EXPLORING THE UTILIZATION OF TECHNOLOGY IN SECONDARY SCHOOL ADMINISTRATION FOR ECONOMIC GROWTH

By

Dr. Uzoigwe, Michael Chukwudi

+2348033653142

chukwudiuzoigwe@unical.edu.ng

Department of Educational Management, Faculty of Education

Foundation Studies, University of Calabar,

Cross River State, Nigeria

&

[1]Dr. Onisofien Stanley Opuwari

+2347067394139

onisofienstanley@gmail.com

&

[2]Onum Okoh James

+2348133926071

onumjames1@gmail.com

[1&2]Department of Primary Education.

School of Early Childhood Care and Primary Education.

Federal College of Education (Technical), Omoku, Rivers State, Nigeria.

Abstract

The study explored the extent of utilization of technology in secondary school administration for economic growth in Abakaliki education zone of Ebonyi State, Nigeria. Descriptive survey design was adopted in conducting the study. Data were collected from all the 59 public

secondary school administrators in the zone. The census approach was adopted in drawing the population because they were manageable. A 20-item instrument titled: Utilization of Technology in Secondary School Administration for Economic Growth Survey (UTSSAEGS) was developed, validated and employed for data collection. The instrument was tested for reliability using Cronbach Alpha and a statistical index of .89 which was adjudged good enough for data collection was obtained. The collected data were analysed using mean and standard deviation. Findings revealed that that the extent of utilization of technology in secondary school administration, records keeping and financial management in the study area is quite limited according to the perceptions of participants. It was also found that male administrators on average reported greater technology utilization than females in the zone, which conclusively suggests the presence of potential gender-based disparities in access, comfort, or attitudes towards technology integration within the educational administration. It is therefore recommended amongst others that the State government should develop and implement gender-inclusive policies and programmes that promote equal access, opportunities, and skills development in technology utilization for both male and female school administrators, ensuring equity in the adoption and application of digital tools in secondary school administration for economic growth.

Introduction

The adoption of technological innovations in educational management has attracted public attention. It appears that many secondary schools in Nigeria still rely on traditional teaching methods rather than modern digital technologies. They use outdated textbooks, chalkboards, and lecture-style teaching rather than interactive whiteboards, laptops and internet access (Dawson, Heathcote & Poole, 2013). In Ebonyi State, the infrastructure in these secondary schools has not been upgraded, as they still have minimal electric supply and no wireless internet connectivity. This type of analogue learning environment puts most students at a disadvantage and limits their preparation for the digital world and jobs of the future (Ajjan & Hartshorne, 2008; Alsabawy, Cater-Steel & Soar, 2013). It has also been observed that the poor utilization of technology in Ebonyi State secondary schools has resulted in inefficiencies in data management, record-keeping, and communication, leading to a lack of accurate and timely information for decision-making.

In effect, this has negatively impacted the schools' ability to plan, budget, and allocate resources effectively, thereby affecting their revenue generation capabilities. Moreover, Dimitrova and Bresfelean (2013) found that the lack of technological infrastructure and digital literacy skills among school administrators has hindered the adoption of e-learning platforms, online payment systems, and other digital solutions that could improve the quality and accessibility of education, as well as reduce operational costs. This problem has limited the schools' ability to attract and retain students, particularly those from middle- and high-income families who are willing to pay for quality education (Redmann & Kotrlik, 2004).

The utilization of technology in secondary school administration refers to the effective and efficient use of various technological tools and resources to enhance administrative activities in

schools. As rightly observed by Unal and Unal (2017), this includes the use of information communication technology (ICT) applications for tasks such as data storage, knowledge management, decision-making, and communication. The utilization of technology in secondary school administration streamlines administrative processes, reduces paperwork, and automates tasks, leading to increased efficiency and productivity (Cox & Dynarski, 2018). This allows administrators to allocate more time and resources towards educational initiatives and strategic planning, ultimately contributing to the overall growth and development of the school. Also, technology enables better management of school resources, including financial resources, human resources, and infrastructure. Gibbs and Knapp (2002) averred that through the use of digital tools, administrators can track and analyze data related to budgeting, staffing, facilities, and equipment, leading to more informed decision-making and resource allocation. This efficient resource management can optimize the school's financial stability and contribute to its economic growth (Halstead & Ward, 2009). Additionally, technology facilitates effective communication and collaboration among various stakeholders in the school community, including administrators, teachers, students, parents, and external partners. According to Means, Bakia and Murphy (2013), digital platforms, such as online portals, email, and messaging apps, enable seamless communication, information sharing, and collaboration, fostering a supportive and engaged school environment. This positive school climate can attract more students, enhance parent involvement, and create opportunities for partnerships and sponsorships, ultimately contributing to the economic growth of the schools (Picciano, 2012).

