Awareness And Readiness of Stakeholders on ICT Implementation in Rural Schools

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ABSTRACT

Information and Communication Technology (ICT) is designed to solve challenges that affect humanity. However, the rapid advancement in ICT calls for cutting edge ICT knowledge and upskilling of users. As a result, it is mandatory that jobseekers become computer literate. University students are expected to be computer literate. Therefore, integrating ICT into teaching and learning (T&L) has positive benefits. This study analyses the state of ICT integration at rural schools in the Rekopantswe Area office (5 selected schools) in Ngaka Modiri Molema district in North West province which were selected using a random sampling method. A questionnaire was used to gather data. The results show that the attitudes, awareness, and readiness of educators could be improved through ICT integration as prior knowledge is harnessed. A quantitative research approach was adopted. Research shows that ICT can improve T&L and help them become innovative when appropriate ICT tools are made available. ICT integration requires not only the modernisation of the ICT tools, but significant shifts in the mind-sets of stakeholders' attitudes, roles, and belief systems to construct new knowledge. This awareness and readiness of the stakeholders is also fundamental for the successful integration of ICT projects. The results show that learners and educators are aware of initiative of the South African government to integrate ICT in T&L. The stakeholders exhibited positive attitudes and belief systems though some were not aware of the government's ICT integration initiative. It is unfortunate that schools have not embraced fully ICT integration. With more emphasis on online education in the face of the pandemic, there is need to fund and speed up such ICT integration projects at all the secondary schools, in rural, urban and peri-urban areas.

Keywords: Attitude and benefit; implementation; Information and Communication Technology; integration; teaching and learning.

INTRODUCTION

Information and Communication Technology (ICT) is an integral part of most organisations, businesses, and schools (Amedzo, 2007). The use of ICT in schools is fundamental as it prepares learners for 4IR and the attendant information age. Given the advancements in ICT, the integration of ICT in teaching and learning (T&L) is mandatory. Studies show that ICT integration in comparison to the conventional and traditional ways of teaching makes T&L inventive, creative, exciting, engaging, and significantly viable (Hartley, 2007). This study was informed by constructivist theory where learners and teachers use past experiences and knowledge to construct new knowledge.

In recent years, several studies have reported several opportunities and potential benefits of ICTs designed to improve the quality of education. The United Nations Educational, Scientific and Cultural Organization [UNESCO] (2003), observed that ICT is a major tool for the establishment of the knowledge society. ICT is perceived as a platform and catalyst for innovation in education (Desai, Hart, & Richards, 2008). Appropriate use of ICT in the school education system is considered a significant factor in improving the quality of education in rural secondary schools as premised in constructivism. The endeavour of different private sectors and the government has focused on providing in Limpopo and the North West rural schools

with good ICT equipment. However, an analysis and evaluation of the integration of ICT into the educational practices of using ICT in the rural classroom has been lacking. It is interesting to note that most schools do not have access to ICT in rural areas while those with access are not utilizing ICT for T&L. The access to ICT and the competence of educators is a challenge. The barriers to ICT integration in teaching and learning are discussed in detail in the recent studies (Maatuk, 2021), (König, 2020) and (Mahyoob, 2020). However, in South Africa, resources to address these barriers are available. The private sector has also partnered with government is addressing these challenges. Unfortunately, despite, these remedial actions, the challenges still persist. The further analysis of the challenges and coupled with the use of prior knowledge of educators and learners may be a solution to the challenge. constructivism theory was therefore chosen as a possible tool of harnessing prior knowledge while new knowledge is constructed which promotes the use and the integration of ICT in T&L.

This paper focuses on the awareness and readiness of learners, educators, principals, and departmental officials on ICT integration. It is important to determine the readiness of stakeholders in an endeavour to examine whether ICT implementation and integration in rural schools has any positive impact. Furthermore, the paper focuses on the need to develop an appropriate inducting and training strategy to up skill stakeholders on how to use ICT in an efficient way. The teachers are expected to adopt and adapt to new teaching roles and to prepare learners for an ICT integrated world of work. Using the theory of constructivism, the perspective of stakeholders could be used to construct new knowledge which could guide the integration of ICT and ICT training. In particular, educators use technology depending on their perceptions and their trust in a way it can contribute to the success of learners and the learning process which is in line with the theory of constructivism. ICT integration is critical for the implementation of education systems in all global economies. There is, therefore, a need for a new approach guided by the theory of constructivism to automate and equip all schools with ICT tools for the success of online education, now more than ever in the face of the disruptive effects wreaked by the Covid-19 pandemic in 2020, 2021 and 2022.

