

Secondary School Teachers' Literacy to Integrate ICT for Enhancing School Management Efficiency: Experience from Njombe Town Council, Tanzania

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Abstract- This paper describes the findings on teachers' literacy to integrate ICT for enhancing secondary school management efficiency in Tanzania. Extensively, the paper gives the comprehensive idea on how teachers are prepared in integrating ICT in management of school's functions. The question directed the paper was; How ICT literate are secondary school teachers in enhancing schools' management in Njombe Town Council? Convergent research design consisted of quantitative and qualitative approaches was applied. The study used simple random sampling to get 98 teachers and purposive sampling to 7 school heads and 1 TEO. Questionnaire and interview were applied in collecting data in public secondary schools in Njombe Town council. Quantitative data were analysed by descriptive statistics while thematic analysis was used to qualitative data. The study's findings revealed that, even though most teachers have average ICT competence, the gap is still noticeable in ICT managerial trainings rather than ICT trainings for basic ICT knowledge and skills. As ICT plays a crucial role in the improvement of education sector, regular teachers ICT professional development programs are to be practiced for enabling school's management efficiency. Thus, the study recommends for the government to support ICT facilities and teachers' ICT training for attaining effective school's management in public secondary schools.

Indexed Terms- ICT, ICT readiness, ICT literacy and management.

I. INTRODUCTION

Information and Communications Technology literacy among heads of school and teachers is needed for effective management of secondary schools in particular and for the improvement of the education sector in general. Therefore, appropriate application of ICT facilitates implementation of school management functions such as fiscal, instructional and administrative management. Fiscal management includes budget creation, accounting tasks and audit. Instructional management comprises of teaching and learning practices, timetabling and examinations handling while administrative management consists of creation and storage of data on human and physical resources.

According to [1], [2], ICT in education management includes the use of technical and communication equipment/software and handling technology used among diverse individuals or settings for making, gathering, processing and transferring information. Examples of ICT equipment in secondary schools include; printer, scanner, mobiles, telephones, television, photocopy machine, tablets, computer, projectors and cameras. Also, among the ICT software that facilitates management of schools' functions are; Facility Financial Accounting and Reporting System (FFARS)-[3]; [4], Primary Records Managers Secondary (PReMS), Selfform Management Information System and School Information System (SIS) [5].

According to [6] teachers in secondary schools have the roles of performing diverse school's management functions as delegated by their school heads. As ICT integration plays a crucial role in performing various

schools' functions in schools, ICT readiness is among the criteria for school management efficiency. For effective ICT application and management efficiency, ICT readiness can be evaluated in terms of operators and technology as well as organisation and environment [7]. ICT readiness can also be assessed by interior and exterior variables [8]. Basing on users, [8] specified that competence, intuitions, attitudes, trust and motivation are determinant factors for teachers' ICT readiness towards technology. The basic skills and knowledge either from formal or informal training on hardware and software are so vital to teachers as they make them competent in ICT integration [9].

In the United States of America (USA) national ICT policy, strategies and objectives have been established to ensure teachers' ICT readiness for effective achievement in the management of education sector in secondary schools and the 21st Century demands [10]. These strategies include adjustment of schools to meet the society's demands. Thus, ICT is used in assisting training and staff professional improvement in learning institutions and School Management System (SMS) [11].

In the United Kingdom about £1.8 billion has been spent in the improvement of ICT infrastructures in secondary schools [12]. These efforts according to British Educational Communications and Technology Agency (BECTA) studies, have changed teachers' attitude towards using ICT in teaching and learning processes.

Countries like Malaysia, Indonesia and Pakistan have framed their strategies and policies on teachers' ICT literacy through their Ministry of Education due to their prospects on it [13]. However, despite the significance of ICT in simplifying the execution of education management, Malaysia seems to have slight ICT readiness in teaching and learning in rural compared with urban locales due to ICT skills deficit and absence of technical succour [14]. Also, heads of school and teachers in Indonesia have defective ICT readiness in school management activities while Pakistan experiences a similar situation especially in Mountainous Rural Schools of Gilgit-Baltistan due to insufficient ICT competence [11], [15]. In response to that, measures have been enacted to ensure

teachers' ICT readiness and schools' management efficiency by endorsing Education Management System for simplifying sharing of quality information, financing ICT facilities as well as teachers training [16], [17].