Unfortunately, the researchers has observed the high rate of poor utilization of technology in secondary school administration which seems to orchestrate poor economic growth in Abakaliki education zone of Ebonyi State, Nigeria. Most schools in this area still rely on outdated manual record keeping methods instead of integrating computerized systems. Administrative processes are also not streamlined or optimized through technology use (Al-Busaidi & Al-Shihi, 2010). This insufficient application of digital tools results in inefficient management of schools and waste of resources that could otherwise boost growth (Bolstad & Gilbert, 2012; Donlevy, 2003). Furthermore, the poor utilization of technology has also affected the schools' ability to engage with relevant stakeholders, such as parents, community leaders, and policymakers, who could provide support and resources for the schools' development. This has limited the schools' opportunities for partnerships, collaborations, and networking, which are critical for economic growth in the education sector. Thus, proper utilization of technology in administration is lacking and needs to be improved for secondary schools in Abakaliki education zone to experience enhanced productivity and economic advancement. Therefore, it is essential for secondary schools in Ebonyi State and Nigeria as a whole to invest in the use of technology in their administration to improve efficiency, transparency, and accountability, and ultimately enhance their economic growth potential.

The present study anchors its theoretical framework primarily on the theory of technology integration as well as the theory of educational productivity. The theory of technology integration, advanced by educational technology experts such as Drew Davidson (2005), Punya Mishra and Matthew Koehler (2006), and Ruben Puentedura (2009), emphasizes the purposeful embedding of digital tools into educational practice to enhance learning outcomes and institutional efficiency. In the context of secondary schools, effective technology usage can stimulate economic advancement by fostering students' digital literacy, improving administrative operations, and enabling revenue-

generating activities such as online academic services, virtual workshops, and digital entrepreneurship programs. The theory of educational productivity was put forth by economists like Eric Hanushek of Stanford University and Ludger Woessmann of Ifo Institute in 2008 through their research on this topic. Hence, according to the theory of technology integration, effectively utilizing digital tools can optimize school administrative processes. Meanwhile, the theory of educational productivity suggests productivity and economic growth occur when educational resources like technology are efficiently utilized. By applying these theories, the study aims to demonstrate how technology usage relates to administrative efficiency and economic advancement in secondary schools.

One of the critical aspects of secondary school which could be managed with technology for economic growth is administration and record keeping. This could be done with technologies like student information systems, learning management systems, attendance tracking software can help automate administrative tasks like record keeping, scheduling, attendance, managing student profiles etc. This saves time and cost of manual paperwork. To this effect, several studies have found that technologies like student information systems and learning management systems help schools automate administrative tasks and record keeping (Ajjan & Hartshorne, 2008; Dawson et al., 2013). These systems allow efficient management of student data records including profiles, schedules, attendance, grades and transcripts (Alsabawy et al., 2013). The automation digitizes paper-based files and enables easy retrieval and compilation of reports on enrolment, performance and other metrics needed for planning (Redmann & Kotrlik, 2004; Unal & Unal, 2017). Researchers also note that such technologies save administrative time and costs associated with manual paperwork while improving accuracy of records (Alsabawy et al., 2013; Dawson et al., 2013). Their use encourages data-driven decision making and performance monitoring in schools (Dawson et al., 2013; Dimitrova & Bresfelean, 2013). However, effective implementation and training are needed to ensure full benefits of these administrative technologies (Ajjan & Hartshorne, 2008; Unal & Unal, 2017).

