Factor influencing effective use of information and communication technology on adult learning in Sumbawanga Municipality- Rukwa Region, Tanzania

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ABSTRACT

This study investigated the factors influencing the effective use of Information and Communication Technology (ICT) in adult learning in Sumbawanga Municipality, where all enrolled adult learners at the Sumbawanga Center were involved. The study involved Adult Learning Theory (Andragogy) of Malcolm Knowles.The theories help explain how adults learners interact with technology, and what factors affect ICT effective use of ICT in adult education. In addition the theory focuses on how adults learn differently from children emphasizing self-direction, prior experience, and goal orientation was particularly relevant. This theory explains how adult learners engage with ICT tools (e.g., e-learning platforms) and emphasizes that ICT use must align with adults' need for autonomy and the application of knowledge to real-life tasks. The study involved all 94 adult learners registered at the Sumbawanga Adult Learning Center, who were selected purposively. A cross-sectional research design was employed, as it allowed for the collection of data at a single point in time. Interviews, document reviews, and focus group discussions were used as data collection methods, while questionnaires and checklists were administered to capture all necessary data for the study. For data analysis, descriptive statistics were used to analyze the demographic characteristics of respondents where frequencies and percentages described the characteristics of respondents in addition likert scale was used to determine the level of using ICT among adult learners. Moreover on determining factors for effective use of ICT, inferential statistical analysis, specifically multiple linear regression, was applied. The study concluded that the level of ICT use among adult learners was low. Furthermore, factors such as learners' ICT competency, availability of ICT tools at the learning center, unreliable internet, and unstable power supply significantly influenced ICT use, with statistical significance at the 0.01 and 0.05 levels. The study recommends that the Government of Tanzania strengthen adult education institutes by providing adequate ICT tools, ensuring reliable internet access, and improving power supply. These improvements would enhance the effective use of ICT in adult learning.

Keywords: Adult Learning, ICT, Factors Influencing ICT Use, Malcolm Knowles, Sumbawanga Municipality, Tanzania

I. INTRODUCTION

Learning at adulthood is a common phenomenon across the world since education is inseparable from life, and unlimited by age and time although adults are individuals whose age and biological state require an expected form of behaviors and set of social roles . Literacy is an indispensable foundation that enables young people and adults to engage in learning opportunities at all stages of the learning continuum (Williams, 2020). As an age-independent, context bound and continuous process, the acquisition and development of literacy takes place both within, outside educational settings, and throughout life.

Increasingly, reading and writing are viewed as part of a broader conception of key competencies, including ICT skills, which require sustained learning and updating their skills. The organization for their learning is required to empower with advanced ICT skills, knowledge and experience for the purpose of improving their capacity and ability to master their lives (Góralska & Leek, 2017). This has been among the priorities of different governments across the world, Tanzania inclusive. The necessity of learning at adulthood has come into practice due to the situations requiring an individual to adjust in respect to work, and family commitment. Tanzania has been implementing various adult education programs through Institute of Adult Education (IAE), Adult and Non-Formal Education Development Programme (ANFEDP) and other programs to enable adults take certificates in various academic institutions.

The goal of this effort was to raise the level of education among adults who have not completed their comprehensive and/or secondary education. Tanzania, plagued with a 22.4 % illiteracy rate among residents over 15

years of age, has set its sights on achieving 100 % literacy as reported by (Fute et al., 2023).Therefore the government has set a blueprint for achieving this goal in a wide-ranging "National Adult Literacy and Mass Education Rolling Strategy 2020/21 to 2024/25". Among other measures, the plan supports literacy courses across the country, sets up a monitoring database to track progress and funds creation of learning materials. It also pays for teacher training and research on best practices. Tanzania's current illiteracy rate puts it well behind schedule for achieving Sustainable Development Goal 4.6, which calls for 100 % literacy among youths and adults by 2030 (Nyangarika & Ngasa, 2020).

It is obvious that previous adult literacy campaigns have not been very successful; this might be as a result of the neglect of the importance of ICT in teaching and learning activities. However, the use of ICT as a literacy enabler will depend on the readiness of community to adopt ICT as a tool for literacy. There is a lack of localized research on the use of ICT in adult education specific to Sumbawanga Municipality has facilitated this study to be conducted so as to get reliable information on factors for effective use of ICT among adult learners . The minimum usage of ICT for adult literacy education in Sumbawanga Municipality is a major source of concern for this study. Therefore it is necessary to critically examine the effectiveness of ICT as a literacy enabler on the development of adult literacy programme.

1.1 Research Objectives

The study had two specific objectives:

i. To determine level of using ICT in adult learning in Sumbawanga Municipality
ii. To examine Socio- Economic factors influencing the effective use of ICT in adult learning in Sumbawanga Municipality.

II. LITERATURE REVIEW

2.1 Theoretical Review

A theoretical framework for a study on Information and Communication Technology (ICT) in Adult Education provides a foundation to understand how adults learn with technology, adopt digital tools, and the factors influencing their use of ICT.

