

Digital Education Awareness among Administrators: A Cross-Regional Analysis of Tabora (Tanzania) and Lucknow (India)

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Abstract: This study presents a cross-regional analysis of digital education awareness among secondary school administrators in Tabora, Tanzania, and Lucknow, India. With the rapid integration of digital tools in education systems globally, the role of administrators in facilitating, supporting, and sustaining digital education has become increasingly crucial. The research investigates the level of awareness, preparedness, and strategic engagement of administrators with digital education policies, platforms, and technologies. Using a mixed-methods approach, including structured surveys and semi-structured interviews, data were collected from 60 administrators across both regions. Findings reveal notable disparities between the two regions, with administrators in Lucknow demonstrating higher levels of digital awareness and infrastructure support compared to those in Tabora. However, both regions shared common challenges such as limited professional training, inadequate funding, and infrastructural gaps. The study underscores the importance of targeted capacity-building programs, policy support, and cross-regional collaboration to bridge the digital divide. It also highlights the potential of mobile-based platforms and low-cost digital solutions in overcoming infrastructure barriers in underserved regions. By comparing two distinct socio-economic and educational contexts, this research provides valuable insights into the evolving landscape of digital education in the Global South and offers policy recommendations to enhance the effectiveness and inclusivity of digital learning initiatives through improved administrative engagement.

Keywords: Digital Education, Educational Administrators, Cross-Regional Analysis, Digital Awareness, Educational Technology Integration

I. Introduction

The rapid integration of digital education in secondary schools has profoundly reshaped administrative roles worldwide. In diverse contexts such as Tabora, Tanzania, and Lucknow, India, school administrators are now central to the design, deployment, and sustainability of technology-driven instruction. Their digital awareness encompassing knowledge, attitudes, and infrastructural familiarity is critical for guiding effective technology uptake and equitable access (Yunus et al., 2021; Chigona & Chigona, 2022). Administrators must act as both instructional leaders and digital facilitators to bridge the policy-practice divide in education systems undergoing digital transformation.

Global Trends and COVID-19 Acceleration

The COVID-19 pandemic forced schools globally to pivot online, vividly demonstrating the strategic importance of school leadership. Studies in India reveal that administrators who established robust digital communication channels (e.g., WhatsApp groups) enabled teachers to adapt quickly to remote instruction (Goswami & Sharma, 2021), while gaps in institutional support left others struggling (Mishra et al., 2020). Similarly, international reviews confirm that the shift increased reliance on administrators to coordinate infrastructure, training, and emotional support for staff and students (UNESCO, 2021; Reimers & Schleicher, 2020). These developments have reinforced the administrator's role in sustaining digital learning ecosystems through inclusive planning and responsive leadership.

Digital Infrastructure & Policy Frameworks

India's recent policy reforms including the National Education Policy (NEP) 2020 and platforms such as DIKSHA are aggressively steering secondary schools towards digital integration by promoting ICT adoption, teacher training, and extensive content libraries (Ministry of Education, 2020; Kumar & Sengupta, 2022). Under *Samagra Shiksha* and initiatives like PM SHRI, Uttar Pradesh alone has rolled out smart classrooms and distributed tablets to educators in thousands of schools (Mehta, 2023). Despite this, national data show uneven penetration: only ~21% of UP's schools have internet access (8–37% in government vs. private schools), with functional smart classrooms in just ~14% (NIEPA, 2022). These figures underscore persistent infrastructure inequities, even as policy momentum grows (Banerjee & Dey, 2021).

Contexts of Tabora and Lucknow

Tabora, a semi-urban region in north-western Tanzania, is gradually introducing digital tools in secondary education, yet research remains sparse. Notably, Buhori and Nyaisa (2024) highlighted early adoption of social media in pre-primary settings, stressing the need for teacher competency and content quality assessments. Similarly, Mwakapenda (2021) observed a lack of system-wide digital capacity in Tanzanian secondary schools, especially concerning administrator-led integration strategies. Still, there is a lack of targeted studies on secondary school administrative practices in Tabora, indicating a gap this analysis seeks to fill. In

Lucknow, administrative efforts under NEP and programs like *Project Alankar* have begun establishing ICT labs, deploying tablets, and launching digital libraries across government secondary schools (Sharma & Saxena, 2023). However, disparities persist between public and private institutions, as well as in actual technology utilization mirroring trends observed across northern India (Kumar & Agarwal, 2022).

