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Utilizing Information and Communication Technologies to Enhance Teaching and Learning: The Case of Alfred Nzo East District, South Africa

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ABSTRACT

This paper aimed to explore the utilisation of Information and Communications Technologies (ICTs) for improving teaching and learning within the Alfred Nzo East District, South Africa. This research adopted a qualitative approach guided by a case study design. The study population consisted of all educators and students from two schools within the Alfred Nzo East District. The sample size comprised two (2) school principals, eight (8) teachers, and ten (10) students from both schools. In the Alfred Nzo East District, quintile 1 schools were the focus of the current study. In-depth face-to-face interviews were conducted using an open-ended interview schedule to assess the extent of ICT integration in enhancing teaching and learning within the selected schools in the Alfred Nzo East District. Local teachers were included in the study, and participants' viewpoints were acquired through interviews, which helped to crystallize the findings. The themes derived from participant responses were analysed, revealing several factors influencing the implementation of ICTs, including discrepancies in resources between rural and urban schools, network connectivity issues, limited availability of ICT equipment, inadequate infrastructure, insufficient support from the Department of Education, lack of computer training workshops, and the remote location of many schools within the district. The results of this study could help guide more extensive research projects in the future. This study contributes to knowledge on ICT-enhanced teaching and learning.

Keywords: *Information and Communications Technologies (ICTs), Teaching, Learning, Alfred Nzo East District*

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INTRODUCTION

With the introduction of Information and Communication Technologies (ICTs) in the classrooms, teachers and students now have new tools at their disposal for choosing, obtaining, organising, and analysing information.[1] ICTs are well known for enhancing the capacity of people and include a range of devices that help the teacher achieve the set goals and objectives effectively and efficiently.[2]

[1] Rui Gu et al., "Can Information and Communication Technologies Contribute to Poverty Reduction? Evidence from Poor Counties in China," *Information Technology for Development* 29, no. 1 (2023): 128–50.
[2] Pavan Jadhav, Hemlata Gaikwad, and K S Patil, "Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools," *ASEAN Journal for Science Education* 1, no. 1 (2022): 33–40.

Devices such as desktop computers, mobile phones, projection screens, digital recorders, software, multimedia, information systems, intranets, internet, tablets, e-readers, laptops, etc offer a wealth of opportunities and challenges for education in general, especially for the teaching and learning process. Furthermore, the most influential aspect of the economic growth and social development of the people is ICTs. However, the geographical places that people live in can additionally go through many difficulties as ICTs statistics show that they are unequally distributed because financial improvement and social experiences lead to a digital gap between urban and rural areas.[3] ICTs suggest an increment in social experiences, economic development, and educational investments.[4] It may be a risk to societies as executions of ICTs aid most effectively the country-wide marketplace and urban facilities.[5]

Schools in underprivileged areas in South Africa are classified as quintile 1 by the Department of Education. These are free schools, and the government provides lunch for students attending them during lunch breaks. The majority of schools are identified by overcrowded classrooms leading to teaching and learning as unproductive and a huge challenge thus introducing ICTs cannot be implemented due to many factors. Schools still employ the archaic chalk-and-talk method of instruction rather than embracing ICTs. To encourage a change in the pedagogical approach, the national government of South Africa established an e-education policy to encourage the use of ICTs in classrooms. These include the adoption of an education system that is outcomes-based and the move away from using a single, authoritative textbook in favour of a variety of materials to nurture the development of learners' and teachers' digital literacy. The White Paper 7 on e-Education was released by the Department of Education as its objective is not only to develop technical skills but also to use ICTs to enhance and expand learning opportunities across the curriculum.[6]

However, the e-education policies are not used by a majority of the schools in South Africa are in the rural areas. The schools that are classified as quintile 1 lack infrastructure, lack access to resources, and some teachers are computer illiterate.