2.1.1 Theory (Andragogy) of Malcolm Knowles

Malcolm Knowles' theory of Andragogy focuses on unique ways which adult learn .The theory show how adults learn differently from children. This theory emphasizes that adult learners are self-directed, internally motivated, and bring a wealth of life experiences into the learning environment. The theory is particularly relevant in understanding how adults engage with Information and Communication Technology (ICT) in educational settings (Knowles, 1978).

The theory is relevant to ICT in Education because it emphasize Self-Paced Learning that, ICT tools allow adults to learn at their own pace, revisiting materials as needed and focusing on areas where they need more support. In addition, the theory enhance interactive simulations, online collaboration platforms, and access to vast online resources within ICT can connect learning directly to real-world contexts. Moreover, accessibility and flexibility is being improved since overcome geographical barriers and time constraints, making learning more accessible and convenient for adult learners. Finally yet importantly, ICT to adult learners allows engagement and interaction through online forums, video conferencing, and interactive exercises within ICT can foster a sense of community and encourage active participation.

2.2 Empirical Review

Several empirical studies have investigated the factors that influence the effective use of Information and Communication Technology (ICT) among adult learners in various educational settings. These studies provide insights into how individual, institutional, and technological variables interact to support or hinder ICT adoption and use.

2.2.1 Level of using ICT in adult learning

Study conducted by Haruna and Amos (2024) on effectiveness of teaching technology integration in the adult learning process the study concluded that, the use of teaching technology was low about 30% and the major constraints are insufficient of find to have ICT tools also absence of necessary skills for operation of ICT tools. Consequently, their study recommended that the responsible authorities should allocate funds to ensure adult learner are well equipped with ICT facilities and also ensure an ICT curriculum is taught from primary school to higher education levels to enhance students' attitudes towards the uses of technology in teaching and learning process.

2.2.2. Social Economic factors influencing the use of ICT in adult learning

Several studies done on digital literacy as a critical factor in determining the effective use of ICT by adult learners. Bashir and Khan (2016) found that adult learners who have knowledge and skills on how to operate ICT more likely to engage in online learning activities compared to those who illiterate in ICT tools such as computers. Similarly to a study done by Motorga (2023) and Kara et al (2019) who reported challenges faced by adult learners in online distance are limited skills on the use of ICT tools in accessing learning materials.

Access to ICT Infrastructure: Availability of reliable infrastructure including computer laboratories equipped electricity power and internet connectivity has been reported as a key factors by Bashir and Khan (2016) on international conference on information technology based higher education and training on factors affecting learning capacity of information technology concepts in a classroom environment of adult learner.

Altitude and motivation: This has been reported as key factor for the adoption of ICT among adult learners, since willingness of individuals to use ICT, frequency of ICT tool usage in a broad context and frequency of ICT tool usage in the context of language learning. Therefore an adult learner can develop a behaviour of using ICT, if ICT tools is being used frequently in learning environment (Nagy & Habók, 2018).

Training and Technical Support: This reveals that, train mature learners address the life transitions help in integration between mature learners and adult learners of mature learners in today's changing world. Moreover it is observed that if individuals has skills of operating ICT tools in learning automatically can develop a behaviour of using ICT tools frequently. Therefore training opportunities and ongoing technical support are crucial for adult learners to use ICT effectively (Formosa, 2015).

Relevance and Contextualization of Content: The effectiveness of ICT in adult learning also depends on the relevance of digital content. Sithole and Mbukanma (2024) on their study of ICT use and perceived effectiveness in an adult learning context reported that, Adult learners are more engaged when digital learning materials are directly applicable to their lives or livelihoods.

Institutional and Policy Support: Institutional commitment through supportive policies, funding, and curriculum integration enhances the sustainability of ICT use. Akinola et al. (2023) observed that, adult education centers that had clear ICT policies and budgetary allocations were more successful in implementing ICT-based programs. In addition, Mwakyambiki et al .(2024) in their study observed that implementation ICT policies at education centres such as using online programs attract more learners, in adopting online and distance learning modalities.

III. METHODOLOGY

3.1. Study Area

The study was conducted in Sumbawanga Municipality within Rukwa Region between June 21, 2024 and November 30, 2024. According to the 2022 national census, the area has the population of 303,986, comprising 144,657 male and 159,329 female. Municipality has 182,970 urban dwellers and 121,016 rural dwellers. The area has been selected because it hosts a number of formal adult learning centers, including literacy programs and continuing education institutions. This concentration of learning centers in the Municipality makes it feasible to access respondents who are adult learners and key informants such as teachers and heads of learning centers.

3.2 Research Design

The study adopted a cross sectional design, the design is suitable to collect data in a single point of time, also the design is effective and cost efficiency (Cummings, 2018). Often, cross-sectional designs are used to examine and compare single variables across multiple subgroups that are similar in other characteristics. For the study, these types of designs are commonly used to examine the extent of ICT usage among adult learners at the given time.

3.3. Sampling and Sample size

Non-probability sampling was used was used to select adult learners. Purposive sampling was used to select all 94 respondents from different level at an adult literacy center. In addition, a head of learning center and teachers were also selected purposively as key informants.