II. Literature Review

Digital Policy Landscape & National Initiatives

In India, the National Education Policy (NEP) 2020 and the complementary National Digital Education Architecture (NDEAR) mark a paradigm shift toward integrating technology into administration, teaching, and learning. These reforms emphasize interoperable infrastructure, state-level governance (via IT cells), and digital certification highlighting administrators' critical role in policy adoption. In Tanzania, the 2024–2030 Draft National Digital Education Strategy reports that over 30,000 secondary schools received ICT hardware, and in-service training programmes (e.g., SEQUIP) reached thousands of teachers and leaders. Despite these investments, policy impact depends on administrators' awareness and capacity for implementation. Studies from Sri Lanka and India demonstrate that cohesive policy frameworks are necessary but insufficient without local leadership alignment and monitoring capacity.

Administrator Awareness & ICT Infrastructure in Tanzania

Tanzanian research underscores awareness gaps among school leaders. Chaula & Mwamlangala (2025) analyzed teacher training's impact on ICT use in primary SMIS, finding that targeted training boosts digital administration, yet poor internet and hardware undermine outcomes. Masumbuko et al. (2025) documented systemic limitations: limited pre-service digital teacher education, scarce in-service support, and rural–urban divides particularly affecting geography subject integration. In secondary schools, Warioba et al. (2022) identified infrastructural barriers and administrative inertia as key constraints to digital adoption. Collectively, these studies suggest that Tanzanian administrators often lack both technical understanding and strategic frameworks for digital transition.

Administrator Readiness in Indian Context

In India, Covid-era research provides insight into administrative dynamics. A 2022 study revealed that government school teachers and leaders faced inadequate infrastructure and poorly designed training large cohorts, limited depth, and mismatch of needs. Conversely, elite private schools exhibited stronger digital readiness: more frequent training, dedicated technical staff, and adaptive leadership. Empirical reviews highlighted that state-sponsored schemes like DIKSHA (launched 2020), Sampark Smart Shala, and Project Gyanodaya combine infrastructure rollout with capacity building and are often facilitated by administrators at district and school level. These mixed findings underscore that in India, administrators' awareness and capacity often mirror school resource levels.

Cross-Regional Comparisons: Tanzania vs. India

Table 2.1: Comparative analysis reveals shared and divergent admin-level challenges and strengths:

Dimension	Tanzania	India
Policy & Infrastructure	National strategies (e.g. SEQUIP) scribd.com but uneven rural access	NEP 2020 & NDEAR rollout, DIKSHA, local apps
Training Quality	Limited, subject-specific, low admin focus	Variable: weak in govt schools; strong in elite/private
Leadership Awareness & Attitude	Low digital readiness and strategic planning	Higher awareness in private sector; govt admin struggle to contextualize training
Systemic Equity Issues	Pronounced rural–urban gaps in infrastructure & administrative capacity	Significant socio-economic divides; elite schools lead adoption

Theoretical & Methodological Insights

Studies used frameworks like Technology Acceptance Model (TAM) applied to school leaders to assess readiness. The cross-country literature encourages mixed-methods approaches with administrator-focused surveys, interviews, and SMIS usage data to assess awareness, attitudes, skill levels, and digital governance. Yet, no known study directly compares administrative digital awareness across Tanzania and India indicating a clear gap for coupled regional analyses.

III. Methodology

This study adopts a mixed-method approach, integrating both qualitative and quantitative data collection techniques to explore digital education awareness among secondary school administrators in Tabora, Tanzania, and Lucknow, India. A total of 60 heads of school participated in the study, with 30 respondents drawn from each region. Data were collected using structured

questionnaires, semi-structured interviews, and field observations to ensure a comprehensive understanding of administrators' awareness, perceptions, and implementation practices regarding digital education.