RELATED WORK

The Value of ICT Educational Tools

A myriad of institutions has adopted modern ICT tools which are relevant and enhance productive engagement with the process of learning. A significant number of these ICT tools are free which enhances their adoption and integration. They also enhance and enable social communicative strategies (Brown, 2010). The pervasiveness, resilience, user friendly and functionality of ICT tools positions ICT as an attractive, flexible, and adaptable educational tool ideal for educational institutions of higher learning (Tinio, 2002). These tools should be harnessed into higher education institutions as well as secondary schools in South Africa in the context of constructivism.

Research in ICT tools promotes constructivist perspectives in education as it connects online learning to a broad extent compared to conventional educational approaches (McLoughlin & Lee, 2008). Social educational technologies encourage publication, sharing of knowledge, re-use of learning content, and the electronic dissemination of such generated content. It also links fundamental resources and materials in information settings that are administered and controlled by instructors and learners (Tay & Allen, 2011). The prior knowledge and experiences of stakeholders is therefore fundamental in bringing such technologies into rural classrooms.

Literature demonstrates a number of benefits of ICT tools for educational purposes. These include the enhancement of learners' discussion experiences, improvement of learning stimuli and experience and support of individualised subject content (Amedzo, 2007). Given the prior knowledge of the stakeholders and their experiences, knowledge can be constructed and disseminated. ICT educational activities and tools are fundamental in improving learners' cooperative and collaborative skills (Ellison, 2002). The adoption of ICT educational tools has resulted in greater success in effective acquisition of content as much as creativity amongst learners.

ICT pedagogical activities may also improve the involvement of learners in a classroom setting where both the introvert and extrovert participate and collaborate in creating new knowledge. The anxiety and stress levels of learners are markedly reduced by adopting ICT educational tools (Wheeler, Yeomans & Wheeler, 2008). Given the Covid-19 pandemic, there is now a more urgent need for ICT integration into all the learning centres from primary to tertiary levels.

ICT Trends in education

ICT tools are an integral part of the 21st century contemporary classroom. These ICT tools include software applications, projectors, computers, scanners, printers, interactive whiteboards and more. The proliferation of wireless networks, virtual reference services, interactive web interfaces, virtual collections and individual web portals have led to computerization of the learning spaces since the turn of the new millennium (Ramzan, 2004). Findings in pedagogical technology demonstrate that ICT can be a pertinent component in improving the quality of instruction and comprehension while new knowledge is constructed through computer assisted learning.

Ten of the global trends and innovations include cloud computing, mobile learning, gaming, one-to-one computing, ubiquitous learning, personalised learning, educator-generated open content, redefinition of learning spaces, smart portfolio assessment, and educator managers. These global trends automate classroom settings as their uptake is on the rise. Technologies are essential to the thriving of educational institutions (Hawkins, 2002). It should be noted that ICT trends in South Africa are lagging behind those of comparative economies. The pandemic is now forcing all the schools and tertiary institutions to embrace ICT integration without further delay.

Preparedness of Educators

Inadequate ICT training to equip educators with the requisite readiness for ICT does not enhance the integration of ICTs in rural schools in SA. Most rural schools in SA do not have educators with prerequisite ICT skills and experience in computer literacy and this substantially hampers ICT integration efforts. This observation is supported by the tenets of the theory of constructivism which aver that educators need necessary skills and expertise in the use for skills transfer. Capper (2003) argues that most schools in South African have computers however, the challenge is the computer literacy of educators. Capper also hints that educators who have access to computers do not utilize them due to lack of expertise. They do not know how they can integrate ICT into their teaching. Furthermore, they do not have time to explore ICT tools and have negative attitudes towards ICT. For example, they think ICT is too much of a burden with technical difficulties and complexities which are unnecessary. This can be addressed through the use of the theory of constructivism where new knowledge which promotes the use of ICT in T&L is constructed.