3.4 Data Collection and Analysis

Both qualitative and quantitative data were collected from primary and secondary sources. Primary data were gathered through interviews, focus group discussions. Questionnaires were administered for guiding interview method and a checklist was used for focus group discussion and documentary review. Descriptive statistical analysis was used to summarize demographic characteristics of adult learners.

In determining level of using ICT in adult learning the collected data was analyzed by using Likert scale, was used to capture opinions of the respondents on different aspects of ICTs used in their institutions which were to be

answered on five-point rating scale. The data were tabulated in the form of frequency distribution. Weighted average indicates the importance given the respondents to each item or statement.

On determining level of using ICT, the study based on different ICT tools such as accessibility of computer, the availability of internet, the use of Smart phone and the use of video conference in learning, where by learners were in position of rating by the following rates : 4 Strong Dis agree, 3 Disagree, 2 Strong Agree, 1 Agree

On examining Socio-Economic factors influencing the effective use of ICT in adult learning inferential statistical analysis (multiple linear regression) and multiple response was used and allowed participants to select more than one answer when responding to certain questions particularly those involving ICT tools, challenges, or benefits experienced in adult learning. This approach was appropriate and justified for the following reasons:

Multiple linear regression model "Factors influencing the effective use of ICT"

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon_i \quad (i)$$

Where:

Y is the dependent variable,

β_0 is the intercept,

$\beta_1 \ldots \beta_n$ are the coefficients of the independent variables $X_1 \ldots X_n$, and

ε_i is the error term accounting for unexplained variation.

Based on the study variables, the specified regression model becomes:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon_i \quad (ii)$$

Table 1

Factors Influencing the Effective Use of ICT

Variables	Variables Description	Expected effects
Depended variable Y	Effectiveness on the use of ICT	+/-
Independent variable Xs	Factors influencing the effective use of ICT	+/-
TCOMPET	Teachers competence on ICT Dummy 1 Competence 0 otherwise	+/-
LCOMPET	Learners competence on ICT Dummy 1 Competence 0 otherwise	+/-
AVAILABILITY INTERNET	Availability of ICT tools Dummy 1 Available 0 otherwise Availability of reliable internet Dummy 1 Available 0 otherwise	+/- +/- +/-
WILLINGNESS	Willingness to use ICT Dummy 1 Willing to use 0 otherwise	+/-
POWER	Reliability of power Dummy 1 Reliable 0 otherwise	+/-
SECURITY	Security of ICT tools Dummy 1 Safety 0 otherwise	+/-
LOCATION	Geographical location Distance in Km from centre	+/-
FINANCE	Financial capacity to access Amount of fund in shilings	+/-

IV. FINDINGS & DISCUSSION

4.1 Demographic Characteristics of Respondents

In assessing the socio-demographic factors influencing the effective use of ICT in adult learning, the results presented in Table 1 provide insight into the gender, age, and educational background of the respondents.

4.1.1 Gender Distribution

The result from Table 2 indicates that majority of respondents about 61% were female and about 39% were male indicating that women (mothers) have higher level of awareness on adult education compared to male may be due to women involvement in community based programs which are aiming at empowering them socially and economically . In addition they get aware on the role of education during their program meeting. These findings differ from Shabani and Jabbari (2022) in their study of challenges Facing Adult Learners in Formal Secondary Education in Kibaha Town Council who observed that there was gender balance between female adult learners and male.

4.1.2. Age Distribution

The result from Table 2, shows that majority of respondents (about 58%) were within the age group of 18-27 years, while the remaining group ware above 47 years. This implies that the younger adult are more likely to engage in adult learning programs possibly due to easy adaptability to ICT. This result is similar to Milana et al. (2017) who noted that, the group of 15-24 years are more motivated to pursue educational learning opportunities compared to aged group.

4.1.3. Education Level

On educational level, approximately 70% of respondents has attained primary education, but they failed to join secondary education due to several factors including financial capacity of their families. Therefore from this result indicated in Table 2, provide evidence that majority has attained basic education which is primary education but they have being motivated to proceed with learning due to availability of ICT so as to compete with employment market. This result is contract to study of Mollel (2019), who reported that the majority of adult learners in his study in Arusha District Council held diploma-level qualifications. The contrast may be attributed to differences in target populations, regional education policies, or accessibility of adult education programs across different areas.

4.1.4. Marital Status of Respondents

The result from Table 2, show that majority of adult learners about 65% were single. This implies single individuals are more likely to participate in adult learning because the decision on whether to participate is within his or her capacity compared to married group. One plausible explanation can be single group have less family responsibilities which allow them to be flexible. The same result was reported by Damalie et al. (2023) on their study on demographical Challenges of Adult Learners in Ghana. Therefore the result concluded that, the higher participation of single individuals in the study may reflect their freedom in making decision and prioritize personal development through education.