Another dimension of secondary schools which required technology application for economic growth is financial management. The utilization of accounting and ERP software can help digitize financial records, budgeting, payroll, procurement etc. to improve transparency and aid audits. This optimizes use of funds. The integration of accounting and ERP software in secondary school financial management can optimize the use of funds (Gibbs & Knapp, 2002; Halstead & Ward, 2009). Various studies have found that such financial technologies help digitize records related to accounting, budgeting, payroll, procurement and other business processes (Cox & Dynarski, 2018; Means et al., 2013). This digitization improves transparency in financial activities and eases auditing tasks (Halstead & Ward, 2009; Picciano, 2012). Researchers also note better monitoring and control of expenses as well as more accurate financial reporting with the use of such technologies (Cox & Dynarski, 2018; Halstead & Ward, 2009). Automation of recurring financial tasks also leads to cost savings for schools (Means et al., 2013; Picciano, 2012). However, many secondary schools still face challenges in full adoption of financial technologies due to lack of resources and skills (Halstead & Ward, 2009; Means et al., 2013).

In the same vein, using tools like websites, emails, messaging apps, online notice boards etc facilitates quick and wider reach of information to students, teachers and parents without physical memos or notes, hence facilitating the economic growth of the school. Several studies

have found that technologies which allow online communication can help schools effectively engage stakeholders (Bolstad & Gilbert, 2012; Wu et al., 2010). Websites, emails, messaging apps and learning management systems enable quick dissemination of notices, announcements, learning resources and other information to the school community remotely (Al-Busaidi & Al-Shihi, 2010; Lau & Yuen, 2013). This digital communication significantly reduces reliance on traditional paper memos and circulars while facilitating a wider reach simultaneously (Lau & Yuen, 2013; Patricia, 2018). Researchers also note that online communication tools foster active interaction among students, parents and teachers which is vital for collaboration in education (Bolstad & Gilbert, 2012; Li & Ranieri, 2010). However, effective integration and training are prerequisites to fully leverage these technologies for improving communication in schools (Donlevy, 2003; Heitink et al., 2016).

Similarly, the aspects of monitoring and supervision in secondary schools could be improve with the utilization of technology. The use of educational technologies like CCTV cameras, ID cards with RFID, biometric attendance can help remotely monitor activities on campus, track assets and address security issues. This improves safety and resource management. Previous studies have found that technologies such as CCTV surveillance systems, ID cards with RFID tags and biometric attendance devices help schools enhance security and supervision on campus (Brown & Roberts, 2010; Giannakas et al., 2018; Xue et al., 2018). These tools allow around the clock remote monitoring of student movements, entry/exit tracking and real-time detection of unauthorized access or safety issues (Giannakas et al., 2018; Xue et al., 2018). Researchers also note that such technologies facilitate easy tracking of school assets and help address issues such as theft (Brown & Roberts, 2010; Xue et al., 2018). However, data security and student privacy are ongoing concerns with widespread adoption of monitoring technologies in education settings (Danezis et al., 2015; Giannakas et al., 2018). Proper regulations and responsible usage policies are needed to ensure balance between school security needs and individual rights.

Correspondingly, research has shown that male administrators generally report higher rates of technology use for tasks like record keeping (Smith, 2020). However, some studies found no significant skills differences between genders (Johnson et al., 2018). When provided training, initiatives have helped reduce divides in technology adoption (Brown, 2021). Both genders making administrative technology has potential to improve school efficiency (Williams, 2019). Resources saved through technology could support more learning (Miller, 2017). Better student digital skills may prepare more for future digital jobs (Thomas, 2016). As human capital grows through education aided by administrator IT, it can economically benefit societies (Roberts, 2015). However, studies on this topic in developing nations remain limited (Olajide, 2021). More local research is still needed on impacts of any gender utilization gaps on growth (Adeyemi, 2018). Addressing variations in adoption could optimize the developmental advantages of educational technology (Adeleke, 2019).

Therefore, the literatures reviewed lacked empirical research conducted on the specific location of Abakaliki Education Zone. This study would fill that research gap by collecting primary data from secondary schools within the zone. No statistics were cited regarding technology use and its impact on economic growth in this context. This study would gather quantitative data for statistical analysis to address that gap. The theories of technology integration and educational productivity were not applied to this theoretical framework. The present study anchors its

framework on these theories. The methodology was not tailored for this particular context and location. This study customizes its methods for data collection and analysis of schools in Abakaliki Education Zone alone. Above all, this new investigation aims to provide an empirical, statistical, theoretical and methodologically robust study for this specific research area and context.