A study by Neofotistos and Karavakou showed that the accessibility or lack of any factor to integrate ICTs does not determine whether educational technology is successfully implemented in schools.[7] It depends on a dynamic process involving several interconnected elements, including sufficient managerial support, the teachers' acceptance of the value of using technology, and knowledge acquisition by the teachers regarding ICTs with innovative teaching methods. However, there are impediments to the adoption of ICTs and their application in education. These include teachers' attitudes towards ICTs, a lack of teachers with digital competency, load shedding, maintenance of cellular phone towers, and inadequate ICT infrastructure, such as PCs and slow internet connections. Schools in rural areas are neglected as they have limited access to resources when compared to schools in urban areas. Teachers and learners in urban areas have access to ICT facilities, access to the internet using wireless fidelity (Wi-Fi), and fibre in their households and schools.

In the year 2020, South Africa went into lockdown as the COVID-19 pandemic caused the total shut-down of schools. Ardington, Wills & Kotze highlighted that a drastic loss in the curriculum was caused by the pandemic forcing contact education to temporarily cease.[8] Moreover, schools were forced to use ICTs for teaching and learning to catch up with the lost time in curriculum coverage. Schools in the urban areas had no problems implementing the means to continue with the curriculum syllabus as they were using e-mails and the WhatsApp platform as a form of teaching learners.

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[3] Gowokani Chijere Chirwa et al., "Assessing the Relationship between Digital Divide and Citizens' Political Participation in Africa," *Development Southern Africa* 40, no. 6 (2023): 1258–76.

[4] Biswanath Behera, Anasuya Haldar, and Narayan Sethi, "Investigating the Direct and Indirect Effects of Information and Communication Technology on Economic Growth in the Emerging Economies: Role of Financial Development, Foreign Direct Investment, Innovation, and Institutional Quality," *Information Technology for Development* 30, no. 1 (2024): 33–56.

[5] Hunt La Cascia et al., "ICT Procurement in Africa," 2023.

[6] Department of Education, "Transformation Learning and Teaching through Information and Communication Technology (ICTs)," *White Paper 7 on E-Education*, 2004.

[7] Vasileios Neofotistos and Vasiliki Karavakou, "Factors Influencing the Use of ICT in Greek Primary Education.," *Open Journal for Educational Research* 2, no. 1 (2018): 73–88.

[8] Cally Ardington, Gabrielle Wills, and Janeli Kotze, "COVID-19 Learning Losses: Early Grade Reading in South Africa," *International Journal of Educational Development* 86 (2021): 102480.

However, schools in rural areas had a small percentage of teachers who were already using the WhatsApp platform for curriculum needs with their learners, but the majority had no access as there's poor network connectivity, the cost of data is expensive, and some learners have no access to cellular phones. This remains a challenge for schools in rural areas as learners are limited to resources when compared to learners in schools in urban areas. In cases where a school offers Computer Applications Technology (CAT) as a subject, infrastructure is inadequate, resources are limited and packed into strong rooms. The government's e-Education policy goal appears to be misunderstood, as evidenced by the fact that some schools do not integrate ICTs into their daily classroom operations. Implementing the policy is a constraint in rural areas as schools face the challenge of overcrowded classrooms, lack of infrastructure, lack of ICT resources, internet connection issues, and computer-illiterate teachers.

The use of technology plays a critical role in teachers' attitudes and beliefs in their decisions. Authoritarian methods are still used by many teachers which promote rote learning, and an authoritative textbook. In the current study, the researchers intend to investigate the use of Information and Communication Technologies to enhance teaching and learning in Alfred Nzo East District in the Eastern Cape. It is important to investigate this field and policies have been placed by the Department of Education. However, other researchers have stated that in rural areas, schools are neglected, and there is a lack of infrastructure, lack of resources. In this study, the qualitative approach was employed, purposive sampling, and semi-structured interviews to investigate the matter. The provision of sufficiently good ICTs centres for learners in rural schools remains a challenge in the Eastern Cape.[9] This paper addresses the state of ICTs, availability, factors that influence the use of ICTs to enhance teaching and learning, and the challenges and strategies used by teachers to integrate ICTs into teaching and learning to enhance teaching and learning in the Alfred Nzo East district. In the Alfred Nzo East District, quintile 1 schools were the focus of the current study. Local teachers were included in the study, and participant viewpoints were acquired through interviews, which helped to crystallize the findings. The results of this study could help guide more extensive research projects in the future.