Table 2

Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage
Sex	Male	37	38.9
	Female	57	61.1
Age	18-27	54	57.4
	28-37	21	22.2
	38-47	16	16.7
	47+	3	3.7
Education level	Primary School	66	70.3
	Secondary school	28	29.7
	Above secondary	0	0
Marital status	Married	33	35
	Single	61	65

4.2 Levels of Using ICT in Adult Learning

In this part, the responses were collected using a 4-point Likert scale (1 = Agree, 2 = Strong Agree, 3 = Disagree, 4 Strong Disagree).The level of ICT use in adult learning was assessed by comparing the mean score for each quality dimension against a predefined cut-off point (weighted average score of 4.52). The main focus were on computer accessibility, Availability of internet, the use of smartphone and the use of video conference in distant learning. The findings from Table 3 reveal a generally low level of ICT usage among adult learners. While access to smartphones is relatively high indicating agreement or strong agreement on their usage access to more formal ICT tools such as computers and video conferencing facilities remains significantly limited**.** The following are the detailed descriptions on the extent of using ICT.

4.2.1 The Accessibility of Computer

The results indicate that approximately half of the adult learners reported having access to a computer, Majority (51.9%) strongly disagreed they had access; WA < 4.5 shows limited access. while the remaining had limited or no access. This finding aligns with the study by Giannoukos et al. (2016), which found that over 70% of adult learners had access to a personal computer a key tool in adult education.

However, the results contrast with those of Chirwa (2018), who found that a majority (65.6%) of respondents accessed the internet through their colleges, followed by those using mobile phones (26%), and a smaller proportion (8.4%) through internet cafés. Notably, about 15% of respondents in Chirwa's (2018) study did not access the internet at all.

Access to ICT tools such as computers is a critical determinant of ICT usage among both learners and instructors. Nevertheless, limited access does not always indicate a lack of resources. As Schoepp (2005) noted, some institutions may possess sufficient ICT equipment, but poor organization and allocation of these resources may hinder effective access and utilization. Furthermore, Al-Alwani (2015) emphasized that low levels of ICT use by teachers are often linked to inadequate training approaches. Training programs that lack pedagogical integration and focus solely on technical skills tend to be less effective. Therefore, successful ICT integration requires both infrastructure and pedagogically sound training programs.

4.2.2 The Availability of Internet

The results from Table 2 indicate that nearly 70.4% (46.3% + 24.1%) disagreed; WA above 4.5 indicates very poor availability. Therefore majority revealed that, that internet availability at their learning centers is unreliable. This suggests that the use of ICT for learning purposes is significantly limited, as the effective utilization of ICT tools—particularly computers and smartphones—largely depends on stable and accessible internet connectivity.

These findings are consistent with those of Oguzor and Adebola (2011), who reported that most adult learners in Nigeria lacked access to reliable internet, which in turn reduced their usage of ICT tools in educational activities. Similarly, the low level of ICT use observed reflects broader challenges faced in many developing countries, where the lack of inadequacy of ICT infrastructure remains a major barrier to the integration of technology in adult education. This situation is further exacerbated by persistent poverty and insufficient funding for ICT training and development, as highlighted by Hennessy et al. (2010). These constraints hinder both learners and educators from effectively leveraging digital technologies for educational advancement.

4.2.3 The Use of Smart Phone

The results from Table 3 indicate that the smartphone is the only relatively high-use ICT tool among adult learners, with approximately 92.6% (59.3% + 33.3%) of respondents agreeing or strongly agreeing that they use smartphones for learning. However, many reported limitations in accessing certain documents particularly large Portable Document Format (PDF) files with complex formatting or graphics on some websites. Although mobile technologies are not yet widely or routinely integrated into formal education settings, especially at the ordinary level in secondary schools, they hold significant potential for a variety of pedagogical and contextual applications, particularly in higher and adult education (Shirima & Sanga, 2017). Nevertheless, the effective use of smartphones for educational purposes is influenced not only by the user's digital literacy and familiarity with mobile tools but also by the technical specifications of the device itself, such as memory size, processing power, screen resolution, and supported file formats (Sharples, 2009). A learner with a low-end smartphone may encounter difficulty in opening or interacting with content-heavy files or online learning platforms, thus limiting their learning experience. These findings are in line with the study by Haruna and Amos (2024), which emphasized the potential of mobile devices in educational environments, especially for enhancing adult learner engagement and flexibility.

4.2.4 The Use of Video Conference in Distant Learning

The results from Table 3 reveal that 94% of respondents (with 79.6% strongly disagreeing and 14.8% disagreeing) reported not using video conferencing in their learning process. This finding highlights a significantly low level of ICT utilization within adult education settings. Such limited use of digital tools may hinder the adoption of more dynamic and interactive pedagogical methods. However, empirical studies emphasize the potential benefits of video conferencing and email discussion forums in adult learning environments. For instance, Bond et al. (2021) argue that these tools can greatly enhance access to authentic materials and foster meaningful communication with remote learners, thereby promoting collaborative and immersive learning experiences.

Additionally, the integration of multimedia presentation software has been shown to support various adult education competencies by accommodating diverse learning styles. Digital videos, for example, provide learners with the opportunity for self-critique and allow for both facilitator and peer feedback on language use and performance. Word processing applications further enable adult learners to develop essential academic skills such as planning, organizing, revising written work, and practicing reading strategies like skimming and scanning (Nyangarika & Ngasa, 2020). The limited use of these ICT tools in the current study suggests a gap between the availability of digital learning technologies and their actual implementation in adult education, which could negatively impact learning outcomes.