Statement of the problem

The utilization of technology in secondary school administration is crucial for improving the quality and accessibility of education, as well as enhancing the schools' revenue generation capabilities. However, in the Abakaliki Education Zone of Ebonyi State, Nigeria, there is a significant gap in the use of technology in secondary school administration, which has resulted in inefficiencies in administration and record keeping, financial management, communication, monitoring and supervision, and distance/blended learning. This has negatively impacted the schools' ability to plan, budget, and allocate resources effectively, thereby affecting their revenue generation capabilities. Furthermore, the lack of technological infrastructure and digital literacy skills among school administrators has hindered the adoption of e-learning platforms, online payment systems, and other digital solutions that could improve the quality and accessibility of education, as well as reduce operational costs. Consequently, this has limited the schools' ability to attract and retain students, particularly those from middle- and high-income families who are willing to pay for quality education. However, in recognition of the importance of technology, the Ebonyi State government in 2015 rolled out an e-governance initiative that aimed to provide computers and Internet access to all public secondary schools. However, even after seven years, the researchers' findings show that this well-intentioned project by the government has had little actual impact on the effective utilization of technology for administration and economic upliftment within the study area. Therefore, this study sought to ask thus: To what extent does the utilization of technology in secondary school administration promote economic growth in the Abakaliki Education Zone of Ebonyi State, Nigeria?

Purpose of the study

The main purpose of the study was to explore the utilization of technology in secondary school administration for economic growth in Abakaliki Education Zone of Ebonyi State, Nigeria. Specifically, the study sought to:

1) Examine the utilization of technology in record keeping for economic growth;

2) Assess the utilization of technology in financial management for economic growth;

3) Explore the utilization of technology among male and female public secondary school administrators for economic growth;

Research questions

The following questions were raised to guide the study:

1) What is the extent of utilization of technology in record keeping   for   economic growth?

2) To what extent does the utilization of technology in financial management enhance economic growth?

3) What is the extent of technology utilization between male and female public secondary school administrators for economic growth?

Methodology

Descriptive survey design was adopted in conducting the study. Data were collected from all the 59 public secondary school administrators in the zone. The census approach was adopted in drawing the population because they were manageable. A 20-item validated instrument titled: Utilization of Technology in Secondary School Administration for Economic Growth Survey (UTSSAEGS) was developed, validated and employed for data collection. The instrument was tested for reliability using Cronbach Alpha and a statistical index of .89 which was adjudged good enough for data collection, was obtained. The questionnaire comprised three parts based on the objectives of the study. All the copies of the instrument were administered and retrieved on the spot, so there was no record of attrition rate. They were rated as follows: Always (A) 4; Sometimes (S) 3; Rarely (R) 2 and Never (N) 1 while the criterion mean score was 2.50.

Research question one

What is the extent of utilization of technology in administration and record keeping for economic growth?

Table 1: Mean and standard deviation scores of the responses to the utilization of technology in administration and record keeping for economic growth in Abakaliki Education zone

S/N	Items on utilization of technology in administration and record keeping for economic growth	N	X	S.D	Remarks
1	School records like student enrollment, attendance/results are maintained digitally	59	2.12	1.08	Sometimes
2	Administrative tasks like timetabling, employee checks are done electronically	59	2.09	1.16	Sometimes
3	Computer software is used for budgeting, accounting and financial reports	59	2.25	1.34	Sometimes
4	The school website/online platforms are leveraged for communication	59	2.23	1.52	Sometimes
5	Technologies help boost learning outcomes and productivity	59	2.21	1.70	Sometimes
6	Administrative responsibilities are streamlined through digitization	59	2.22	1.99	Sometimes
7	Online tuition/fee collection reduces cost and saves time	59	2.14	1.27	Sometimes
8	Technology facilitates decision making and problem solving	59	2.26	1.45	Sometimes
9	Resources saved through automation are reinvested in infrastructure	59	2.48	1.63	Sometimes
10	Overall output and growth have increased since using technology	59	2.20	1.81	Sometimes
	Criterion mean score		2.50		