Quantitative data obtained from the questionnaires were analyzed using descriptive statistics, including frequency and percentage distributions, to identify patterns and trends in digital awareness and usage. Qualitative data derived from interviews and observational notes were analyzed thematically to uncover deeper insights into the challenges, opportunities, and contextual factors influencing digital education integration at the administrative level. This methodological framework allows for a cross-regional comparison, highlighting both commonalities and differences in digital education awareness between the two regions.

IV. Results and Discussion

The findings of this research are presented in eight main areas: Awareness of ICT Benefits, Learning Pathways, Internet Proficiency, Computer Literacy Level, Formal ICT Training, Microsoft Word & Excel Skills, Access to Applications and MS Access & PowerPoint Skills;

HOS Awareness of the Advantages of ICT

The study sought to find whether secondary school administrators were aware of the benefits of using ICT in administration work. The administrators were asked to state the benefits of using ICT in school administration. The results are shown in Table 4.1 below;

Table 4.1: Awareness of the Advantages of ICT in Tabora Municipal -Tanzania and Lucknow District - India

Awareness of the Advantages of ICT	Tabora Municipal - Tanzania		Lucknow District - India	
	Frequency	Percentage	Frequency	Percentage
Yes	23	77%	26	87%
No	7	23%	4	13%
Total	30	100%	30	100%

The data shows that a majority of secondary school administrators in both Tabora Municipal - Tanzania and Lucknow District - India are aware of the benefits of using Information and Communication Technology (ICT) in administrative work. Data from Table 4.1 indicate that in Tabora Municipal - Tanzania out of 30 administrators, 23(77%) indicated awareness of the benefits of ICT, while 7(23%) reported no awareness. Likewise in Lucknow District - India: Out of 30 administrators, 26(87%) demonstrated awareness, whereas 4(13%) did not. These figures highlight a high level of awareness among administrators in both countries, though slightly higher in India.

The findings suggest that most administrators in both Tabora Municipal - Tanzania and Lucknow-India understand the advantages of incorporating ICT into school management tasks. This high awareness aligns with the global shift towards digital management in educational administration, where ICT tools streamline activities such as student record-keeping, communication, scheduling, and resource management. Administrators in both countries may recognize that ICT can increase efficiency, improve data accuracy, and provide real-time data access, essential for informed decision-making.

The variation in awareness levels (87% in Lucknow District - India vs. 77% in Tabora Municipal - Tanzania) may reflect differences in national ICT policies, infrastructure availability, and training opportunities. India's higher percentage could be attributed to the country's more advanced digital infrastructure and broader government-led initiatives promoting ICT in education (Raju, 2020; Sharma, 2019). In contrast, while Tanzania has shown considerable progress, limited resources and training gaps could account for the lower ICT awareness among Tanzanian administrators (Mtebe & Raisamo, 2017).

The Level of Computer Literacy

The data from Tabora, Tanzania, reveals a low level of formal computer literacy among school heads. None have formal certificates, only 16% hold diplomas, and 17% possess qualifications above diploma level. A significant 67% are considered "not literate", having acquired skills informally, mostly due to limited access to ICT training programs and resources. These findings point to broader systemic issues in Tanzania's education system, such as inadequate ICT infrastructure and training, especially in rural areas, which hampers the ability of school leaders to implement technology-driven educational reforms.

In contrast, data from Lucknow, India, shows a higher level of formal computer literacy. While none of the heads have formal certificates, 50% have diplomas and 33% hold higher qualifications, leaving only 17% as "not literate." This higher literacy is attributed to better access to formal ICT training and supportive government initiatives, such as the Digital India campaign, which promotes ICT integration in education. As a result, Indian heads of schools are more proficient in using technology for school management and instruction.