Table 3
Levels of Using ICT in Adult Learning

Description	4	3	2	1	WA	Remark
The accessibility of computer	10(18.5%)	11(20.4%)	5(9.3%)	28(51.9%)	4.32	Agree
The availability of internet	25(46.3%)	13(24.1%)	10(18.5%)	6(11.1%)	4.56	Strong agree
Availability of smart phone	2(3.7%)	2(3.7%)	32(59.3%)	18(33.3)	4.33	Disagree
The use of video conference in distant learning	43(79.6)	8(14.8%)	1(1.9%)	3(5.6%)	4.78	Strong Disagree

Note. WA = Weighted Average. The values represent the number of respondents and their percentage per response level on a Likert scale.

4.3 Factors Influencing the Effective Use of ICT in Adult Learning (descriptive statistics results)

The integration of Information and Communication Technology (ICT) into adult learning has increasingly become essential in enhancing access, flexibility, and the quality of education. However, the successful adoption and utilization of ICT among adult learners are influenced by various interrelated factors. Understanding these factors is crucial for policymakers, educators, and institutions aiming to design inclusive and effective digital learning programs. Table 4 presents key factors identified by respondents that significantly affect the use of ICT in adult education settings.

Table 4
Key Factors that Significantly Affect the Use of ICT

Factors	Frequency (f)	Percentage of Cases (%)
Learners competent on ICT	44	81.5%
Availability and accessibility of ICT tools	38	70.4%
Availability of reliable power	33	61.1%
Availability of reliable internet	34	63.0%
Geographical location	18	33.3%
Financial capacity	15	27.8%

4.3.1 Leaners Competence in ICT

The result from Table 4, indicates that competence in a major factor on operating ICT tools, this factor was most frequently mentioned by respondents. More than 80% of respondents revealed that, Adult learners must possess at least basic skills in using computers, and smartphones, for effective ICT. This result aligns with Deriba et al. (2025) on their study on enhancing Digitalization in Ethiopian Higher Education: emphasizes that ICT competence is a prerequisite for adult learners to meaningfully engagement in e-learning environments**.** The same result was reported by Ahmad et al. (2023) on their study that lack of technical support, awareness, institution readiness, quality online course content, and less information technology skill of faculty members in the early years present challenges. Further, self-efficacy, financial and technology factors, pedagogical learning, socio-economic evolution, digital competence and compatibility, and lack of technological infrastructure have significantly affected the adoption of eLearning in higher education institutions in recent years.

4.3.2 Availability and Accessibility of ICT Tools

Many respondents about 70% cited the importance of access to tools like computers and smartphones. Without adequate devices, even well designed ICT programs remain underutilized. Without adequate devices, remain underutilized. Similarly, Mtebe and Raisamo (2014) reported that tool accessibility remains a great factor for effective use of ICT in sub-Saharan Africa.

4.3.3 Availability of Reliable Internet

The result from Table 4 indicates that most of respondents reveals that, the internet is a crucial factor in fostering ICT adoption among adult learners by providing access to resources, facilitating flexible learning, and promoting collaboration. It enables access to online learning platforms, research materials, and interactive tools, making education more convenient and engaging for adults with various commitments. The result from Table 4 indicates that reliable connectivity was also identified as critical factor, more than 60% of respondents agreed that, the internet facilitates

access to educational materials, online classes, and communication with tutors. This result was also reported by Bala and Ladan (2023) in their study of Challenges of Using Information Technology in Teaching Adult Education in, Nigeria and reported that, one of the domestic challenges is concerned with technical problems such as disconnection problems and lack of broadband Internet speed experienced by adults in their study locations.

4.3.4 Availability of Reliable Power

A reliable power supply is a crucial factor in adopting ICT among adult learners, as it directly impacts the accessibility and usability of digital learning tools. Inconsistent or unavailable electricity can hinder access to online learning resources, creating a barrier to participation for adult learners who may rely on electricity for devices and internet connectivity. The result from Table 4, shows that Consistent electricity supply was another major concern about 60% of respondents reported that, devices and internet services are dependent on power availability. According to Mtebe and Raisamo (2014), erratic power supply remains a technical barrier to ICT integration in Tanzania. Without electricity, ICT tools become unusable regardless of availability.

4.3.5 Geographical Location

The result from Table 4 indicates that geographical location can affect flow of internet and availability of power and ICT resources. About 30% one third of respondents revealed that, learners in rural areas often experience limited ICT infrastructure and support compared to their urban counterparts. The result was similar to study done by Forman et al (2005) on relationship between geographic location and the diffusion of Internet technology, that the internet varies area to area basing on nature of economic and social activities performed there. The same result was also reported by (Sithole & Mbukanma, 2024)

4.3.6 Financial Capacity

The result from Table 4 indicated that about 28%, of respondents reported that financial capacity limited them to adopt ICT, but it remains crucial factor. Learners may not afford ICT tools, data bundles, or power sources like solar systems if has no financial capacity. However, Ahmed and Kabir (2018) showed that financial constraints significantly limit the adoption of ICT tools among rural learners and low-income populations. Even when infrastructure is available, affordability becomes a major barrier.