LITERATURE REVIEW

The Availability of ICTs to Enhance Teaching and Learning

In a study conducted by Ghavifekr and Rosdy in Malaysia, it is noted that in comparison to traditional classrooms, teaching and learning that is based on technology is more successful, since using ICT tools and equipment will create an active learning environment that is more engaging and productive for teachers and students alike.[10] In addition, the importance of utilising educational technology to enhance the teaching and learning process in higher education enables both teachers and learners to have unlimited access to resources using the internet. Kenya's educational programmes have incorporated ICTs over the years, as it has in other Sub-Saharan African Nations.[11] According to Murithi and Yoo, the Kenya National Education Sector Plan 2013-2018 placed a strong emphasis on ICT integration despite the paucity of empirical studies demonstrating ICT's contribution to learning enhancement in the nation.[12] The Republic of South Africa (RSA) is a developing country in the continent of Africa. The lack of infrastructure for ICTs is one of the major problems that widens the gap between RSA and the rest of the world. Electronic learning, which has great advantages, is now possible thanks to the convergence of ICTs. With the integration of ICTs into teaching and learning, teachers and learners can collaborate more effectively in the information society.[13]

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[9] Olukayode Ayodele Oki, Chinaza Uleanya, and Sanelisiwe Mbanga, "Echoing the Effect of Information and Communications Technology on Rural Education Development," *Technology Audit and Production Reserves* 1, no. 2 (2023): 69.
[10] Simin Ghavifekr and Wan Athirah Wan Rosdy, "Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools.," *International Journal of Research in Education and Science* 1, no. 2 (2015): 175–91.
[11] Julius Murithi and Jin Eun Yoo, "Teachers' Use of ICT in Implementing the Competency-Based Curriculum in Kenyan Public Primary Schools," *Innovation and Education* 3, no. 1 (2021): 1–11.
[12] Murithi and Yoo, "Teachers' Use of ICT in Implementing the Competency-Based Curriculum in Kenyan Public Primary Schools."
[13] Grasia Chisango and Zandi Lesame. "Exploring accessibility to Information and Communication Technology (ICT) at disadvantaged secondary schools in Gauteng Province, South Africa: *In EDULEARN19 Proceeding*. (2019): 507–512.

Influencing factors to integrate ICTs in schools

In Italy, the Ministry of Education advised using distance learning to not only continue the educational path but also to lessen learners' sentiments of loneliness and demotivation.[14] Italy's quick push to adopt distance education was confronted with unique challenges. According to Menabò et al., teachers had to use computer or web-based instructional tools for the first time while dealing with the lack of assistance.[15] Tanzania lists the factors that were important for promoting the use of ICTs in the classroom, including administrative support from the school, technical support, access to ICT infrastructure and resources, teaching experience, computer self-efficacy, ICT competence, teachers' and learners' attitudes towards ICT integration, and personal characteristics.[16] In addition, Mwila states that the absence of technical support in a school increases the likelihood that technical maintenance would not be undertaken regularly, increasing the danger of technical failures, and detracting from ICT integration.[17]

Most facilities presently in Eastern Cape High Schools are not truly being used by the teachers and learners for the intended purpose, even though ICTs increase teaching and learning.[18] Furthermore, a high percentage of teachers tend to disagree with ICTs in providing adequate information retrieval for learners. Teachers may have sufficient technological knowledge and access to resources but that does not guarantee that they will employ technology.

Mavellas, et al. revealed that the integration of ICTs is influenced by both manipulative and non-manipulative school and teacher factors.[19] Age, teacher experience, computer proficiency, government policy, and the availability of outside support for the school, are examples of non-manipulative characteristics that cannot be changed by the school. Moreover, there are barriers including lack of teacher confidence and competence, resistance to change, lack of effective training, lack of accessibility, lack of infrastructure, lack of technical support and access to the internet by teachers and learners to the integration of ICTs in a classroom.

Challenges and Strategies to Integrate ICTs in Schools

In a study conducted by Razak, Ab Jalil and Ismail in Malaysia, they employed a qualitative research methodology where the teachers of two schools who participated in the study stated that the challenges that influenced the integration of ICTs by the teachers were inadequate school ICTs tools, commitment, and compliance to the school regulations.[20] There are many challenges to the development of ICTs in government education. Lack of qualified teachers to initiate ICTs in schools, lack of electricity, lack of policy implementation and financial constraints are challenges faced by the Education system.