The existence and growth of innovative projects and broadcasts linked to ICT for education (ICT4E) in some areas of the continent including sub-Saharan Africa (SSA) signify the necessity of teachers' ICT literacy in educational management efficiency. However, the projects are challenged by absence of operative ICT policies, substructure and fiscal restraints [18]. But, due to the significance of employing ICT in management of schools' functions, most of the developing nations still have endless struggle to improve efficiency by adopting and applying digital technology [19].

In South Africa, for supporting teachers' ICT readiness, most schools possess some elementary ICT infrastructure and systems for pedagogy implementation for 65%–70% [20]. [21] asserts that ICT facilitates daily management of education institutions for preserving quality implementation of pedagogy in teaching and learning actions. This makes learning processes valuable and simplifies learning institutions management in creation of timetable, students registration, managing fiscal resources, managing procurement and storage, data management and school material resources management as well as lesson or lectures presentations [21]. However, in some schools, teachers' ICT literacy was low due to the shortage of enough ICT trainings and absence of support from principals and top management.

In Kenya, [22], reveal some noted efforts in enhancing teachers' ICT readiness in which most secondary schools were found to possess computers supported by parents, the government, development organisations and non-governmental organisations such as New Partnership for African Development (NEPAD) E-schools programme. Also, [23] revealed on the introduction of National Education Management Information System (NEMIS) and trainings for collecting data and human resources information for the better consumption of resources. The integration of ICT also is seen in the creation of

websites for institutes' information sharing, students' admission and acquiring results [23]. Despite the efforts enacted in to influence ICT implementation in Kenya, most of public secondary schools in Machakos Sub-County were found to have minimal ICT readiness in managing teachers and students' attendance software and NEMIS application [12].

In Tanzania, National ICT policies (2003,2007 and 2016) emphasize on the development of ICT literacy at all levels of education, among students, teachers and educational administrators [24]. The Education Sector Development Programme (ESDP) called for devolving the education management functions and the introduction and application of Education Management Information System (EMIS) for enhancing the efficiency of service delivery [25], [26]. Also, the Universal Communications Service Access Fund (UCSAF) in cooperation with the President's Office- Regional Administration and Local Government (PO-RALG) have been supporting ICT teachers training annually and provision of ICT facilities like computers, data projectors, printers, scanners and cameras to some schools [27]–[29].

Some of studies done on assessing the progress of ICT policy implementation in secondary schools education in Tanzania such as Joseph (2021); Rajab (2020), reveal the affirmative attitudes of teachers on ICT use in teaching and learning activities. The readiness in ICT integration was due to its perceived usefulness in facilitating students learning by widening the accessibility of education resources, arousing students' participation towards the lesson and assisting students understanding [30]. [19] in their study in Arusha region advise teachers in secondary schools to utilise ICT facilities, EMIS and Software as a Service (SaaS) for effective management of budgets, precise and time gathering as well as distribution of information in schools. But, in some public secondary schools teachers were addressed to have low ICT readiness due to incompetence in ICT usage, inadequacy of ICT facilities and shortage of technical support. For instance [32] shows this to be the case in Hanang District, Manyara. However, in some schools with inadequate ICT facilities some teachers possessing their own ICT tools like laptop and smart phones

were ready to apply them in fulfilling their daily school management functions [33].

Several studies conducted globally identify teachers' ICT readiness in implementing teaching and learning in different education institutions. Nevertheless there is still limited knowledge about the level of ICT literacy of teachers towards digital management of schools' functions efficiently due to the variation of science and technology as well as government pressure by introducing some Education Management Systems in schools in Tanzania. Thus, this study explored teachers' ICT literacy level on facilitating execution of school management functions in public secondary schools in Tanzania, using Njombe Town Council as sample. The paper was directed by the research question; How ICT literate are secondary school teachers in enhancing schools' management in Njombe Town Council?

II. METHODOLOGY

The study applied mixed research approach which comprises of quantitative and qualitative [34]. Convergent research design was used for gathering data simultaneously to evade the contradictions in findings and formulation of rational conclusion [35]. The study was conducted in public secondary schools at Njombe town council in Njombe region. The selection of this site was based on the presence of sufficient ICT gadgets compared to other councils in the region (PO-RALG, 2020). Thus, it was important to know how several managerial school's functions are attained via ICT.

