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Influence of Teacher Training on ICT Usage in School Management Information Systems: A Case of Rorya District, Tanzania

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ABSTRACT

This study investigates the influence of teacher training on the usage of Information and Communication Technology (ICT) in School Management Information Systems (SMIS) in primary schools in Rorya District, Tanzania. The research aims to determine how teacher training affects the integration and effective usage of ICT in school administration, while identifying the challenges and opportunities in this process. A descriptive research design was employed, with data collected through structured questionnaires distributed to 75 headteachers from public and private schools. Data analysis involved both descriptive statistics and multiple regression analysis using SPSS software to evaluate the relationships between teacher training, infrastructure availability, and ICT usage. The results show that frequent and targeted ICT training significantly enhances teachers' abilities to use SMIS for administrative tasks. However, infrastructural limitations, including unreliable internet and inadequate hardware, were identified as barriers to the full adoption of SMIS. The study recommends continuous professional development programs focusing on SMIS functionalities and improved ICT infrastructure to maximize the potential of technology in school management.

Keywords: Teacher training, ICT integration, School Management Information Systems, Professional development, ICT infrastructure.

INTRODUCTION

Globally, the integration of Information and Communication Technology (ICT) in education is increasingly recognized as a critical factor in enhancing both teaching and administrative functions. ICT, particularly in School Management Information Systems (SMIS), streamlines school operations, improves data management, and enhances communication between stakeholders. SMIS facilitates efficient handling of administrative tasks such as student attendance, resource allocation, and performance monitoring, thus fostering transparency and accountability in educational institutions (Brown, 2020; Kumar, 2021; Zhao, 2019). However, for schools to fully exploit these benefits, teachers need adequate ICT skills, making teacher training a crucial component of ICT adoption in school management (Mustafa & Gündüz, 2020; Van Wyk, 2019; Dawson, 2021).

In Africa, the integration of ICT in education is a priority for many countries, yet the process faces several barriers, including inadequate infrastructure, limited financial resources, and insufficient teacher training (Hennessy, Haßler & Hofmann, 2020; Ogutu, Musakali & Muraya, 2022; Suleiman, 2021). Despite policy efforts, the adoption of ICT in African schools remains uneven. For instance, in South Africa, a study by Mapisa and Makena (2024) in the Eastern Cape Province identified significant gaps in ICT proficiency among teachers, particularly in administrative tasks. Their research showed that while teachers were enthusiastic about using ICT, they lacked the necessary skills to implement these technologies effectively in SMIS. The study called for targeted teacher training programs to overcome these barriers (Mapisa & Makena, 2024; Dlamini & Sithole, 2021; Mwanza & Maseko, 2022).

In Tanzania, the adoption of ICT in primary schools is still at a nascent stage, despite increasing attention from

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

policymakers and educational stakeholders. ICT has the potential to improve school management, but its successful implementation faces challenges such as inadequate infrastructure, insufficient teacher training, and limited continuous professional development opportunities (Mtebe & Raphael, 2021; Mkuchu & Joseph, 2022; Kimaro & Chachage, 2020). The Tanzanian government has initiated policies aimed at increasing ICT usage in schools, including SMIS, to address administrative inefficiencies. However, many teachers, who are expected to be the primary users of these systems, lack the ICT competencies required to fully utilize SMIS in school administration (Ngeze, 2020; Mtebe & Raphael, 2021; Swai & Roman, 2022).

Research on ICT training for teachers across various educational contexts emphasizes the importance of equipping teachers with the skills necessary for using ICT effectively in both instructional and administrative settings. De Silva (2022) evaluated an ICT training program in Sri Lanka and found that participants reported increased confidence and proficiency in using ICT tools. However, the focus was largely on teaching applications rather than SMIS. Similarly, Abraham et al. (2022) in Ethiopia found that ICT-assisted training improved teachers' knowledge and skills, though the study focused on instructional use rather than administrative applications (Abraham et al., 2022; De Silva, 2022; Agyeman, 2020). These studies demonstrate the broader importance of ICT training in education but highlight the need for training programs that also address school management systems.

Despite the growing body of literature on ICT in education, there remains a significant gap in understanding how teacher training impacts ICT usage in school management systems, particularly in Tanzanian primary schools. While much of the research focuses on ICT’s role in enhancing classroom teaching, few studies examine its role in SMIS, which is critical for efficient school administration. This study seeks to address this gap by investigating the influence of teacher training on ICT usage within SMIS in primary schools in Rorya District, Tanzania. Specifically, the study assesses how teacher training impacts the effective integration of ICT into school management and identifies barriers to and opportunities for improvement.