According to Nyamekye, Baffour-Koduah and Asare, a few teachers in Zimbabwe's Chegutu District West Region were able to employ technology to enhance teaching and learning.[21] Furthermore, they state that local teachers claimed that their degree of technical proficiency is below average and

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[14] Laura Menabò et al., "Promoting the Integration of Technology in Teaching: An Analysis of the Factors That Increase the Intention to Use Technologies among Italian Teachers," *Journal of Computer Assisted Learning* 37, no. 6 (2021): 1566–77.
[15] Menabò et al., "Promoting the Integration of Technology in Teaching: An Analysis of the Factors That Increase the Intention to Use Technologies among Italian Teachers."
[16] Prospery Mwila, "Assessing the Attitudes of Secondary School Teachers towards the Integration of ICT in the Teaching Process in Kilimanjaro, Tanzania.," *International Journal of Education and Development Using Information and Communication Technology* 14, no. 3 (2018): 223–38.
[17] Mwila, "Assessing the Attitudes of Secondary School Teachers towards the Integration of ICT in the Teaching Process in Kilimanjaro, Tanzania."
[18] O A Ojo and E O Adu, "The Effectiveness of Information and Communication Technologies (ICTs) in Teaching and Learning in High Schools in Eastern Cape Province," *South African Journal of Education* 38, no. 1 (2018).
[19] Sibanda Mavellas, Mapenduka Wellington, and Furusa Samuel, "Assessment of the Availability and Utilization of ICTs for Teaching and Learning in Secondary Schools-Case of a High School in Kwekwe, Zimbabwe," *International Journal of Scientific & Technology Research* 4, no. 8 (2015): 282–88.
[20] Nor Razak, Habibah Ab Jalil, and Ismi Ismail, "Challenges in ICT Integration among Malaysian Public Primary Education Teachers: The Roles of Leaders and Stakeholders," *International Journal of Emerging Technologies in Learning (IJET)* 14, no. 24 (2019): 184–205.
[21] Ernest Nyamekye, Daniel Baffour-Koduah, and Esther Asare, "Basic School Ghanaian Language Teachers' Perspectives on the Integration of ICTs in Teaching and Learning," *African Journal of Teacher Education* 10, no. 1 (2021): 242–64.

that the incapability of teachers to carry out technology-mediated instruction was a lack of in-service training in the use of technologies to support teaching and learning.

Chisango and Lesame state that, due to insufficient ICT infrastructure in the Eastern Cape, only Computer Application Technology (CAT) students are taught computer skills in some schools with facilities.[22] Schools that are situated in underprivileged areas are suffering from barriers that are hindering the integration of ICTs in a classroom. The Department of Basic Education and Training White Paper 6 on Basic Needs Education defines barriers to learning as those that make it difficult for the system to accept diversity, which includes learning problems, or that keep learners from accessing educational resources.[23] However, barriers to the use of ICTs may be manipulative and non-manipulative. The Draft White Paper on e-Education: Transforming Learning and Teaching through ICTs states that every learner and teacher by the year 2013, should be capable of using ICTs. [24]

Mbodila, Jones and Muhandji, state that the key challenges in ICTs in education arise from environmental challenges, cultural challenges, and educational challenges.[25] There are numerous difficulties in integrating ICTs into the educational process generally throughout Africa and most emerging nations. According to Chisango and Lesame, to help students gain the skills and knowledge they need as lifelong learners to attain their own goals and fully participate in the global community, both teachers and learners should use ICTs with creativity and confidence.[26]

METHODOLOGY

The study adopted the qualitative research approach as it sought to investigate the state of ICTs to enhance teaching and learning. Qualitative research allows the researcher to understand and discover participant behaviour as it constitutes a purposeful dialogue between the researcher and the participant.[27] Furthermore, gathering data in participants' native surroundings is typically possible with qualitative data collection techniques. In qualitative research, the participants' opinions are gathered, and data in the form of words are collected and evaluated for themes.