The population of 501 people involving 1 Town Education Officer, 16 head of schools and 484 teachers were used as they are executors of ICT policy, circulars and guidelines of all education managerial functions at schools' settings [6]. The sample size of 106 participants from 7 of 16 public secondary schools were used. Purposive sampling was used to obtain 1 TEO and 7 heads of school while simple random sampling was used to get 98 teachers. Interview, questionnaire and observation were tools used in data gathering. Analysis of qualitative data was done thematically by involving data recognition, coding, theme creation, reviewing, naming, and inscription [37]. Quantitative data was

analysed using descriptive statistics in which percentages, frequencies and graphical simulations were facilitated by SPSS version 20 in revealing the graphs, charts and figures. Also, all study processes during data gathering and reporting adhered to all ethical matters for the informants' protections and effectiveness of the study.

III. FINDINGS AND DISCUSSION

This segment provides the discoveries and discussion on how public secondary school teachers are ICT literate in enhancing schools' management. These have been presented serially by assessing teachers' ICT literacy in carrying out secondary school's management functions with its sub-parts. Also, tables and figures have been used in the description of the outcomes to facilitate the in-depth understanding of the discoveries.

3.1 Teachers' ICT Literacy in Carrying out School's Management Functions

This objective intended to examine teachers' ICT knowledge and skills in carrying out various schools' functions. The findings in this objective were obtained from teachers' questionnaire and interview from school heads and TEO. Teachers' ICT literacy concept was assessed by basing on presence of teachers' ICT trainings and ICT competence.

3.1.1 Teachers' ICT training

This was projected to understand the accessibility of teachers' training for acquiring ICT basic knowledge and skills and ICT integration as an instrument of the school's management. In addition, this sub section provides information on the selection criteria for training and frequency of training.

3.1.1.1 ICT training for basic knowledge and skills

This was for exploring teachers' readiness by possessing an elementary ICT knowledge and skills. Thus, teachers were asked to tell whether they had in-service ICT training for basic ICT knowledge and skills. The details were as illustrated in Figure 3.1.

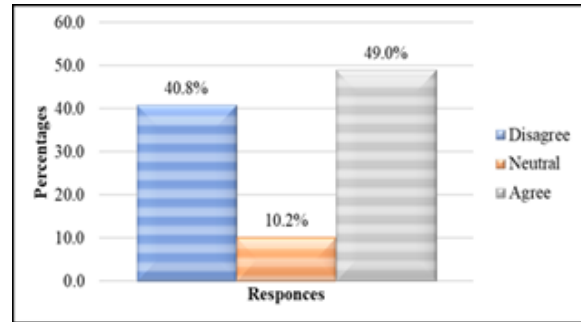


Figure 3.1: In-service ICT training for basic knowledge and skills

Source: Field data, 2022.

The details in Figure 3.1 showed that 49% (n=48) of the respondents agreed to the statement which intended to know whether they had in-service training for ICT basic knowledge and skills. On the other hand, 40.8% (n=40) disagreed while 10.2% (n=10) were neutral. Based on these findings it implies that most teachers in schools were able to implement ICT resources in secondary schools. The results are in line with [31] who noted that most of the teachers had basic ICT trainings when they were assessing teachers literacy towards integrating ICT in secondary schools Dodoma City secondary schools.

3.1.1.2 ICT trainings as tool of management

This part intended to capture an understanding on whether teachers were oriented in using various Education Management Information Systems (EMIS) or School Information System (SIS) as obliged by the government in executing school functions. Figure 3.2 gives the results of the findings obtained.

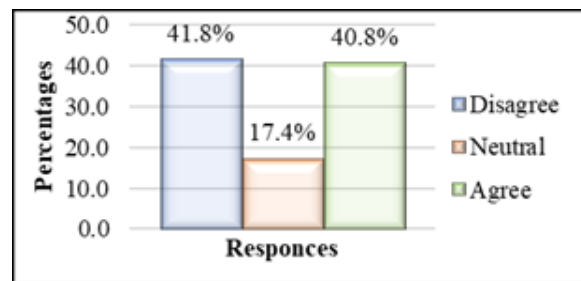


Figure 3.2: In-service ICT training as a tool of management in school.