The comparison highlights a disparity in ICT training accessibility between the two regions. India's success reflects stronger policy frameworks and investment in digital education, while Tanzania's situation underscores the urgent need for systemic

reforms and dedicated ICT training for educational leaders. India's example provides a model for other developing countries, including Tanzania, to bridge the digital literacy gap in educational leadership. Table 4.2 and 4.3 shows the expertise in computer application;

Table 4.2: Expertise in Computer Applications in Tabora Municipal - Tanzania

Applications/Response	Very Good	Good	Average	Weak	Poor	Total
Microsoft Word	0(0%)	7(16%)	9(50%)	7(17%)	7(17%)	30(100%)
Microsoft Excel	0(0%)	0(0%)	11(50%)	9(17%)	10(33%)	30(100%)
Microsoft Access	0(0%)	0(0%)	0(0%)	14(33%)	16(67%)	30(100%)
Power Point	0(0%)	0(0%)	0(0%)	13(17%)	17(83%)	30(100%)
Internet	10(33%)	11(50%)	9(17%)	0(0%)	0(0%)	30(100%)

Source: Data Collected by the Researcher 2024

Table 4.3: Expertise in Computer Applications in Lucknow District - India

Applications/Response	Very Good	Good	Average	Weak	Poor	Total
Microsoft Word	7(17%)	8(33%)	8(33%)	7(17%)	0(0%)	30(100%)
Microsoft Excel	0(0%)	11(50%)	10(33%)	9(17%)	0(0%)	30(100%)
Microsoft Access	0(0%)	10(33%)	11(50%)	9(17%)	0(0%)	30(100%)
PowerPoint	7(16%)	7(17%)	10(67%)	7(17%)	0(0%)	30(100%)
Internet	11(50%)	10(33%)	9(17%)	0(0%)	0(0%)	30(100%)

Source: Data Collected by the Researcher 2024

Microsoft Word and Excel

The data from Tables 4.2 and 4.3 reveal notable differences in Microsoft Word and Excel proficiency between Heads of Schools (HoS) in Tabora Municipal, Tanzania, and Lucknow District, India. In Tabora, Tanzania, HoS show moderate to low proficiency in both applications. For Microsoft Word, only 16% rated their skills as "Good," with none reporting "Very Good." Most rated themselves as "Average" (50%), while 34% fell into "Weak" or "Poor" categories. Excel skills were even lower, with no "Good" or "Very Good" ratings, 50% "Average," and the rest split between "Weak" (17%) and "Poor" (33%). These findings align with research highlighting limited ICT infrastructure and training in Tanzanian schools (Komba & Nkumbi, 2020; Omwenga & Waiganjo, 2019).

In Lucknow, India, HoS exhibit higher proficiency. For Word, 50% rated their skills as "Good" or "Very Good," and only 17% as "Weak." Excel skills were also stronger, with 50% rating as "Good" and 33% as "Average." These results are supported by studies (Bhattacharya & Sharma, 2021; Prakash & Kaur, 2022) emphasizing India's investment in ICT education and structured training programs, which have improved digital competencies among school leaders. Figure 4.1 and 4.2 summarize the expertise in Microsoft Word and Excel application;



Figure 4.1: Expertise in Microsoft Word



Figure 4.2: Expertise in Microsoft Excel

Microsoft Access and PowerPoint

For Microsoft Access and PowerPoint, Tabora - Tanzanian HoS displayed limited expertise. None of the respondents rated their skills in either application as "Very Good" or "Good." Specifically, 67% reported "Poor" skills in Microsoft Access, with only 33% indicating "Weak" skills. Similarly, PowerPoint showed no "Very Good" or "Good" ratings, with the majority (83%) rating their skills as "Poor" and only one HoS (17%) as "Weak."

This trend can be attributed to limited training opportunities and access to specialized computer applications within Tabora Municipal - Tanzanian schools, as noted by Mpungose and Mthiyane (2019), who found that educational leaders in Tanzania have limited exposure to diverse software applications due to constraints in ICT policy implementation and resource allocation. The results are similar to those found by Mulokozi and Komba (2021) who observed that Tanzanian teachers need specific training on more complex applications like Access and PowerPoint.