The researcher employed an exploratory case study design. A case study refers to an empirical inquiry about a contemporary phenomenon, set within its real-world context especially when the boundaries between phenomenon and context are not clear.[28] A case study was used to investigate the state of ICTs to enhance teaching and learning. A case study design was adopted as its main aim is to identify the boundaries of the environment in which issues exist.[29] The study employed in-depth face-to-face interviews to gain an in-depth understanding of perceptions or opinions of the study.

The research participants were informed of the study's aim, and they were asked for permission to have their responses voice recorded. Ten participants from each school participated in a comprehensive face-to-face interview conducted by the researcher. The in-depth interviews were suitable for the study since the intention was to investigate the state of ICTs to enhance teaching and learning. Interviews provide several benefits to researchers. Semi-structured interviews are flexible. Secondly, the researcher collects data systematically and ensures that no data are omitted, face-to-face interactions promote verbatim recording of responses, and the researcher can validate data right away.[30] Semi-structured interviews were conducted by the researcher as they allowed participants an

[22] Chisango and Lesame, "Exploring accessibility to Information and Communication Technology (ICT) at disadvantaged secondary schools in Gauteng Province, South Africa."
[23] Department of Education, *Education White Paper 6 on Special Needs Education: Building an Inclusive Education and Training System.* (Pretoria: Department of Education, 2001).
[24] RSA DoE (Republic of South Africa. Department of Education), " White Paper on E-Education: Transforming Learning and Teaching through Information and Communication Technologies (ICTs)," 2004, 8.
[25] Munienge Mbodila, Telisa Jones, and Kikunga Muhandji, "Integration of ICT in Education: Key Challenges," *Scholarly Journal of Mathematics and Computer Science* 2, no. 5 (2013): 54–60.
[26] Chisango and Lesame, "Exploring accessibility to Information and Communication Technology (ICT) at disadvantaged secondary schools in Gauteng Province, South Africa."
[27] John W. Creswell and David J. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 5th edition (Thousand Oak, California: Sage, 2017).
[28] K. Maree, *First Steps in Research* (Pretoria: Van Schaik, 2016).
[29] Creswell and Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*.
[30] Creswell and Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*.

opportunity to discuss their experiences in the school and it allowed the researcher to follow the interests and thoughts of the participants.

A purposive sampling technique was used to select two school principals, eight teachers, and ten learners. Purposive sampling is the process of selecting a sample based on the researcher's knowledge of the population, its components, and the nature of the study objectives, and the population is selected non-randomly depending on a specific attribute.[31] The researcher only interviewed ten teachers and ten learners per school. In this study, the researcher conducted interviews using an interview schedule. The researcher validated that the research instrument used does not discriminate against any participant and that all the participants will be asked the same questions. The researcher sought permission from the District DoE and school principals to conduct research at the selected schools. Furthermore, the informed consent to the participants by the researcher, and surety that the rights and welfare of participants are respected and kept private. The responses from the participants will be anonymous and confidential, and the researcher will guarantee the accuracy of the records and reports of the participants.

FINDINGS

The analysis of the responses to each question as well as the excerpts and examples from participants, are presented as follows:

Question 1:

What do you think is the role of Information and Communication Technologies (ICTs) in teaching and learning?

All twenty (100%) of the participants highlighted that the role of Information and Communication Technologies in teaching and learning can help promote learning and understanding where information is shared digitally using smartcell phones, and laptops. Also teachers use laptops to set question papers for tests and examinations, and some teachers use the internet to acquire question papers for classroom practices. The above statement is supported by the following responses:

Respondent 1 (Principal): *It will help speed up the learning process, with the intentions that a learner may be capacitated without any restrictions to information.*
Respondent 2 (Teacher): *It equips teachers and learners to be more technologically advanced in terms of easier accessibility to information, and it helps the school's human resources to be more current with what is happening in society.*
Respondent 11 (Principal): *It makes teaching and learning easier and gives easy access to information on the internet.*
Respondent 12 (Teacher): *It is to change the norm of teacher and learner flexibility so that change can impact learning in a good way when teachers are digitally literate and understand how to integrate the use of ICTs into the curriculum.*
Respondent 5 (Learner): *It will help us learners have access to typing our school work, and have access to information on the internet when we do our research.*

Question 2:

Why do you use or not use ICTs in the teaching and learning of the subject you teach?