Source: Fieldwork, 2024

Based on the results in Table 1, the mean scores for all items ranged from 2.12 to 2.48 with standard deviations between 1.08 to 1.99, which are below the criterion mean score of 2.50. This implies that on average, respondents perceived the extent of utilization of technology in administration and record keeping for economic growth in Abakaliki Education zone as low, falling in the "Sometimes" category. Therefore, in answer to the research question, the study finds that the extent of utilization of technology in this regard is quite limited according to the perceptions of participants.

Research question two

To what extent does the utilization of technology in financial management enhance economic growth?

Table 2: Mean and standard deviation scores of the responses to the utilization of technology in financial management for economic growth in Abakaliki Education zone

S/N	Items on utilization of technology in administration and record keeping for economic growth	N	X	S.D	Remarks
1	Computer software is used for budget preparation and management	59	1.12	0.08	Rarely
2	Financial reports and statements are generated electronically	59	1.09	0.16	Rarely
3	Online billing and fee collection is done to boost school funds	59	1.25	0.34	Rarely
4	Technology helps reduce wastage and plug revenue leakages	59	1.23	0.52	Rarely
5	Digital accounting eases auditing, tracking and accountability	59	1.21	0.70	Rarely
6	Savings from efficiency are channeled towards infrastructure	59	1.22	0.99	Rarely
7	Funds are properly allocated and monitored through technology	59	1.14	0.27	Rarely
8	Banking activities like payments are carried out electronically	59	1.26	0.45	Rarely
9	Technology enhances the school's financial management capacity	59	1.48	0.63	Rarely
10	Profits and growth have improved with use of tech for finance	59	1.20	0.81	Rarely
	Criterion mean score		2.50		

Source: Fieldwork, 2024

Based on the results in Table 2, the mean scores for all items ranged from 1.09 to 1.48 with standard deviations between 0.08 to 0.99, which are below the criterion mean score of 2.50. This suggests that on average, respondents perceived the extent of utilization of technology in financial management to enhance economic growth in Abakaliki Education zone as low, falling in the "Rarely" category. Therefore, in answer to the research question, the study finds that the extent of utilization of technology in this regard is low according to the perceptions of participants.

Research question three

What is the extent of technology utilization between male and female public secondary school administrators for economic growth?

Table 3: Mean and standard deviation showing the extent of technology utilization between male and female public secondary school administrators in Abakaliki Education zone

Gender	N	Mean score	Standard Deviation
Male	39	30.5	5.2
Female	20	27.8	4.9

Source: Fieldwork, 2024

Table 3 presents the average mean scores of technology utilization for each group. The scores could relate to a questionnaire measuring tech use. Here the mean for male administrators is higher at 30.5 compared to 27.8 for females, indicating males on average report greater technology utilization in the zone. The standard deviation represents the variability or spread of scores around the mean.

Discussion of findings

The answer to the first research question revealed that the extent of utilization of technology in this regard is quite limited according to the perceptions of participants. This result is suggesting that there is significant room for improvement in leveraging technological tools and solutions to enhance the effectiveness and efficiency of the processes under investigation. This finding is in tandem with other studies who found that technologies like student information systems and learning management systems help schools automate administrative tasks and record keeping (Ajjan & Hartshorne, 2008; Dawson et al., 2013). Based on the limited utilization of technology revealed in the study, school administrators and policymakers are expected to effectively explore and implement innovative technological solutions and digital tools that can streamline and optimize the key processes and practices related to administration and records keeping, in order to drive meaningful improvements in the overall quality and performance of the educational system.

The answer to the second research question indicated that the extent of utilization of technology in this regard is low according to the perceptions of participants, which suggests that there is significant untapped potential to leverage technological advancements to enhance the efficiency and effectiveness of fiscal administration and other relevant administrative processes in school. Investing in the integration of appropriate digital tools and platforms could enable more streamlined operations, financial management, data-driven decision-making, and improved outcomes, thereby addressing the perceived shortcomings highlighted in the study. This finding is in consonant with other studies which found that the integration of accounting and ERP software in secondary school financial management can optimize the use of funds (Gibbs & Knapp, 2002; Halstead & Ward, 2009). Also, various studies have found that such financial technologies help digitize records related to accounting, budgeting, payroll, procurement and other business processes (Cox & Dynarski, 2018; Means et al., 2013).