Source: Field data, 2022

Figure 3.2 revealed that 40.8% (n=40) agreed to have in-service training on ICT as a tool of management

while 41.8% (n=41) disagreed and 17.4% (n=17) were neutral. These findings imply that most of the teachers had no training on using Education Management Information Systems (EMIS) or School Information Systems (SIS) in carrying out diverse schools' functions. This is because ICT managerial trainings were normally being provided to only teachers who had been appointed by the school head to carry out some basic school's functions. For instance, students' registration and transfers which is done through Primary Recording Manager Secondary (PReMS) and Financial tasks through Facility Financial Accounting and Recording System (FFARS). Thus, these tasks needed to be performed via EMIS or SIS which normally need respective teachers to be oriented on their implementations.

Likewise, the explanations as to why few teachers were trained on using ICT in managing some basic schools' functions were justified from school heads' interview. The findings show that some ICT training in the management of schools were based on teachers' managerial positions such as second master, school bursar, academic teacher, statistic teacher and ICT teacher. However, in some cases teachers who got training were reported to assist others to acquire that knowledge where necessary by depending on the training objectives. Thus, the situation of teachers' ICT trainings as a tool of management was justified when one head of school A said;

In my school most teachers have basic ICT trainings, however only few have trainings on incorporating ICT as tool of management by depending on their basic managerial positions appointed. This includes school accountant, second master, academic master and school statistician. Actually, this has been so for enhancing them to implement some EMIS such as FFARS, PReMS, TSS and Selfforms. (Interview with head of school A , July 2022).

Similarly, the findings were justified from TEO's interview when he said that;

Yes, first there are teachers who learnt ICT as one of the courses in their universities, but also teachers acquire skills according to their positions they have at their schools like school

bursars, academic masters, ICT teachers, second masters, statistics teachers and heads of school (Interview with TEO, 2022)

Furthermore, interviews results showed that in service teachers' trainings on either basic knowledge and skills or as tool of management were provided in different levels such as school, district or national levels depending on the training objectives. For instance, there has been ICT training which have been provided national wise by President's Office - Regional Administration and Local Government (PO-RALG) in which teachers from different schools in our country have been meeting in various centres for trainings. In addition, it was addressed that most of these teachers' ICT trainings were sponsored by either district council, Ministry of Education, Science and Technology and other educational stakeholders such as Communication companies. For instance, in answering to the question which asked who sponsors ICT trainings provided to teachers, the head of school C said that;

I remember two weeks ago Vodacom communication company provided training on using internet they installed in our computer lab. On February, also Tigo communication company trained us on how to use internet for four hours. But, basing on the Ministry of Education, Science and Technology, one teacher from our school also attended ICT training on School Information system (SIS) national wise at Morogoro and facilitated other teachers after his return council wise. (Interview with head of school C, July 2022).

Additionally, for ensuring the effectiveness of trainings provided to teachers, the findings indicated that follow up is normally done through ensuring those who have acquired trainings facilitate others in their district council or schools where necessary. Also, the results revealed that follow up was conducted through assessing the implementation of knowledge and skills in their managerial positions appointed through Education Management Information Systems. From these findings it implies that the contribution of ICT in the improvement of education sector is wide known. That is why education stakeholders such as communication

companies decide to sponsor some trainings in schools but also the presence of follow up on the trainings impacts.

Thus, from the findings it is revealed that training is essential for teachers' ICT readiness to integrate technology in school management functions. These findings concur with the notion of [38] which declares that, the contemporary age of digital technology can only be interested in various fields such as education if all individuals are built with suitable ICT consciousness and abilities. Also, added that effective training is so essential for imparting ICT knowledge and skills to facilitate teachers' readiness in ICT integration in schools. Thus, the results concur with Technological Acceptance Model which suggests that the possession of knowledge and skills obtained from in service ICT trainings are among the stimulus for adoption and implementation of ICT in management of school's functions efficiently.