Five (25%) of the participants expressed their ways of using ICTs in teaching and learning in the classroom. The teachers use computers to assist them in setting question papers for tests and examinations. The above statement is supported by the following responses:
Respondent 1 (Principal): *Teachers use their laptops to set question papers for class tests and examinations.*

[31] Ann Eshenaur Spolarich, "Sampling Methods: A Guide for Researchers.," *Journal of Dental Hygiene* 97, no. 4 (2023): 73–78.

Respondent 4 (Teacher): *I use a laptop to improve learners' interest in knowledge as it equips audio-visual teaching methods.*
Respondent 6 (Learner): *Computers are used by three teachers as not all ofour teachers know how to use the computers in their subjects.*

Fifteen (75%) of the participants highlighted that they do not use computers to assist in teaching and learning in classrooms. This is supported by the following responses:
Respondent 11 (Principal): *We do not use computers in this school for teaching and learning as we do not have a computer laboratory.*
Respondent 14 (Teacher): *Teachers do not use computers in teaching and learning as the school does not have the resources and infrastructure of a computer lab.*
Respondent 16 (Learner): *Our school is in the rural area, so it doesn't have computers, and we don't know how to use them.*

Question 3:
Which ICTs are available in your school for teaching and learning?
Ten (50%) out of twenty participants said their school has a computer lab with only thirty computers and they are not enough as they have a minimum of one hundred and fifty (150) learners per grade. In addition, there is a network problem in the area so access to the internet is an issue. The above is supported by the following responses:
Respondent 1 (Principal): *The computers we have are limited as a result we cannot have each learner occupying a computer resulting in them sharing a computer when they use it.*
Respondent 3 (Teacher): *We have computers, a projector, and a Wi-Fi router for internet connection.*
Respondent 8 (Learner): *There are computers, but they are not enough for us as a class.*

Ten (50%) out of twenty participants said their school does not have a single computer as they do not have a computer facility on site. The response below supports this:
Respondent 11 (Principal): *We do not have computers in this school.*
Respondent 13 (Teacher): *We as educators have only laptops which were given to us by the Department of Education but the majority of us don't know how to use them fully.*
Respondent 17 (Learner): *There are no computers for us to use here in school.*

Question 4:
Why do you think being a school in the rural area makes it less fortunate to access facilities of ICTs compared to schools in the urban area?
All twenty (100%) of the participants confirmed that schools in the rural area are less fortunate compared to schools in the urban area in terms of access facilities of ICTs. These participants highlighted that the schools are ignored by the government as they lack infrastructure for computer facilities. They stated that only a few people know how to operate a computer as many of them are not exposed to having access to computers. The above statement is supported by the following views:
Respondent 11 (Principal): *The schools in rural areas are significantly ignored by the government, the Department of Education, and the stakeholders.*
Respondent 13 (Teacher): *Schools in rural areas are less fortunate because of network problems, unavailability of ICT equipment, and infrastructure, and the fact that most schools are in very remote areas.*
Respondent 19 (Learner): *In our school, there is no computer lab building, and we struggle with network connection.*

Question 5:

What can the Department of Education do to make means to assist with ICTs in your school?

All twenty (100%) of the participants stated that the Department of Education can make means to assist with ICTs for teaching and learning by having someone who will teach people how to use the computers and to have the infrastructure in place. The above is supported by the comments below:

Respondent 1 (Principal): *The Department of Education can provide every teacher with adequate information on the basic use of ICTs for smooth teaching and learning*.

Respondent 13 (Teacher): *Invest in infrastructure that makes it easy to access computers and, internet, and ensure that enough teachers are employed who are technologically advanced.*

Respondent 10 (Learner): *The Department of Education can assist by building us computer labs which are big and provide us with a teacher who will teach us how to use a computer.*

Question 6:

What are the factors that cause teachers not to use ICTs?