This research contributes to the discourse on ICT integration in education by providing insights into how teacher professional development can enhance ICT adoption in SMIS. The findings will be particularly relevant for policymakers and educational administrators seeking to improve school operations through the use of ICT, with implications for both policy and practice in Tanzania and similar contexts (Ogutu, Musakali & Muraya, 2022; Mtebe & Raphael, 2021; Swai & Roman, 2022).

LITERATURE REVIEW

This section examines the literature on the influence of teacher training on ICT usage in School Management Information Systems (SMIS). It addresses the knowledge gap in the existing studies and presents theoretical and empirical insights into the topic.

Teacher Training as a Key Factor for ICT Integration based on Chirwa and Mubita (2021) highlight the significance of teacher training in effectively integrating ICT tools into the teaching and learning process. Similarly, in your paper, you can argue that teacher training plays a crucial role in the adoption and effective use of School Management Information Systems (SMIS) in schools. Teachers who have received proper training in ICT are more likely to use technology confidently and competently in both their teaching practices and administrative tasks, such as managing student data, attendance, and assessment records.

Similar to Chirwa and Mubita's (2021) findings on the importance of teacher training for ICT adoption in geography teaching, this study underscores the pivotal role of training in the use of School Management Information Systems (SMIS). The data suggests that teachers with more extensive ICT training are more confident and competent in managing school information, which directly impacts the efficiency and effectiveness of school management.

Theoretical Review

Diffusion of Innovations Theory

The theory, introduced by Rogers in 1962, provides a framework for understanding how new technologies are

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

adopted and diffused within educational settings. The theory posits that the adoption process involves several stages: knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2019). In the context of ICT adoption in school management systems, DOI suggests that teachers must first understand the potential benefits of ICT before committing to its implementation. Teacher training is crucial in this stage as it provides the foundational knowledge and skills required for effective ICT adoption (Mtebe & Raphael, 2021).

Additionally, DOI emphasizes the role of continuous support during and after the training process. Teachers who receive sufficient ongoing technical and administrative support are more likely to adopt ICT in school management (Tondeur et al., 2020). Moreover, the theory points to the importance of teacher attitudes towards ICT adoption, with those who perceive ICT as useful in administrative tasks being more likely to integrate SMIS in their daily operations (Moses et al., 2020).

Technological Pedagogical Content Knowledge (TPACK)

The Technological Pedagogical Content Knowledge (TPACK) framework, developed by Mishra and Koehler (2006), is another crucial theoretical model. It highlights the need for teachers to develop not only technical skills but also a deep understanding of how these skills intersect with pedagogical knowledge and administrative tasks (Mishra & Koehler, 2019). For effective ICT usage in SMIS, teachers need training that integrates technology with specific administrative practices, such as managing school data, performance tracking, and resource allocation (Voogt et al., 2020).

The TPACK model further suggests that professional development programs should focus on a holistic approach, providing teachers with skills that cut across technical, administrative, and pedagogical domains. This ensures that teachers are well-prepared to use ICT tools for school management in ways that align with broader educational goals (Scherer et al., 2020).

Empirical Literature Review

Teacher Training and ICT usage in SMIS

Empirical studies consistently highlight the importance of teacher training as a fundamental factor in the adoption of ICT in SMIS. For instance, a study by Ogutu, Musakali, and Muraya (2022) in Nairobi, Kenya explored the impact of structured teacher training on ICT usage in school management. The research design was a descriptive survey, and the sample size included 120 teachers from both public and private schools. The population targeted school staff involved in ICT training programs. The study found that teachers who underwent formal ICT training were significantly more proficient in utilizing ICT for administrative tasks, such as record-keeping and communication with stakeholders. This highlights the importance of targeted training focused on SMIS functionalities rather than general ICT skills.

Similarly, Swai and Roman (2022) conducted a study in Tanzania and noted that inadequate ICT training programs were a major barrier to SMIS adoption. The study design was a mixed-methods approach, involving 60 teachers from various primary schools in the Rorya District. The population comprised teachers who had received basic ICT training. Findings revealed that despite basic ICT knowledge, teachers struggled with more complex SMIS functionalities, suggesting that training programs should be tailored to address administrative ICT usage. They recommended a redesign of teacher training to better align with school management needs.