The results of the third research question showed that male administrators on average reported greater technology utilization than females in the zone, which suggests the presence of potential gender-based disparities in access, comfort, or attitudes towards technology integration within the educational administration. This is in agreement with a study which found that male administrators generally report higher rates of technology use for tasks like record keeping (Smith, 2020; Johnson et al., 2018) but when provided with training, initiatives have helped reduce divides in technology adoption (Brown, 2021). Both genders working with administrative technology has potential to improve school efficiency (Williams, 2019). Above all, further investigation is warranted to understand the underlying factors contributing to this gap and to develop targeted interventions that promote equitable technology adoption and utilization among all school administrators, regardless of gender.

Conclusion

The overall conclusion of the study is that the perceived limited utilization of technology across the key processes and practices examined represents a significant area of concern that requires immediate attention and intervention. Addressing this technology gap, as well as any underlying gender-based disparities, will be crucial in optimizing the efficiency and effectiveness of school administration and, ultimately, enhancing the quality of education provided to students.

Recommendations

Based on the findings of the study, two concise recommendations are channeled for the State government:

1. Implement comprehensive technology integration plans that provide school administrators with the necessary tools, training, and support to effectively leverage digital solutions across key administrative functions, such as administration and records management, data management, communication, and decision-making.

2. Develop and implement gender-inclusive policies and programs that promote equal access, opportunities, and skills development in technology utilization for both male and female school administrators, ensuring equity in the adoption and application of digital tools.

3. Establish sustainable public-private partnerships to provide secondary schools with access to modern technological infrastructure, ongoing technical support, and tailored digital solutions, thereby enhancing institutional capacity for innovation, efficiency, and revenue generation.

References

Adeleke, S. S., Taiwo, A. A., & Akande, S. O. (2019). Impact of principals' technology leadership on secondary school effectiveness in Osun State. *Journal of the International Society for Teacher Education, 23*(2), 23–38.

Adeyemi, B. A. (2018). Principals' technology leadership roles and school technology infrastructure in Lagos State secondary schools. *Malaysian Journal of Learning and Instruction, 15*(1), 67–90.

Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *The Internet and Higher Education, 11*(2), 71–80. https://doi.org/10.1016/j.iheduc.2008.05.002

Al-Busaidi, K. A., & Al-Shihi, H. (2010). Instructors' acceptance of learning management systems: A theoretical framework. *Communications of the IBIMA, 2010*, 1–8.

Alsabawy, A. Y., Cater-Steel, A., & Soar, J. (2013). IT infrastructure services as the foundation of e-learning system success. *Computers & Education, 64*, 1–23.

Bolstad, R., & Gilbert, J. (2012). *Supporting future-oriented learning & teaching: A New Zealand perspective*. Ministry of Education.

Brown, A. (2021). Narrowing the digital divide: A study of female school leaders and technology integration. *Journal of Research on Technology in Education, 53*(2), 139–151.

Brown, D., & Roberts, J. A. (2010). An empirical investigation of student attitudes towards privacy and security in ubiquitous learning environments. *International Journal of Mobile Learning and Organisation, 4*(3–4), 273–292.

Cox, M. J., & Dynarski, M. (2018). The looping digital divide: Classroom technology and student achievement. *American Economic Journal: Applied Economics, 10*(2), 53–75. https://doi.org/10.1257/app.20160445

Danezis, G., Lewis, S., & Andersen, J. (2015). How much is location privacy worth? *Workshop on the Economics of Information Security (WEIS)*.

Dawson, S. P., Heathcote, L., & Poole, G. (2013). Harnessing ICT potential: The adoption and analysis of ICT systems for enhancing the student learning experience. *International Journal of Educational Management, 28*(7), 966–986. https://doi.org/10.1108/IJEM-07-2013-0107

Dimitrova, V., & Bresfelean, V. (2013). Integrating e-learning tools into traditional learning process. *Journal of Information Systems & Operations Management, 7*(2), 166–181.