The Heads of Schools (HoS) in Lucknow District - India exhibited somewhat stronger skills in Microsoft Access and PowerPoint. In the case of Microsoft Access, no one rated themselves as "Very Good," 33% reported their skills to be "Good," 50% marked them as "Average," and 17% rated themselves as "Weak." For PowerPoint, 16% said they were "Very Good," 17% said "Good," and the majority 67% marked them as "Average."

According to Gupta and Bansal (2022), continuous professional development and strengthened ICT curriculum in India would lead to a significant increase in expertise with more sophisticated software. Similar emphasis is made by Rajan and Sinha in 2020, suggesting that the practical advantages of regular tool usage, like PowerPoint for educational tasks, contribute to the ongoing enhancement of both administrative and teaching processes. Figure 4.3 and 4.4 below shows the expertise in Microsoft Access and PowerPoint;

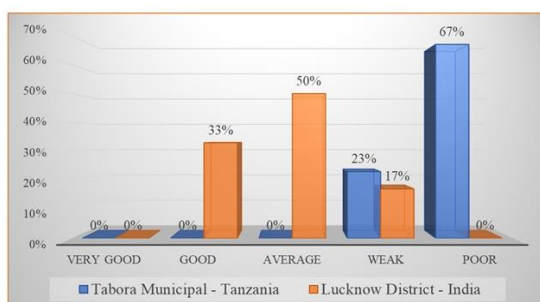


Figure 4.3: Expertise in Microsoft Access

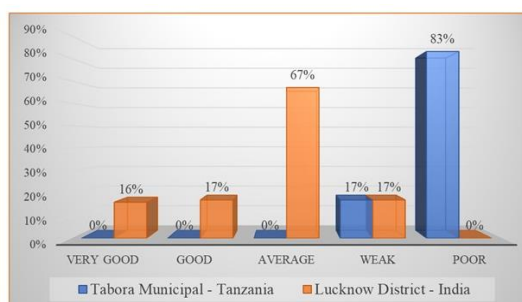


Figure 4.4: Expertise in PowerPoint

Expertise in Internet

Regarding internet proficiency, Tabora Municipal - Tanzanian Heads of Schools (HoS) showed fairly higher competence. A notable 33% rated themselves as "Very Good" in using the internet, and 50% as "Good," with the remaining 17% marking their skills as "Average." None of the respondents rated their internet skills as "Weak" or "Poor." These findings suggest that while internet access may still be limited in some rural areas, school leaders in Tabora Municipal - Tanzania have adapted to the available online resources, particularly for administrative tasks. As Lwoga and Ngulube (2020) argue, familiarity with the internet is often prioritized among school leaders due to the growing reliance on online communication for administrative purposes.

Lucknow District - Indian HoS reported high levels of internet proficiency, with 50% rating their skills as "Very Good" and 33% as "Good." Only 17% rated their internet skills as "Average," with no "Weak" or "Poor" responses. This is consistent with research by Mehta and Chatterjee (2021), who found that internet access and digital skills are better facilitated for school leaders in Lucknow District - India due to government-supported initiatives aimed at expanding ICT infrastructure. These findings underscore the importance of ongoing digital education, as mentioned by Singh and Sharma (2019), who observe that ICT literacy, especially regarding internet skills, is fundamental for educational leadership and contributes to overall educational advancements in the Lucknow District - Indian context. Figure 4.5 below shows the ability in expertise in internet;