In addition, Mtebe and Raphael (2021) in their study of Tanzanian primary schools found that existing digital literacy training programs often focused on general ICT skills without addressing specific SMIS requirements. Their quantitative research design involved a sample size of 150 teachers, with a focus on teachers involved in administrative roles. The findings indicated that this mismatch between training content and practical requirements limits effective ICT integration in school administration. The study recommended the inclusion of dedicated SMIS modules in teacher training programs.

Lastly, Mapisa and Makena (2024) in South Africa emphasized the importance of continuous professional

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

development. Their longitudinal study covered 200 teachers across various regions and found that teachers who participated in ongoing ICT training were more likely to adopt and integrate ICT into both teaching and administrative functions. This underscores the necessity of providing not only initial but continuous training to sustain effective ICT use in schools.

Barriers to ICT Integration in SMIS

Several barriers to ICT integration in SMIS persist, despite increasing awareness of its benefits. In a study by Mtebe and Raphael (2021) in Tanzania, the researchers highlighted infrastructural challenges as a major obstacle to SMIS adoption. Using a descriptive research design, they surveyed 150 teachers in rural districts, with a particular focus on the school staff in regions like Rorya. Their findings showed that unreliable internet connectivity, insufficient access to computers, and a lack of technical support were the primary barriers preventing effective SMIS integration. This was particularly true in under-resourced schools, where technological adoption lagged significantly behind urban counterparts.

Kafyulilo (2020), in a study conducted in Tanzanian primary schools, focused on the impact of teachers' attitudes towards ICT adoption. The research design was qualitative, involving 50 teachers from rural schools, with interviews being the primary method of data collection. The population consisted of primary school teachers who had access to ICT infrastructure but were reluctant to engage with SMIS. The study found that negative perceptions of ICT as overly complex or irrelevant led to lower adoption rates, even when the necessary infrastructure was in place. This highlights the importance of addressing psychological barriers in addition to technical challenges in teacher training programs.

Moreover, a study by Botha et al. (2019) in South Africa identified digital literacy and lack of training as significant barriers to ICT integration. The research design was a cross-sectional study involving 120 teachers from various schools in the Gauteng province. The population consisted of teachers at different levels of digital competency. The findings revealed that many teachers lacked the confidence to integrate ICT into their daily administrative tasks due to insufficient training and digital literacy. The study recommended ongoing technical support and professional development as key strategies to overcome these barriers.

The Role of Continuous Professional Development

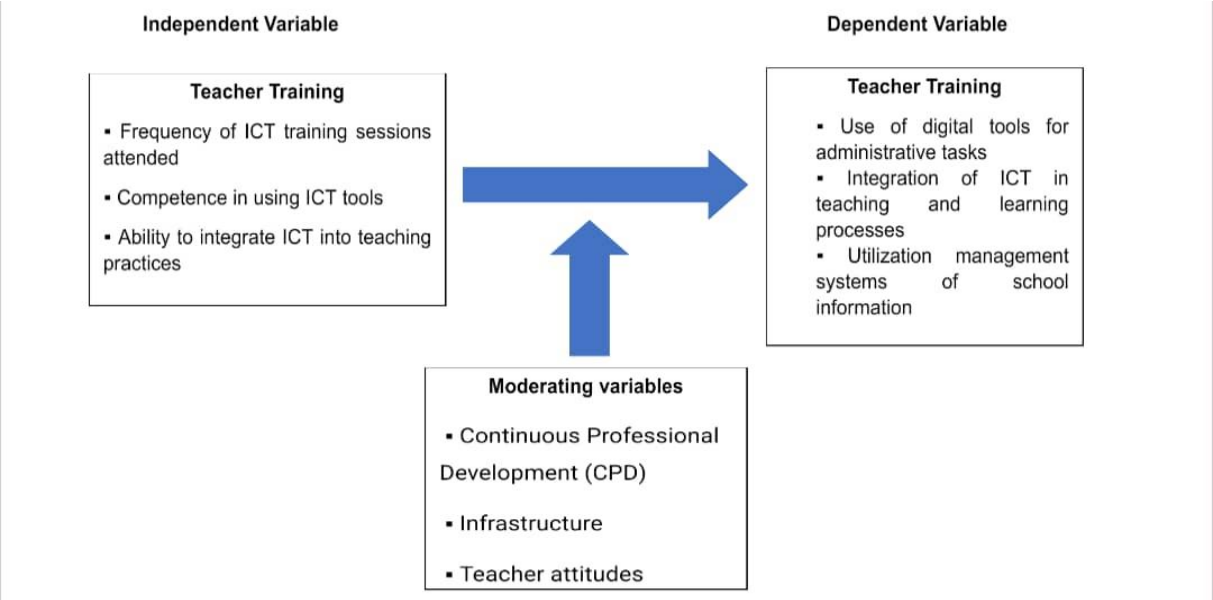
Continuous professional development (CPD) is crucial for sustaining ICT usage in SMIS. Buabeng-Andoh (2020) conducted a study in Ghana, focusing on the importance of CPD for long-term ICT adoption. The research design was a case study, with a sample size of 80 teachers from rural schools. The population included teachers who had attended both initial and follow-up ICT training programs. The findings revealed that teachers who participated in regular CPD sessions were more confident and skilled in using ICT for both educational and administrative purposes. The study recommended that schools invest in continuous training to ensure sustained ICT adoption.