4.3.7 Availability and Accessibility of ICT Tools

The result from Table 5 indicates that more than 70% of respondents reported that, many learners use ICT tools when they are available and accessible to them. Without those tools, the application of ICT cannot succeed. This reveal that, availability and accessibility of ICT tools can significantly influence users by impacting their access to information, communication, and educational opportunities. Furthermore, the design and accessibility of these tools can either empower or motivate adult learners on ICT.

4.4 Factors Influencing the Effective Use of ICT in Adult Learning (Multiple linear regression results)

Table 5 indicate multiple linear regression results for various factors for effective use of ICT, the independent variables were learners competence, availability of internet, willingness to use ICT tools, power reliability, data security, geographical location and financial resources, the dependent variable was effective use of ICT.

The regression model estimation (Table 4) gave R2 of 0.63, which implies that learners competent on ICT, availability of ICT tools, availability of reliable power, location of a learner, financial capacity of learners explain up to 63% total variation in using ICT in adult learning. The likelihood Ratio (LR) was found to be significant at the 5% level of significance. This means that all the explanatory variables included in the model jointly influence the use of ICT in adult learning in Sumbawanga Municipality. The following the factors influence effective use of ICT among adult learners in Sumbawanga Municipality basing on the multiple regression results.

4.4.1 Learners Competent on ICT

The results from Table 4 indicates that learner competence with (p = 0.031), indicate was significant factor since the p- value is less than 0.05 with a beta coefficient of approximately 1.17. This means that for every one-unit increase in learners' ICT competence, the use of ICT tools in adult education is expected to increase by two times , These findings align with Shirima and Sanga (2017), who identified low ICT competence among learners as a major factor for effective use of ICT. Among adult learners. One of form four student, reported:

> *"I fail to learn through the computer because I don't know how to use a computer effectively"* (Focus Group Discussion, (October 12, 2024).

4.4.2 Availability and Accessibility of ICT Tools

This was the factor influencing effective use of ICT, is the availability of ICT tools such as computers, tablets, projectors, and other devices can motivate a learner to concentrate in using those tools as indicated in Table 5. This factor has significant effect since F(p = 0.012) which is less than a threshold of 0.05 , with a beta coefficient of 2.27, indicating that the availability of ICT tools increases the rate of ICT usage more than two times compared to those who do not have and access ICT tools . This finding aligns with the study by Ghavifekr et al. (2016), who reported that the availability of ICT tools in learning centers strongly influences adult learners' use of these technologies. A head of learning center reported ….

"Our learners are willing to use ICT, but the main challenge is the limited number of devices. If we had enough computers and tablets, more learners would participate in digital learning activities." (October 20, 2024).

4.4.3. Availability of Reliable Power

The availability of a reliable power supply has a statistically significant positive effect on the use of ICT tools in adult learning, as indicated in Table 5, having a p-value of 0.005, which is below the 0.05 significance. This means there is strong evidence that reliable power supply is a key factor influencing ICT utilization. The beta coefficient of 3.1 indicates that as the availability or reliability of power, the use of ICT tools increases by approximately 3 times... Supporting this, a member of the focus group discussion explained:

"Sometimes we want to use the computer for searching learning materials, but the power goes off frequently, and this stops us from learning effectively with ICT." (October 10, 2024).

4.4.4 Availability of Reliable Internet

The results from Table 5, indicates that, accessibility of reliable internet was significant factor for the use of ICT among adult learners with the P value of 0.001, with a beta coefficient of 2.15. The positive beta value shows significant relationship between internet availability and ICT use among adult learners. This implies that, as the availability of internet increase the rate of using ICT tools for learning two times. Therefore, the result reveals that learners who are not accessible to internet has lower chance of using ICT for learning purposes, they use ICT tool like mobile phone as means of communication. The same result was reported by Chirwa's (2018) study, that the lack of reliable internet access restricts learners' ability to engage with online resources, participate in digital learning activities, and develop essential ICT skills. One of teacher group members cemented "

*"Most adult learners are prefer to use ICT tools for learning such as computers, projectors and smartphones , but the un reliable internet discourages them from using these tools regularly***" (**October 08 , 2024).

4.4.5 Geographical Location

The results from Table 5 indicate that geographical location with a (p= 0.003) and a beta coefficient of 3.7 indicating is significant factor since P value is less than 0.01 level of significant, indicating that as learners living far from town, the chance low internet access and unreliable electricity power is high. The beta coefficient of 3 reveals that staying in urban areas increases the accessibility of effective use of ICT by four time due to availability of ICT resources, power and internet. This result is similar with study done by Shabani and Jabbari (2022) which reported, that as learners living peripheral, the probability of having the challenges of electricity, poor technological infrastructure, high costs, and geographic factors like difficult terrain to allow the penetration of internet. One of members of focus group reported….