3.1.1.3 Teachers' training frequency

This focused on investigating the frequency of training that teachers had on ICT. The respondents were supposed to reply whether have attended once, twice and more than twice. From these responses, Figure 3.3 illustrates the details;

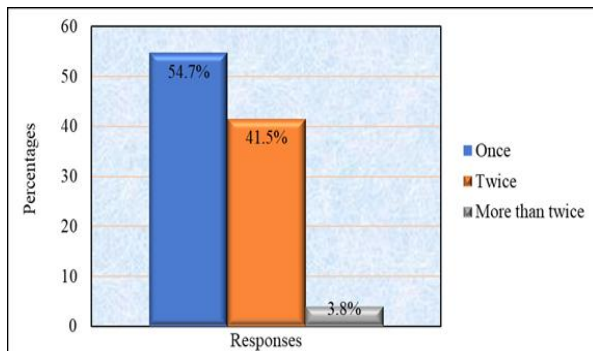


Figure 3.3: Teachers' training frequency
Source: Field data 2022

The details in Figure 3.3 disclose that most of respondents attended ICT training only once for 54.7% (n=26) among 48 respondents that agreed on ICT trainings while 41.5% (n=20) attended twice and 3.8% (n=2) more than twice. From these results, it implies that in public secondary schools there is

absence of regular ICT training which are considered to teachers as majority of them were identified to attend ICT training only once. However, the study of [39] signposts the appreciations of teachers on ICT training and professionalism advancement as the key aspect that inspires them in implementing ICT in their daily responsibilities. Likewise, the findings align with [40] who publicised that the possession of ICT knowledge to teachers facilitates the effectiveness in managing educational assets by facilitating suitable creation, storage and retrieving schools' information in regards to sustainable use of ICT devices.

3.1.1.4 Criteria for selection of schools, participants and interval for ICT trainings

According to the interviews' findings, there are numerous criteria identified in schools' selections, participants and interval of ICT trainings. These included natures of competence provided, series of trainings, curriculum vitae, managerial positions they have at schools or teaching subjects like science subjects or ICT, trainings objectives and authoritative guidelines. For instance, in responding to the interview TEO said that;

Actually, criteria used in selections of schools and teachers are ICT competence, series of training, schools' managerial positions they have or teaching subjects like science subjects or ICT. Also, some participants can be appointed directly from the national level, district level or school level depending on their curriculum vitae on database. But the training interval normally depends on the training objectives (Interview with TEO, 2022).

Similarly, the head of school C showed that teachers' managerial positions is among the criteria when he stated that;

The used criteria are the managerial positions appointed, experience, ICT competence and authoritative guidelines. For example; if you have informed to send a teacher for financial training actually the bursar will be the one due to his responsibilities. Also, if you are told to

send the teacher for statistics issues automatically the teacher from that position will be considered (Interview with head of school C, July 2022)

by the Ministry of Education, Science and Technology.

3.1.2 Teachers’ ICT competences

The findings imply that predetermined sets of criteria for selections of teachers for ICT and interval for ICT trainings are so essential for attaining ICT training outcomes efficiency. The study findings on the series of training as criteria for participants selections concur with [33] where it was shown that teachers’ ICT trainings were provided into three cycles. Thus, those who were chosen to attend cycle one had the chance to attend next cycles so as to make them full equipped with ICT knowledge and skills as targeted

This part expected to understand whether teachers were able to transfer knowledge and skills acquired to integrate ICT in the management of secondary schools effectively. Teachers’ competences were measured through several statements which based on their ability to use computer with other ICT tools, ability to troubleshoot and repair computers where needed, the ability to access and use EMIS effectively. Table 3.1 illustrates more on the finding.

Table 3.1 Teachers’ ICT Competence Level

Statement	D		N		A		Mean
	F	%	F	%	F	%	
I am able to use computer with other ICT tools in management of schools' functions.	25	25.5	34	34.7	39	38.8	2.14
I have the ability to troubleshoot and repair computers where necessary.	40	40.8	9	9.2	50	50	2.12
I have the ability to access and use Education Management Information systems (EMIS) effectively.	18	18.4	41	41.8	39	39.8	1.98
I have ability to manage instructional tasks through ICT tools effectively.	16	16.3	30	30.6	52	53.1	2.37
Overall teachers' competence grade	24.8	25.3	28.5	29.1	45	45.4	2.2

Source: Field data 2022

Key: D=Disagree, N=Neutral, A= Agree and F=Frequency. Also, the ranging of mean score is from 1.0-1.4=Disagree, 1.5-2.4=Neutral and 2.5- 3.0=Agree.