In Swai and Roman's (2022) study in Rorya District, Tanzania, they emphasized the role of CPD in enhancing teachers' proficiency in using SMIS. Using a mixed-methods research design, they surveyed 60 teachers and found that those who engaged in ongoing professional development were more effective in integrating ICT into school management tasks. The population included teachers who had received both initial and continuous ICT training. The study concluded that regular CPD programs focusing on practical applications of SMIS were essential for long-term ICT adoption and usage.

In the United States, Ertmer and Otternbreit-Leftwich (2020) highlighted that CPD programs need to be tailored to evolving technologies to maintain teachers' ICT competency. Their quantitative study involved 150 teachers from various schools and demonstrated that ongoing professional development significantly improved teachers' ability to integrate new technologies into their teaching and administrative functions. The population included in-service teachers who had received multiple rounds of ICT training. This study emphasized that continuous training ensures that teachers remain updated and capable of utilizing new technological tools effectively.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

Conceptual Framework



Source: Author 2024

The conceptual framework for this study illustrates the relationship between teacher training (independent variable) and ICT usage in SMIS (dependent variable). The model posits that effective teacher training, which includes regular training sessions, increased competence in using ICT tools, and the ability to integrate ICT into both teaching and administrative tasks, will lead to greater usage of ICT in school management systems.

METHODOLOGY

This study adopted a quantitative research approach with a descriptive research design to explore the factors influencing ICT usage in School Management Information Systems (SMIS) in Rorya District, Tanzania. The sample size was calculated using Yamane's formula, ensuring a 95% confidence level with a 5% margin of error. With this approach, the final sample size consisted of 75 headteachers, ensuring adequate representation and generalizability of the findings to the broader population of primary schools in Rorya District.

Data were collected through structured questionnaires, focusing on teacher training, infrastructure availability, and ICT integration. The responses were recorded using a 5-point Likert scale (Strongly Disagree to Strongly Agree), which was then converted into a mean index to capture the variables quantitatively. This mean index allowed for the calculation of percentages, which in turn helped in interpreting the data more clearly. The mean index was used to summarize responses and calculate the average agreement levels for key factors influencing ICT usage in SMIS, providing insight into the extent to which teachers and administrators engage with ICT systems. Once the data were cleaned, they were analyzed using descriptive statistics to summarize the trends and multiple regression analysis to examine the relationships between the independent variables (teacher training, infrastructure availability, and ICT integration) and the dependent variable (ICT usage effectiveness in SMIS).

The study utilizes a multiple linear regression model to analyze the relationships between the independent variables (Teacher Attitude towards ICT, ICT Integration in Teaching and Learning, and Teacher Training on ICT Usage) and the dependent variable (ICT usage effectiveness in SMIS). This type of regression is selected based on the nature of the data collected, which includes continuous variables derived from a Likert scale. Multiple linear regression is appropriate for this study because it allows for the analysis of how each independent variable influences the dependent variable while controlling for the effects of other variables.