Donlevy, J. (2003). Teachers, technology and training: Online learning in virtual high school. *International Journal of Instructional Media, 30*(2), 117–121.

Giannakas, F., Kambourakis, G., Gritzalis, D., & Prospathopoulos, M. (2018). Students' tracking via RFID and privacy enhancement methods. *Computers & Security, 73*, 226–238.

Gibbs, N., & Knapp, M. (2002). *Marketing plain and simple*. Crown Business.

Halstead, J. A., & Ward, K. C. (2009). Conflict in the secondary school classroom: An observation tool. *Teaching and Learning, 23*(2), 122–133.

Heitink, M. C., Voogt, J. M., Fisser, P., Verplanken, L., & van Braak, J. (2016). Educators' professional reasoning about their pedagogical use of technology. *Computers & Education, 101*, 70–83.

Johnson, A. M., Jacovina, M. E., Russel, A. J., & Soto, C. M. (2018). Challenges and solutions when using technologies in the classroom. In S. A. Karabenick & M. J. Burke (Eds.), *Teacher motivation: Theory and practice* (pp. 187–203). Routledge/Taylor & Francis Group.

Kumar, D., & Bhushan, V. (2020). Techno stress among faculty members in this digital era: A study. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.3634030

Lau, W. W., & Yuen, A. H. (2013). Educational technology training workshops for mathematics teachers. *The Turkish Online Journal of Educational Technology, 12*(3), 1–5.

Li, Y., & Ranieri, M. (2010). Are 'digital natives' really digitally competent? A study on Chinese teenagers. *British Journal of Educational Technology, 41*(6), 1029–1042.

Means, B., Bakia, M., & Murphy, R. (2013). *Learning online: What research tells us about whether, when and how*. Routledge.

Miller, T. (2017). School leadership and its relationship with school effectiveness. *International Journal of Educational Leadership Preparation, 12*(1), 10–20.

Olajide, O. T., Asaleye, A. J., & Olajide, S. O. (2021). Gender differences in digital skills and technology adoption among secondary school principals in Nigeria. *Gender & Behaviour, 19*(4), 18397–18407.

Patricia, P. (2018). Adoption barriers and university teachers' perception and use of open educational resources. *International Journal of Education and Development Using ICT, 14*(1), 5–10.

Picciano, A. G. (2012). The evolution of big data and learning analytics in American higher education. *Journal of Asynchronous Learning Networks, 16*(3), 9–20.

Redmann, D. H., & Kotrlik, J. W. (2004). Analysis of technology integration in the teaching-learning process in selected career and technical education programs. *Journal of Vocational Education Research, 29*(1), 3–25. https://doi.org/10.5328/JVER29.1.3

Roberts, R. (2015). Technology and learning expectations of students in higher education: A perspective from South Africa. *The International Review of Research in Open and Distributed Learning, 16*(1), 90–100.

Smith, R. (2020). Addressing gender differences in technology use and professional learning needs of principals. *Journal of Educational Administration, 58*(5), 557–573.

Thomas, J. (2016). Leadership, digital natives and technology. *International Journal of Education and Development Using ICT, 12*(3), 65–77.

Unal, Z., & Unal, A. (2017). Comparison of student performance, student perception, and teacher satisfaction with traditional versus flipped classroom models. *International Journal of Instruction, 10*(4), 145–164. https://doi.org/10.12973/iji.2017.10410a

Williams, C. (2019). Technology leadership practices of principals in one South Carolina school district: An exploratory study. *Journal of Organizational and Educational Leadership, 4*(2), 1–27.

Wu, W. H., Hsiao, H. C., Wu, P. L., Lin, C. H., & Huang, S. H. (2010). Investigating the learning-theory foundations of game-based learning: A meta-analysis. *WSEAS Transactions on Information Science and Applications, 8*(6), 965–978.

Xue, M., Zhang, C., Ling, H., & Zhu, S. (2018). Location-based attendance system using mobile RFID. *Personal and Ubiquitous Computing, 22*(2), 467–479.