The findings in Table 3.1 indicate that 25.3% disagreed that they were competent in using ICT in the management of secondary school’s functions effectively while 38% were neutral and 37.2% agreed. Thus, these findings imply that most teachers in secondary schools have average level in ICT competence readiness. The reasons provided by respondents on their average ICT competence rate were due to shortage of regular ICT trainings, scarcity of computers, internet problem, absence or regular cut off of electricity and lack of regular practices due to time limit. Thus, in regards to the

TAM and TOE framework, this implies that most schools can have inefficiency in the management efficiency of secondary schools. This is due to the fact that, average competence of teachers in ICT application can make them failing to solve some challenges they encounter during the execution of their assigned managerial school’s tasks.

The findings are somehow differ to [31] who states that most of teachers are competent in ICT usage when examining teachers’ digital competence in teaching and learning in Dodoma City secondary schools. However, [32] differed in his findings as he

identified that teachers had ICT incompetent in pedagogical aspects when studying teachers' ICT adoption in Hanang public secondary schools.

Likewise, from school heads' interview teachers were rated their competences and confidences towards integrating ICT in schools' functions. The findings show that majority of teachers' competences and confidences were average. The criteria employed by school heads was assessing how teachers were able to manage their school's responsibilities according to the ICT facilities available. This can be vindicated from the responses provided by one head of school A who said that;

On my side, I can say that most teachers' competence and confidence are average. Since the school has few ICT tools, it is difficult to know direct the experience of each teacher on ICT literacy, however most of them possess smartphone. But, those few whom their managerial positions need them to use ICT daily such as academic master and school bursar, I can say that it is good since most of their activities are done via computer and assessed daily (Interview with head of school A, July 2022).

Another head of school C also rated teachers' ICT competence as average by the way teachers apply their knowledge practically out of theories had attained from their university colleges. This is due to the fact that to some extent they still need support from each other in achieving effective ICT integration. This was found in his responses where he said;

I can say that it is average, as most of my teachers in my school are degree holders hence, they have experiences on using ICT. But it is difficult to rate them as excellent or good as the knowledge they got from colleges is not enough for them to be competent practically in managing their daily activities, so we continue to help each other where needed to make us more competent (Interview with head of school C, July 2022).

In addition to that, TEO was asked to assess an overall state of ICT integration in management of his public secondary schools' activities. The responses were based on two criteria which were the provision of school's information and the case of teaching and learning. In case of the provision of school's information, the schools were rated as good as there is no any school which fails totally to implement the systems (EMIS) provided. But also, basing on the teaching and learning processes it was rated as average where reason provided was inadequate of ICT facilities in schools. These were found in his replies where the stated that;

In provision of schools' information, I can say that it is good as no any school which fails to implement the systems provided. But pedagogically, it is average as most of schools have deficient ICT tools like computers and projectors. (Interview with TEO, July 2022).

Focusing on teachers' competence, [41] in their study addressed that teachers' slight level of ICT skills is among the matters that limit effectiveness in employing ICT in schools' settings. This is due to the fact that possession of high skills on ICT make teachers being capable and motivating their self-confidence towards the use of ICT in fulfilment of their school's managerial tasks as suggested by TAM and TOE in the conceptual framework.

CONCLUSION

The findings underscore that while a significant proportion of educators exhibit an average level of competence in using ICT tools for tasks such as troubleshooting and instructional activities, opportunities for improvement remain. Although many teachers possess basic ICT training from their higher education, there is a noticeable gap in specialized managerial training, particularly concerning tools like Education Management Information Systems (EMIS) or School Information system (SIS). These findings highlight the pressing need for tailored and enhanced ICT training programs that elevate teachers' confidence and competence in employing ICT tools effectively to enhance overall school management efficiency.

Therefore, this study serves as a clarion call for a comprehensive transformation in the integration of ICT within public secondary schools' management. By addressing the identified gaps and challenges through strategic interventions, educational institutions and policymakers can collaboratively steer towards a future where ICT perfectly empowers efficient and effective school management, thereby enriching the learning experiences of students and contributing to the advancement of the education sector as a whole.

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