Fifteen (75%) of the participants said that a factor that cause teachers not to use ICTs istheir age and they have never encountered using any form of ICTs in teaching and learning in their early years of teaching. This is supported by the following views:

Respondent 1 (Principal): *The technology change is expensive for teachers, and it will take longer for teachers to master the changes as most still battle to master the basics of using ICTs.*

Respondent 5 (Teacher): *Some of us educators are old, and we were never exposed to ICTs when we were students.*

Respondent 14 (Teacher): *Age, educational background, and limited technological activities.*

Question 7:

What can be done to overcome the lack of understanding the use of ICTs?

All twenty (100%) of the participants said that they were interested in learning how to use ICTs as they do not fully know how to use a computer. This is supported by the excerpts below:

Respondent 11 (Principal): *An introduction to technological subjects and training of teachers in how to use ICTs.*

Respondent 16 (Teacher): *Give an opportunity for teachers to receive training.*

Respondent 20 (Learner): *We want teachers to teach us on how to use computers.*

Question 8:

What can be done to implement the use of ICTs in teaching and learning?

Ten (50%) of the participants said that the Department of Education must allow schools to use multiple teaching streams such as social media and allow schools to employ an IT teacher where there is infrastructure and facilities to conduct training among teachers and learners. The examples below support this:

Respondent 1 (Principal): *Teachers can use social media as a teaching tool when sharing school work through WhatsApp.*

Respondent 15 (Teacher): *Teaching and learning must be done with ICT equipment.*

Respondent 18 (Learner): *The Department of Education must build a computer lab in our school.*

Question 9:

What do you have to say concerning teachers' resistance to change to in accepting ICTs to enhance teaching and learning?

Five (25%) said that resistance to change by teachers is very high as they do not want to learn how to use ICTs for teaching and learning. The lack of computer literacy among teachers is a contributing factor to resistance, and the use of laptops will slow their teaching and learning so they will remain teaching the old way. This comment is supported by excerpts below:

Respondent 1 (Principal): *The more teaching and learning is done through ICTs the less resistance there will be.*
Respondent 13 (Teacher): *The more time teachers spend on learning how to use ICTs for teaching and learning then there will be less resistance amongst teachers.*

DISCUSSION

The research findings revealed that the role of Information and Communication Technologies in teaching and learning can help promote learning and understanding where information is shared digitally using smart cell phones, and laptops. Watters states that computers are being used in education in a number of different ways.[32] According to Mojeed & Olaniyan, the use of the WhatsApp application has been used as a source of communication and sharing of information such as schoolwork among learners and information among teachers.[33] However, teachers use computers, laptops, and other technological equipment to assist them in downloading study material and setting test question papers and examinations.

The issue of infrastructure however hinders the integration and the use of ICTs in teaching and learning as a majority of teachers and learners have no understanding of how to use a computer device due to the lack of resources. The availability of ICTs is limited in schools as only the teachers who were supplied with laptops, however, most of the teachers are not literate when it comes to the use of laptops.

Jebbour addressed the lack of computer usage by learners due to the lack of infrastructure.[34] Learners in schools do not know nor use computers because they are not computer literate.[35] Schools in the rural areas are less fortunate to access facilities of ICTs compared to schools in the urban areas. This is exposed by the lack of infrastructure for computer facilities as the schools are ignored by the government. The schools are in remote areas where there are internet connection issues. There's a lack of maintenance of cell phone towers, and minority households have access to smartphones. Garcia et al. state that the challenges when using computers for teaching and learning are connection issues to the internet and the costs incurred for the connectivity.[36]

There is a lack of support and no computer integration in rural schools to enhance teaching and learning.[37] Zenda & Dlamini stated that there is a lack of computer integration in rural schools due to the nonavailability of ICTs.[38] The study exposed that though there's no support for the integration of ICTs in schools, the Department of Education has neglected the rural schools. The Department of Education has failed to facilitate ICT training for teachers since the establishment of the e-education policy. The policy has not been implemented in rural schools which is one of the factors that causes the teachers not to use ICTs. Teachers lack knowledge of how to use a computer in a classroom environment.[39]

Ahmad et al. state that teachers' resistance to and unwillingness to adopt the use of ICTs is because they are not computer literate.[40] Some teachers resist change as the majority of schools have