Capper (2003) urges that the integration of ICT in education changes traditional teaching methods to digital teaching practices and strategies. This results in what has been called the digital divide as rural schools learners are not prepared for tertiary education where computer knowledge is a prerequisite (Jenkin, 2012). These challenges can possibly be addressed through ICT awareness workshops in-service training, and ICT skills and knowledge transfer initiatives (Tinio, 2002) where theories of change and constructivism are employed.

There are various organizations in South Africa which are developing and equipping educators in the use ICT in education, such as Vodacom-SA, Telkom, and SchoolNet. They have launched digital classrooms or ICT centers where teachers and learners can access computers and Internet. Vodacom also donates laptops, projectors, modems, and interactive whiteboards to rural schools.

The Department of Education should, therefore, ensure that educators are trained in ICT and that ICT forms an integral part of the educators' training. The department can avail bursaries to educators for their ICT professional development.

The implementation of ICT in South Africa is threefold. There is a need to train the current and future educators so that they can embrace ICT and integrate it into their teaching at all the schools while enabling them to use their prior knowledge and experiences in constructing new knowledge. Secondly, there is need for funding to sponsor ICT integration at all rural secondary schools in the North West and Limpopo Provinces. Lastly, policies should be drafted to inform ICT integration to ensure that the economy harnesses the benefits of ICT integration.

COVID-19 and ICT Integration

Covid-19 has exposed many challenges regarding the integration of ICT in teaching and learning such as readiness to use technology, technology infrastructure, human resources, and systems management (Muslikhah, 2020). The implementation of online platforms and processes was affected by a lack of infrastructure and digital competence. These inadequacies demonstrate that integration of ICT in teaching and learning is essential for the successful delivery of classes.

A similar research to our study was conducted in Benghazi (Maatuk, 2021). The study focused on the perspectives of students and teaching staff during Covid 19. The challenges of implementing E-learning such as poor connectivity and high implementation and maintenance costs are highlighted as impediments to the initiative. In general, the Covid-19 provided an opportunity for ICT integration into T&L (Pokhrel, 2021). However, the levels of education and competence of the teaching staff impacts negatively on the success of ICT integration (König, 2020). The study focussed on school computer technology and competence of teachers as the main barriers. Technical, academic, and communication challenges therefore work to scuttle the efforts directed at integration of ICT into teaching methodologies and strategies (Mahyoob, 2020).

The challenges arising from the digital divide such as lack of infrastructure, competence of teaching staff, readiness of schools and Internet access are the main barriers impacting negatively on the implementation and integration of ICT in T&L (Lorente, 2020).

RESEARCH METHODOLOGY

The is descriptive and exploratory. Creswell (2003) defines exploratory research as helpful when not much research has been done on the subject matter.

This study is guided by a quantitative research method employed due to the type of data collected and the efficiency and

accuracy of the data collection method. Questionnaires were the best for data collection. Qualitative method is defined as an efficient and independent approach which is used to collect data about a particular study (Creswell, 2003). Amedzo (2007) points out that quantitative researcher can be objective as the inquiry is focused on the hypotheses which remains consistent. Quantitative methods require an understanding of computational data and models or statistical knowledge. Data can be statistically represented in an organised manner to draw meanings, relationships, and associations amongst the variables (Creswell, 2003).

According to Lubbe and Klopper (2012) a good sample consists of data-rich cases that explain the phenomenon and nature of the subject of interest intensively. A subset of the population was selected using convenience sampling technique and a questionnaire was administered. The questionnaire adopted a five-point rating scale namely; strongly agree, agree, not sure, disagree, and strongly agree. Questionnaires were distributed to the learners, educators, principals and the Department of Education officials in the Rekopantswe Area office (to the 5 selected schools) in Ngaka Modiri Molema district in North West province. The district consists of 10 secondary schools and the sample population considered in this study is 50% of the population. All schools that were selected were within a radius of 60 km from Mafikeng. Schools were randomly selected and the researchers sampled across the four circuits that constitute Rekopantswe Area office. Out of 100 questionnaires that were distributed, only 66% (39 learners, 18 educators, 5 principals, and departmental officials) were completed and returned the questionnaires.