The scientific rationale for choosing multiple linear regression lies in its ability to handle datasets where the predictors and outcome variables are continuous or ordinal, as in the case of this study. The model enables the examination of the joint contribution of multiple predictors to the outcome, which aligns with the objective of

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

exploring the factors that affect ICT usage in school management. Furthermore, this regression method provides robust estimates of the effect sizes for each independent variable, thus offering a comprehensive understanding of how different factors affect the effectiveness of ICT usage in SMIS. The regression model used for this study is expressed as:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$
Where:
Y represents ICT usage effectiveness in SMIS,
β_0 is the constant term,
X_1 is Teacher Attitude towards ICT,
X_2 is ICT Integration in Teaching and Learning,
X_3 is Teacher Training on ICT Usage,
ε is the error term.

Model fitness

The model's fitness was evaluated, revealing an R value of 0.632, indicating a moderately strong positive correlation between the predictor variables (teacher attitude, ICT integration in teaching, and teacher training) and the outcome variable (ICT usage effectiveness). The R-squared value was found to be 0.400, suggesting that the independent variables explain 40.0% of the variance in the dependent variable. The adjusted R-squared value was 0.365, which accounts for the number of predictors in the model. This means that a significant portion of the variation in ICT usage effectiveness is explained by the independent variables considered in the study, including teacher training on ICT usage.

Model	R	R-Squared	Adjusted R-Squared
1	0.632	0.400	0.365

Analysis of Variance (ANOVA)

The ANOVA results indicate that the independent variables significantly predict the dependent variable, with a p-value of 0.000, which is less than 0.05. This suggests that, on average, the regression model accurately and significantly predicts ICT usage effectiveness in SMIS. The results show that the dependent variable (ICT usage effectiveness) is significantly influenced by the independent variables (teacher attitude, ICT integration in teaching, and teacher training on ICT usage).

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	26.234	3	8.745	12.25	0.000
Residual	39.351	72	0.547		
Total	65.585	75			

Estimated Model Coefficients

The estimated model coefficients are summarized as follows:

Variable	Coefficient (B)	Standard Error	t-value	p-value
Constant	1.650	0.540	3.056	0.003
Teacher Attitude towards ICT	0.0125	0.110	0.114	0.909

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

ICT Integration in Teaching and Learning	0.4705	0.095	4.953	0.000
Teacher Training on ICT Usage	0.2501	0.130	1.925	0.059

ICT Integration in Teaching and Learning: The coefficient is statistically significant, with a p-value of 0.000, indicating a strong positive relationship with ICT usage effectiveness. This suggests that better integration of ICT into teaching significantly improves the effectiveness of ICT usage in school management systems. Teacher Training on ICT Usage has a positive coefficient of 0.2501 and a p-value of 0.059, which is just outside the threshold for significance. This implies that teacher training positively impacts ICT usage effectiveness, though more data or improvements might strengthen this relationship. Teacher Attitude towards ICT is not a significant predictor of ICT usage effectiveness, with a p-value of 0.909, suggesting that practical training and support may be more crucial in improving ICT adoption than attitudes alone.

RESULTS AND DISCUSSIONS

Influence of Teacher Training on ICT Usage in School Management Information Systems (SMIS)

The results presented in Table 4 indicate that the majority of respondents (64.5%) agree that teacher training on ICT usage is adequate, while 18.4% were neutral, and 17.1% disagreed. Additionally, 59.4% of respondents stated that there are sufficient computers and devices available for staff use, with 15.8% remaining neutral and 24.8% disagreeing. Furthermore, 57.9% of respondents believe that the software and applications provided through training are up-to-date and effective for educational purposes, with 18.4% being neutral and 23.7% disagreeing.

Statement	1 (Strongly Agree)	2 (Agree)	3 (Neutral)	4 (Disagree)	5 (Strongly Disagree)
Teacher training on ICT usage is adequate	18.4%	46.1%	18.4%	12.5%	4.6%
Sufficient computers and devices are available	16.1%	43.3%	15.8%	18.4%	6.4%
Software and applications are up-to-date and effective	23.7%	34.2%	18.4%	15.8%	7.9%

The Role of ICT Integration in Teaching and Learning

The findings in Table 5 reveal that 63.2% of respondents agree that the integration of ICT into teaching and learning is well-implemented, while 17.1% were neutral, and 19.7% disagreed. Moreover, 59.3% of respondents believe that integrating ICT in teaching enhances administrative efficiency, with 19.4% remaining neutral and 21.3% disagreeing. Additionally, 55.4% of respondents feel that ICT usage in administrative processes reduces workload, while 24.6% were neutral and 20.0% disagreed.