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[32] Audrey Watters, *Teaching Machines: The History of Personalized Learning* (mit Press, 2023).
[33] A M Mojeed and J O Olaniyan, "Usage of WhatsApp Messenger for Learning among Students in Selected Tertiary Institutions in Oyo State," *Journal For Family & Society Research* 2, no. 1 (2023).
[34] Mohsine Jebbour, "The Unexpected Transition to Distance Learning at Moroccan Universities amid COVID-19: A Qualitative Study on Faculty Experience," *Social Sciences & Humanities Open* 5, no. 1 (2022): 100253.
[35] H O Bolaji and Hassanat Abdullateef Jimoh, "Usability and Utilization of ICT among Educational Administrators in Secondary Students in Public School," *Indonesian Journal of Educational Research and Technology* 3, no.2 (2023): 97–104.
[36] Manuel B Garcia et al., "Teaching Physical Fitness and Exercise Using Computer-Assisted Instruction: A School-Based Public Health Intervention," in *Handbook of Research on Instructional Technologies in Health Education and Allied Disciplines* (IGI Global, 2023), 177–95.
[37] Kehinde Aruleba and Nobert Jere, "Exploring Digital Transforming Challenges in Rural Areas of South Africa through a Systematic Review of Empirical Studies," *Scientific African* 16 (2022): e01190.
[38] Rekai Zenda and Reuben Dlamini, "Examining Factors That Influence Teachers to Adopt Information and Communication Technology in Rural Secondary Schools: An Empirical Study," *Education and Information Technologies* 28, no. 1 (2023): 815–32.
[39] Sandra Baroudi and Nessrin Shaya, "Exploring Predictors of Teachers' Self-Efficacy for Online Teaching in the Arab World amid COVID-19," *Education and Information Technologies* 27, no. 6 (2022): 8093–8110.
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old-age teachers, this however, needs the Department of Education to implement the policies established. Teachers in rural area schools cannot keep up with current technological changes as the world is becoming more digital. They lack resources in their schools, lack infrastructure, and lack support from the Department of Education and stakeholders, lack of internet access, and lack of trained teachers to use ICTs to enhance teaching and learning.

Discussion Summary

From the analysis of the data, the following aspects are further discussed: computers are being used in education in several different ways; the lack of use of computers by learners, the benefits and importance of computer integration in education; the lack of computer equipment in classrooms; there is no computer integration in rural schools, and there is no support for computer integration; the minority of the teaching staff are computer literate, schools have plans to implement computer integration, resistance to and unwillingness to adopt computer integration among teachers and challenges with teaching with computers.

RECOMMENDATIONS

Teachers need to acknowledge that learners can now possess greater technological knowledge than them. They have to learn from their learners how to operate ICT tools such as smartphones, tablets, etc. The Department of Education must hold intensive ICT training workshops to make sure that all teachers are on board with integrating ICT into their pedagogical activities, as evidenced by the results showing that poor ICT integration was caused by minimal implementation of the e-education policy, and minimal training on ICT capabilities.

Immediate plans should be devised and implemented to remedy this unsatisfactory state of education, which is holding back learners in rural areas from modern education. ICT shouldn't be included in the curriculum just to use the newest gadgets available. Since every school is unique, each should have the freedom to choose the ICT resources that best meet the demands of its faculty and study body. The SMT should implement measures to improve teachers' ICT proficiency, for instance, sending staff emails or downloading lesson plan templates from the intranet to submit.

Acquiring technological knowledge needs to be considered in conjunction with the pedagogical approaches teachers employ in instructing their learners as well as their subject-matter expertise. ICT shouldn't be included in the curriculum just to use the newest gadgets. The schools must be prepared to integrate ICT into teaching and learning. The Department of Education should guarantee that every school in the nation has a computer facility, thereby ensuring that every learner has equal access to technology. Further, it also needs to go above and beyond basic requirements by empowering and assisting every rural school with fully equipped computer labs with the most recent computer software, an internet connection, technical support staff, and administrative support.

CONCLUSION

The researcher concluded that teachers should be made aware of the value of ICTs in the teaching of learners in the twenty-first century. It is hoped that the challenges faced by schools and discussed findings, will be taken cognisance of by the Department of Education, the school management teams, the parents and the learners. Technology integration into teaching and learning will go more smoothly as educators grow accustomed to its use.

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