
Slack	1.82	0.933	12th
TikTok	1.76	0.927	13th
Instagram	1.71	0.910	14th

Table 2 offers insightful information on how leaders at high schools use digital media tools in the post-pandemic period. The study established which communication and instructional methods were most often used, emphasising calculating mean scores to ascertain usage frequency. Based on the data, the most popular tools were WhatsApp, Email, Google Forms, and Zoom. Their mean scores were higher than 2.50, suggesting they were used often. With a mean score of 2.95, WhatsApp clearly emerged as the most popular tool, closely followed by email at 2.90, indicating their critical importance in promoting communication and information sharing among high school leaders. Zoom and Google Forms also showed notable usage, with mean scores of 2.69 and 2.82, respectively. In contrast, the mean ratings of Slack, TikTok, and Instagram were lower, suggesting that high school leaders do not frequently use these media for education and communication.

Research Question 3: To what extent do high school leaders provide with professional development opportunities in digital technologies in the post-pandemic era?

School leaders' responses to the extent of professional development opportunities in digital technologies were obtained and subjected to percentage analysis. The questionnaire on professional development opportunities in digital technologies contained seven items structured in a four-response type. The minimum, maximum, and range scores were 7, 28, and 21, respectively. The range was divided into three responses: high extent, moderate extent, and low extent (i.e., 21/3=7). Thus, school leaders with scores ranging from 7 – 14, 15 – 21, and 22 – 28 were categorised as those with low, moderate, or high professional development opportunities in digital technologies. Table 3 displays the summary statistics.

Table 3: *Extent of high school leaders with professional development opportunities in digital technologies*

Professional Development Opportunities in Digital Technologies	**Score Range**	**Frequency**	**Percentage**
High Extent	22 – 28	67	29.5
Moderate Extent	15 – 21	132	58.2
Low Extent	7 – 14	28	12.3
Total		227	100.0

Table 3 shows that 58.2% of the school leaders were provided with professional development opportunities in digital technologies to a moderate extent, while 29.5% were provided to a high extent, and 12.3% of them were provided with professional development opportunities in digital technologies to a low extent. Hence, the majority (58.2%) of the school leaders were provided with professional development opportunities in digital technologies to a moderate extent.

5.3 Discussion of findings

The findings of the study highlight the significant impact of adopting digital technology on school leadership and management in the post-pandemic era. The responses from school leaders indicate a

positive influence, with weighted mean scores above the cut-off value of 2.50 across various metrics. Digital technologies are found to enhance school leadership, facilitate communication with teachers and students, support virtual administration, enable effective parent-student progress communication, assist in computing and analysing student performance, aid in virtual meetings, monitor performance in real-time and manage schools without spatial and temporal barriers. These findings are consistent with empirical studies by Ruloff and Petko (2021) and Karakose et al. (2021), which observed similar benefits of digital technology in school leadership, emphasising transformational leadership and digital competency among principals. This implies that high school leaders in Oyo State and Nigeria are adapting to this change by adopting digital technology for school leadership.

Among high school leaders, the most commonly used digital media tools are WhatsApp, Email, Google Forms, and Zoom, with mean scores significantly above the baseline of 2.50. These tools have become critical in facilitating communication and instructional processes. Comparatively, Slack, TikTok, and Instagram tools are used less frequently. These findings align with the study by Monteiro (2023), which identified Microsoft Office applications and video conferencing platforms as the primary digital tools used by school administrators during the pandemic. The outcome of this study shows that high school leaders find WhatsApp to be a compelling choice due to its low cost and ease of use, enabling effective communication and educational administration without major technological or budgetary obstacles. The finding also aligns with the three elements of TAM—perceived usefulness, perceived ease of use, and attitude toward using. The choice of WhatsApp as the most commonly used digital media tool demonstrates the perceived usefulness, perceived ease of use, and attitude toward using. This indicates that these three critical factors influenced or motivated high school leaders to adopt WhatsApp and other digital media tools.

The extent of professional development opportunities in digital technologies provided to high school leaders reveals that 58.2% of leaders received moderate-level opportunities, 29.5% received high-level opportunities, and 12.3% received low-level opportunities. This suggests a substantial, though not universal, investment in developing digital competencies among school leaders. Studies by Peterson (2002) and Mashaya et al. (2022) underscore the importance of continuous professional development to enhance the effectiveness of school leaders in integrating and leveraging digital technologies for improved educational outcomes. The findings indicate that while significant progress has been made, there is a need for more comprehensive and accessible professional development programs to ensure all school leaders are equipped to navigate the digital transformation in education.

5. Conclusion and Recommendations

The study explored the influence of digital technology adoption on school leadership and management, the most used digital media tools, and the extent of professional development opportunities provided to high school leaders in the post-pandemic era. The findings indicate a positive influence of digital technology on school leadership and management, highlighting the enhanced communication, performance monitoring, and remote management capabilities. WhatsApp, Email, Google Forms, and Zoom emerged as the most frequently used digital media tools, facilitating effective communication and information sharing. Additionally, most high school leaders were provided with moderate professional development opportunities in digital technologies, indicating room for improvement in supporting leaders to harness these tools entirely. The following recommendations are made as follows:

- Education authorities should ensure that all school leaders, not just a moderate majority, obtain high-level training by increasing the frequency and calibre of professional development programs centred around digital technology.

- Schools should promote the broader use of underutilised but potentially valuable digital technologies such as Skype, Microsoft Teams, and other collaboration platforms to expand the range of communication and management approaches.
- Given that school leaders have different degrees of digital competency and face various problems, professional development programs should be designed to match their needs.
- The effectiveness of professional development programs and the implementation of digital technologies may be evaluated by implementing frequent assessment and feedback systems. This will enable changes and enhancements based on real-world observations of school administrators.

6. Limitations of the Study

One limitation of this study is its narrow focus on high school leaders in Oyo State, Nigeria. This limited scope may not adequately capture the experiences of school leaders in different regions or countries. Moreover, by primarily concentrating on high school leaders, the research may have failed to consider the perspectives and experiences of other significant stakeholders, including parents, teachers, and students. Furthermore, the sample size of 227 high school leaders may not fully represent the diverse range of experiences and viewpoints among all leaders encountering similar or distinct challenges.

7. Declarations

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