Statement	1 (Strongly Agree)	2 (Agree)	3 (Neutral)	4 (Disagree)	5 (Strongly Disagree)
ICT integration in teaching is well-implemented	23.2%	40.0%	17.1%	13.1%	6.6%
ICT enhances administrative efficiency	22.4%	36.9%	19.4%	14.5%	6.8%
ICT reduces workload and increases productivity	20.0%	35.4%	24.6%	12.1%	7.9%

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

The Influence of Infrastructure Availability on ICT Usage in SMIS

Table 6 shows that 62.3% of respondents believe that the availability of infrastructure such as computers and reliable internet contributes to effective ICT usage, with 17.1% being neutral and 20.6% disagreeing. Additionally, 54.6% of respondents agree that the quality of provided ICT infrastructure meets the needs of the school, with 22.2% being neutral and 23.2% disagreeing. Furthermore, 52.8% of respondents agree that the school provides sufficient internet connectivity for both educational and administrative needs, with 24.6% being neutral and 22.6% disagreeing.

Statement	1 (Strongly Agree)	2 (Agree)	3 (Neutral)	4 (Disagree)	5 (Strongly Disagree)
Infrastructure availability contributes to effective ICT usage	23.2%	39.1%	17.1%	13.1%	7.5%
ICT infrastructure quality meets the school's needs	21.2%	33.4%	22.2%	15.3%	7.9%
Internet connectivity is sufficient for educational purposes	18.4%	34.4%	24.6%	14.3%	8.3%

DISCUSSION

The findings from the regression analysis indicate that teacher training significantly impacts the usage of ICT in SMIS. Teachers who attended frequent ICT training sessions demonstrated higher competence in using SMIS for administrative tasks such as student data management and resource allocation. These findings are consistent with previous studies by Ogutu et al. (2022), which also highlighted the importance of training frequency in improving ICT skills among educators.

However, the study also reveals that infrastructure availability remains a secondary factor affecting ICT usage. Although teacher training improves ICT adoption, schools lacking adequate infrastructure such as reliable internet and sufficient hardware struggle to implement SMIS effectively. This supports the findings of Mtebe and Raphael (2021), who identified infrastructural challenges as a major barrier to ICT integration in Tanzanian schools.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

This study demonstrates the critical role of teacher training in enhancing ICT usage within SMIS in Rorya District, Tanzania. Frequent and targeted ICT training sessions have a direct positive impact on teachers' ability to integrate technology into school management, particularly in administrative tasks such as data management and resource allocation. However, infrastructural limitations continue to hinder the full adoption of SMIS, even among trained educators.

Recommendations

Addressing infrastructural limitations, such as unreliable internet connectivity and inadequate hardware, is crucial for the successful integration of ICT in education and school management systems (SMIS). Below are detailed strategies and case studies that highlight how schools and districts have tackled these challenges, which you can adapt to the context of your research in Rorya District, Tanzania.

Leveraging Offline Technologies and Localized Solutions

Strategy: In regions with unreliable internet connectivity, schools can use offline solutions and technologies

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

that do not require constant internet access. These solutions can include:

Offline Learning Platforms: Platforms that allow teachers to download lessons, materials, and resources while connected to the internet, which can then be accessed offline by students and teachers.

Local Area Networks (LANs): Schools can set up LANs that connect all computers in the school, allowing data to be shared locally without needing an internet connection.

USB or Flash Drive-Based Systems: Systems for distributing materials or updates via flash drives or external hard drives that teachers can update while connected to the internet and then use offline in the classroom.

Case Study:

Application to Rorya District:

Schools in Rorya District can adopt similar offline ICT solutions by introducing portable hard drives or SD cards that contain school management information, teaching resources, and administrative software. These can be updated periodically during internet access, ensuring continuity in the absence of reliable internet connections.

Building Community and District-Wide ICT Infrastructure

Strategy: Rather than relying on individual schools to solve infrastructure challenges, districts or local governments can develop shared ICT infrastructure to support multiple schools. This approach reduces costs and increases efficiency:

Community Internet Access Points: Setting up shared internet access points (e.g., in community centers, local libraries, or district offices) where teachers and students can access the internet for educational and administrative purposes.

Cloud Computing: Use of cloud storage and cloud-based applications that are synced when internet access is available. Teachers and administrators can upload and access school data when they are connected to the internet, and updates can be synchronized across all schools in the district.