In this study, there are participants who required informed consent. Extra care was taken to ensure integrity and quality of the study, respect for the anonymity and confidentiality of the respondents. The independence and impartiality of the study was also considered. For this particular reason, consent forms were distributed to parents of the participating learners. The consent forms were distributed through the learners. The purpose and importance of the study was explained to learners before they participated in the research. This was to ensure that results generated inform the successful integration of ICT at schools.

The methodology was designed to understand the root cause of the problem from the perspective of the respondents. Thereafter, given the perspectives of the respondents and using their prior knowledge, a possible solution is formulated.

ETHICAL CONSIDERATIONS

The study was approved by the North-West University Ethics Committee according to University policy on research ethics. The study had ethical matters since it involved the participation of secondary school learners. The ethical issues were considered, and these were also approved by the North-West University's Ethics Committee. The following are the ethical considerations which were approved by the University's Ethics Committee: (1) The study involved children as participants which were under the age of 18 (high school learners). To address this ethical issue, the researcher first distributed consent forms to parents of the participating learners. The study only proceeded with data gathering after the granting of the permission to involve the learners. In addition, only the learners whose parents had granted permission to participate in the study were involved in the survey. (2) Secondly, the gatekeeper is the Area Manager for a targeted cluster. The researcher requested for permission to conduct the study in the targeted area through a formal written letter. The study was therefore implemented when the sought permission was granted by the area manager. Furthermore, the researcher needed the

following from the University to support his request for permission from the area manager: Student confirmation letter, reference letter and the approval of the research proposal. Furthermore, data which reveal the identity of the respondents was not collected. This data was not also included in the study. The privacy of the respondents was respected and protected in this study. The respondents remained anonymous during data gathering and data analysis. They are also anonymous in this article.

RESULTS

Data analysis

Responses to the questionnaire were analysed using inferential and descriptive statistics. Data was prepared and coded for analysis using a Statistical Package for the Social Science (SPSS). Themes defined data according to its relevance in addressing the research objectives. The standard deviation and means with the correlation of the questionnaire were calculated. Inferential analysis was used to examine the significant differences and to offer explanations for this dichotomy among the respondents. The results of the analysis were represented graphically and in the form of correlation co-efficient and frequency tables for interpretational purposes. The findings were shared with the respondents. The methodology was designed to assess the awareness and readiness of learners and teachers in terms ICT integration.

Responses

The main focus of this study was awareness and readiness for ICT integration as well as the attitudes and belief systems towards ICT integration. The following figures are the graphical representation of the response rate, gender, and age of the respondents.

The results in this section are divided into three parts. The first part (figures 1- 8) is the biographical information about the participants, the second part is the analysis and discussion of the awareness and readiness of ICT integration of the respondents (figures 9 - 11) and lastly, is the analysis of the attitudes and belief systems towards ICT integration of the respondents (figures 12-13).

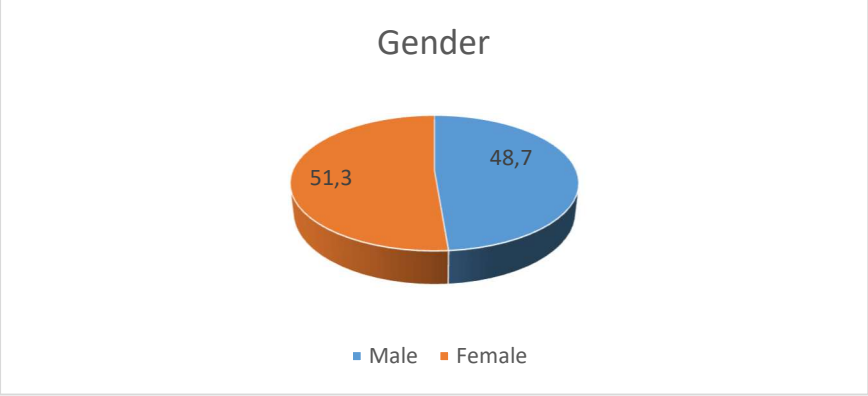


Figure 1: Gender of participants (Learners)