*"I live in Senga Ward where there is no strong internet access for learning; however, the mobile network works. During the weekend, I travel to Sumbawanga town with my laptop to access learning materials because in town there is reliable internet***."** (October 15, 2024).

4.4.6 Financial Capacity

Another for the effective ICT use is the financial capacity to among adult learners to purchase ICT tools and to buy internet bundle. Financial capacity significant effect (p = 0.001) which is less than 0.05 and also less than 0.01 with a beta coefficient of 3.23, indicating that learners with strong financial capacity are more likely to acquire devices such as laptops, desktop and tablets that support their learning. This shows that, as learners having greater financial capacity, the use of ICT tools increases by approximately more than 3 times. These findings align with Shirima and Sanga (2017), who noted that many adult learning centers in Tanzania struggle with limited financial capacity to provide essential ICT tools for both learners and facilitators. One of adult learner reported…

"The price of a cheaper laptop ranges from 600,000 to 1,000,000 shillings, and that is too expensive for me to afford. So, I usually walk to the centre to use the computer that is available in laboratory" (October 2, 2024).

Table 5

Regression Results on Factors Influencing the Use of ICT in Adult Learning

Variable	Standardized Coefficients	Un-Standardized Coefficients	t value	P value
	B	Std error		
TCOMPET	.0824616	.0741431	1.20	0.266
LCOMPET	1.173085	.542482	2.15	0.031*
AVAILABILITY	2.276007	.9033791	2.55	0.012*
INTERNET	2.152114	.7234562	3.09	0.001**
WILLINGNESS	-.2490521	.9669584	0.26	0.797
POWER	3.09939	.42859	2.63	0.005**
SECURITY	-0221283	.0168423	1.32	0.189
LOCATION	3.707817	.8501826	2.78	0.003**
FINANCE	3.232288	.4399055	3.12	0.002**
COSTANT	6.857545	1.542221	3.09	0.001**

Number of observation54, R^2 =63 * = Significant at P < 0.05 and** = Significant at P < 0.01

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study concludes that, the level of using ICT in adult learning was low most of respondents strongly agree, incompetence on ICT, inaccessibility ICT tools such as computer, unreliable internet led to low level of using ICT by adult learners was the indictor of low level of ICT adoption. On the factors influencing the use of ICT, learner's competency, availability of ICT tools in learning center, unreliable internet, unreliable power geographical location and financial capacity of learners were observed to major factors influencing the effective use of ICT in adult learning.

5.2 Recommendations

The study recommends that, the government of Tanzania through Ministry of Education should capacitate management of the institutes of adult education and ensure that the ICT tools are available and accessible in the institution's centres all times. The availability and accessibility will simplify teaching and learning adult education programme because through the presence of information and communication tools the exchange of information between facilitator and adult learners could be easy. In addition, the Management of adult learning centers should make sure all centers are equipped with sufficient required ICT tools also to improve reliable access to internet, power, this will assure adult learners to use ICT effectively.

REFERENCES

Ahmad, S., Mohd Noor, A. S., Alwan, A. A., Gulzar, Y., Khan, W. Z., & Reegu, F. A. (2023). eLearning acceptance and adoption challenges in higher education. *Sustainability, 15*(7), 6190.

Ahmed, M. S., & Kabir, A. (2018). The acceptance of smartphone as a mobile learning tool: Students of business studies in Bangladesh. *Malaysian Online Journal of Educational Technology, 6*(2), 38–47.

Akinola, O. B., Adewole, F. A., Grace, M., Araneta, C. T., & Fedeli, M. (2023). Policies and online learning environment for adult education and higher education's emerging needs. *Comparative Research in Adult Education, 5*, 125.

Al-Alwani, A. (2015). Barriers to information technology in Saudi Arabia science education (Doctoral dissertation). University of Kansas.

Bala, M. T., & Ladan, T. (2023). Challenges of using information technology in teaching adult education in colleges of education in North-West Zone States, Nigeria: A case study of the Isa Kaita College of Education Dutsinma, Katsina State.

Bashir, G. M., & Khan, H. U. (2016, September). Factors affecting learning capacity of information technology concepts in a classroom environment of adult learners. In *2016 15th international conference on information technology based higher education and training (ITHET)* (pp. 1–6). IEEE.

Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021). Emergency remote teaching in higher education: Mapping the first global online semester. *International Journal of Educational Technology in Higher Education, 18*(1), 50. https://doi.org/10.1186/s41239-021-00282-x

Chirwa, M. (2018). Access and use of internet in teaching and learning at two selected teachers' colleges in Tanzania (Master's thesis). Sokoine University of Agriculture. https://www.suaire.sua.ac.tz/handle/123456789/2696

Cummings, C. L. (2018). Cross-sectional design. In *The SAGE Encyclopedia of Communication Research Methods*. SAGE Publications Inc.

Damalie, I. F., Agbanu, P., Fiadzomor, P., & Wilson, G. (2023). Knowing demographical challenges of adult learners: A vital tool for administrators in managing adult learning programmes in the public technical universities of Ghana. *Open Journal of Social Sciences, 11*(4), 441–454.