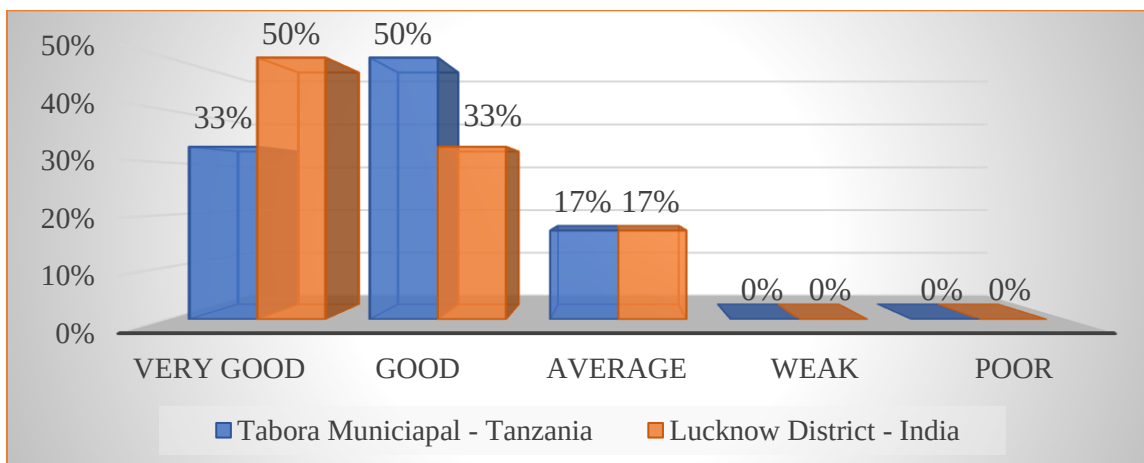


Figure 4.5: Expertise in Internet

Summary on the Level of Awareness Among Administrative Leaders on EduDigitality

The analysis highlights how these leaders perceive and engage with various aspects of digital education, including ICT benefits, internet proficiency, training opportunities, and government support. Table 4.4 outlines the similarities and differences in awareness and digital readiness across the two regions, offering insight into how contextual factors such as infrastructure, policy, and access influence digital integration in educational administration.

Table 4.4: Summary of the Level of Awareness Among Administrative Leaders on EduDigitality between Tabora Municipal in Tanzania and Lucknow District in India

Aspect	Similarities	Differences
Awareness of ICT Benefits	High awareness of ICT benefits in school administration; both recognize its role in improving efficiency.	Slight variation in awareness levels: Tabora – 77%, Lucknow – 87%.
Internet Proficiency	All HoS showed strong internet usage skills; no one rated themselves as "Poor" or "Weak."	No major difference; both show good competency in internet use for administrative tasks.
Computer Literacy Level	None of the Heads of Schools (HoS) had computer literacy at the certificate level, as both reported 0% in this category.	Tabora: Mostly low (67% not literate); Lucknow: High (83% formally trained).
Microsoft Word & Excel Skills	Both use these tools to some extent.	Tabora: Weak to moderate skills; Lucknow: Higher proficiency with several "Very Good" ratings.
MS Access & PowerPoint Skills	Basic awareness in both regions.	Tabora: Poor proficiency; Lucknow: Moderate to good proficiency.
Access to Applications	Basic access in both regions.	Tabora: Limited access to advanced tools; Lucknow: Broader exposure and usage.
Overall Digital Readiness	Both are on the path toward digital integration.	Tabora: Still developing, hindered by infrastructure and resources; Lucknow: More digitally ready, supported by structured initiatives and investments.

Source: Data Collected by the Researcher 2025

V. Conclusion and Recommendations

Conclusion

The study highlights a growing awareness of digital education among school administrators in both Tabora (Tanzania) and Lucknow (India), yet reveals key disparities in implementation. While Indian administrators benefit from structured ICT training and better infrastructure, Tanzanian counterparts face challenges such as limited training access and infrastructural deficits. Bridging this gap requires more than awareness it demands targeted skill-building, strategic investment, and strong policy execution.

Recommendations:

- i. **Targeted Administrator Training:** Role-specific ICT programs should be introduced, focusing on practical skills in digital tools and platforms. Tanzania must prioritize both pre-service and in-service training to close competency gaps.
- ii. **Infrastructure Development in Tanzania:** Government and development partners should enhance access to computers, internet, and alternative power solutions to support digital learning in underserved areas.
- iii. **Refresher Programs in India:** To address underutilized tools, Indian administrators should receive ongoing training with a focus on leadership in digital implementation and data usage.
- iv. **Peer Exchange Initiatives:** Cross-country learning and mentorship programs can foster collaborative problem-solving and expose administrators to diverse implementation strategies.
- v. **SMIS and Data Use:** Administrators in both regions should be trained to use School Management Information Systems effectively for data-driven planning and decision-making.

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