Application to Rorya District:

Rorya District can consider setting up district-level internet hubs that provide internet access to nearby schools. Schools can synchronize their data with the district server and use cloud-based applications for managing school information when internet access is available, even if the individual school infrastructure is limited.

Solar-Powered ICT Solutions

Strategy: In many rural areas, unreliable electricity adds to the infrastructural challenges. Solar-powered ICT solutions can be an effective strategy for ensuring continuous access to ICT tools:

Solar-Powered Computers and Tablets: These devices, designed to operate in areas with limited access to electricity, can be used for teaching and school management tasks.

Solar-Powered Internet Connectivity: Mobile hotspots or satellite systems powered by solar energy can provide internet access to areas without reliable electricity.

Case Study:

Uganda’s Solar-Powered ICTs: In Uganda, a number of rural schools have benefited from solar-powered ICT tools. Solar energy systems have been used to power computers, projectors, and internet routers, which help address both energy and connectivity challenges. A program in Northern Uganda called “The Rural

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

Electrification Agency" partnered with mobile companies to provide solar-powered internet connections and computing devices.

Application to Rorya District:

In Rorya District, schools can explore solar-powered ICT solutions as a sustainable method of overcoming electricity issues. Solar-powered tablets or laptops can be used for SMIS activities, and solar-powered internet systems can be deployed in schools to provide reliable internet access.

Partnerships and Collaborative Funding Models

Strategy: Establishing public-private partnerships (PPPs) or collaborating with non-governmental organizations (NGOs) can help schools overcome infrastructural limitations:

Private Sector Partnerships: Schools can partner with local businesses, ICT companies, or mobile network providers to support the provision of hardware, internet connectivity, and training.

NGO Collaboration: NGOs that focus on education and ICT can provide funding or support for infrastructure improvements. For example, some NGOs provide computers or technology solutions to schools in rural areas.

Case Study:

Ghana's ICT in Education Project: Ghana partnered with private telecommunications companies to roll out ICT infrastructure in schools. The initiative aimed to address the connectivity problem by providing low-cost internet packages and school-specific ICT tools to underserved areas. Additionally, UNICEF has been involved in similar partnerships to provide ICT resources to schools in sub-Saharan Africa.

Application to Rorya District:

Rorya District can benefit from PPPs by collaborating with local and international organizations to access affordable ICT hardware and internet connectivity. Mobile network companies, for example, could offer discounts on data packages for educational purposes, or hardware providers might offer affordable solutions for rural schools.

Mobile Solutions for School Management

Strategy: Given the widespread use of mobile phones, mobile-based solutions can help overcome some of the hardware and internet limitations. These solutions can be used for both administrative purposes and student engagement.

Mobile-Based SMIS: Mobile apps designed for school management can enable teachers and administrators to access and manage school data from their smartphones or feature phones.

SMS-Based Updates: For regions with limited internet access, SMS-based systems can be used for sending attendance records, exam results, and other important information.

Case Study:

Nigeria's Mobile School Management System: In Nigeria, mobile-based solutions for school management have been piloted, where teachers and school administrators use mobile phones to manage attendance, grades, and reports. This helps bypass the need for desktop computers and unreliable internet access.

Application to Rorya District:

Rorya District can implement SMS or mobile-based solutions for administrative tasks such as attendance, student performance tracking, and communication with parents. This would make SMIS more accessible in areas with limited internet connectivity.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

1. Expand and Improve Teacher Training Programs; It is essential that schools invest in comprehensive ICT training for teachers, focusing not only on administrative tools but also on innovative educational technologies. Training should be practical and continuous, equipping teachers with the skills to adapt to evolving ICT tools.

2. Policymakers should design CPD programs that offer ongoing ICT training tailored to SMIS functionalities. These programs should be context-specific, addressing both the administrative and pedagogical applications of ICT.

3. The integration of ICT into the teaching and learning process should be further developed, ensuring that ICT becomes a central tool in school management. Schools should create an environment where ICT is used not just for management tasks but as a key part of the educational process.

4. The study emphasizes that teacher training and ICT integration are even more critical to the success of ICT usage in schools. Therefore, investments in infrastructure should be matched by investments in training and professional development.

5. The study suggests that the Tanzanian government, educational institutions, and development partners should collaborate to ensure that schools receive not only the necessary infrastructure but also adequate support in terms of teacher training and ICT integration strategies. This balanced approach will lead to more effective and sustainable use of ICT in school management systems.

Competing Interests

The author declares that there are no competing interests.

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