Deriba, F., Kassahun, A., & Tekinerdogan, B. (2025). Enhancing digitalization in Ethiopian higher education: A Technology Acceptance Model approach. *SSRN*. https://doi.org/10.2139/ssrn.5197923

Forman, C., Goldfarb, A., & Greenstein, S. (2005). Geographic location and the diffusion of internet technology. *Electronic Commerce Research and Applications, 4*(1), 1–13.

Formosa, M. (2015). Supporting and mentoring mature learners: A 'train-the-trainer' programme for facilitators of ICT learning for older adults. *Research and Applications, 4*(7), 17–23.

Fute, A., Wan, X. L., & Oubibi, M. (2023). A historical review of global efforts on adult literacy education, with particular reference to Tanzania. *International Review of Education, 69*(3), 327–350.

Ghavifekr, S., Kunjappan, T., Ramasamy, L., & Anthony, A. (2016). Teaching and learning with ICT tools: Issues and challenges from teachers' perceptions. *Malaysian Online Journal of Educational Technology, 4*(2), 38–57.

Giannoukos, G., Besas, G., Hioctour, V., & Georgas, T. (2016). A study on the role of computers in adult education. *Educational Research and Reviews, 11*(9), 907–923.

Góralska, R., & Leek, J. (2017). Empowerment in the lifelong learning perspective: Example from the "ICT Guides" project. *Rocznik Andragogiczny, 24*, 187–202.

Haruna, A., & Amos, O. (2024). Effectiveness of teaching technology integration in the adult learning process in selected higher learning institutions in Tanzania. *International Journal of Education, Humanities and Social Science (IJEHSS), 7*(4), 316.

Hennessy, S., Harrison, D., & Wamakote, L. (2010). Teacher factors influencing classroom use of ICT in Sub-Saharan Africa. *Itupale Online Journal of African Studies, 2*, 39–54.

Kara, M., Erdogdu, F., Kokoç, M., & Cagiltay, K. (2019). Challenges faced by adult learners in online distance education: A literature review. *Open Praxis, 11*(1), 5–22.

Knowles, M. S. (1978). Andragogy: Adult learning theory in perspective. *Community College Review, 5*(3), 9–20.

Mikołajczyk, B. (2023). Universal human rights instruments and digital literacy of older persons. *The International Journal of Human Rights, 27*(3), 403–424.

Milana, M., Holford, J., Hodge, S., Waller, R., & Webb, S. (2017). Adult education and learning: Endorsing its contribution to the 2030 Agenda. *International Journal of Lifelong Education, 36*(6), 625–628.

Mollel, E. (2019). Effectiveness of adult education programme in promoting development among the Maasai community in Arusha District (Master's thesis). University of Dar es Salaam.

Motorga, M. E. (2023). Digital transformation in adult education: Empowering global understanding and sustainable development. *Revista de Științe ale Educației, 48*(2), 46–63.

Mtebe, J., & Raisamo, R. (2014). Investigating students' behavioural intention to adopt and use mobile learning in higher education in East Africa. *International Journal of Education and Development using ICT, 10*(3).

Mwakyambiki, S. E., Lunyelele, S. P., Ndumbaro, R., & Ndunguru, W. (2024). Assessing adults' willingness to engage in adult education: A case study of Kigamboni and Temeke municipalities, Tanzania. *Journal of Adult Education in Tanzania, 26*(1), 65–85.

Nagy, J., & Habók, A. (2018). Attitudes and behaviors related to individual and classroom practices: An empirical study of external and internal factors of ICT use. *Libri, 68*(2), 113–123.

Nyangarika, A., & Ngasa, Z. J. (2020). Profitability of ICT usage towards productivity of small business enterprises in Tanzania. *International Journal of Advance Research and Innovative Ideas in Education, 6*(3), 1504–1512.

Oguzor, N. S., & Adebola, H. E. (2011). Internet and e-learning technologies and the adult educator in Nigeria. *International Journal of Academic Research in Business and Social Sciences, 1*(1), 64–72.

Schoepp, K. (2005). Barriers to technology integration in a technology-rich environment. *Learning and Teaching in Higher Education: Gulf Perspectives, 2*(1), 56–79.

Shabani, S., & Jabbari, N. (2022). The impacts of technology on the human rights of linguistic minorities. *Special Education, 1*(43).

Sharples, M. (2009). Methods for evaluating mobile learning. In *Researching mobile learning: Frameworks, tools and research designs* (pp. 17–39).

Shirima, C., & Sanga, C. A. (2017). Assessment of contribution of ICT for sustainable livelihoods in Kilosa District. In *Information Technology Integration for Socio-Economic Development* (pp. 260–283). IGI Global.

Sithole, V. L., & Mbukanma, I. (2024). Prospects and challenges to ICT adoption in teaching and learning at rural South African universities: A systematic review. *Research in Social Sciences and Technology, 9*(3), 178–193.

Williams, U. I. (2020). Influence of ICT on the enhancement of adult learning in private literacy centres in Port Harcourt Metropolis. *International Journal of Innovative Information Systems & Technology Research, 8*(3), 46–53.