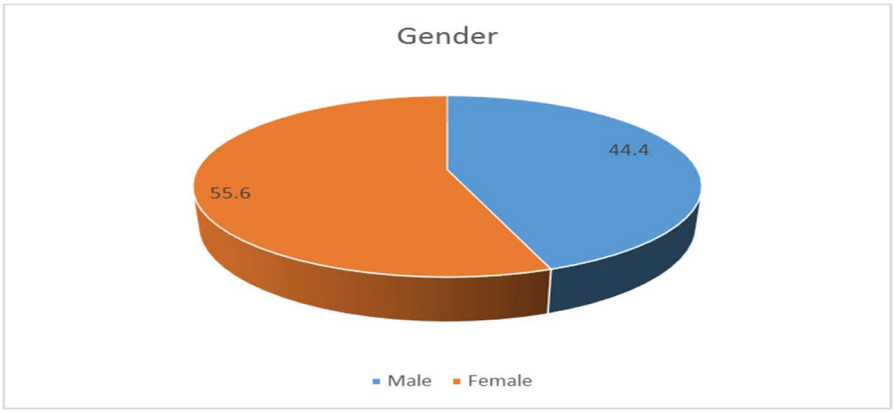


Figure 2: Gender of participants (Educators)

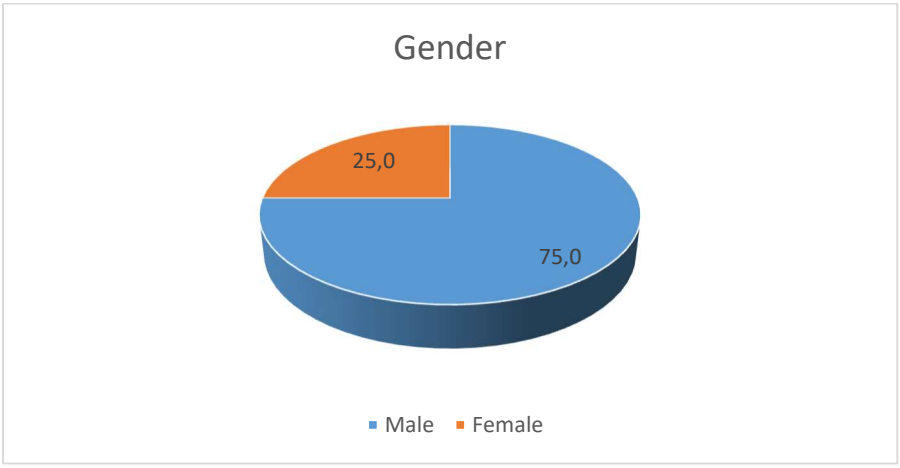


Figure 3: Gender of participants (Principal)

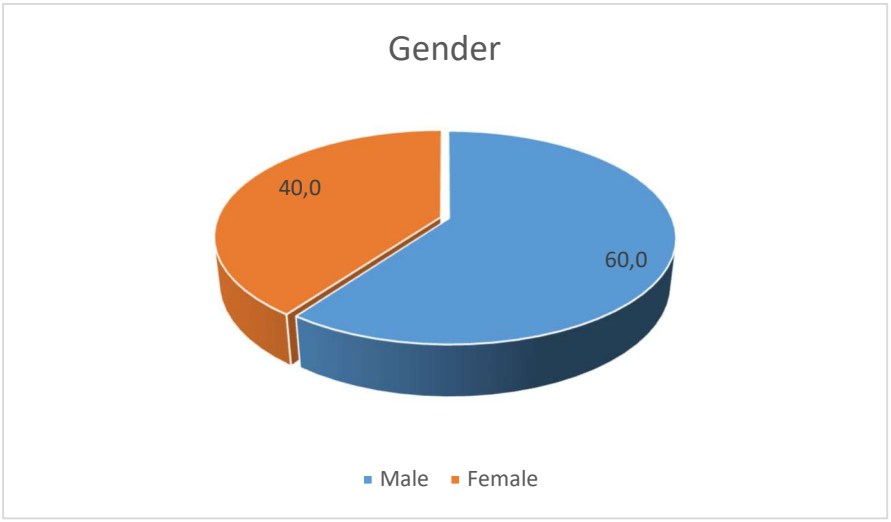


Figure 4: Gender of participants (Departmental officials)

The figures 1 to 4 show that the majority of the respondents were male. This shows that the ranks of principals and departmental officials are predominantly male.

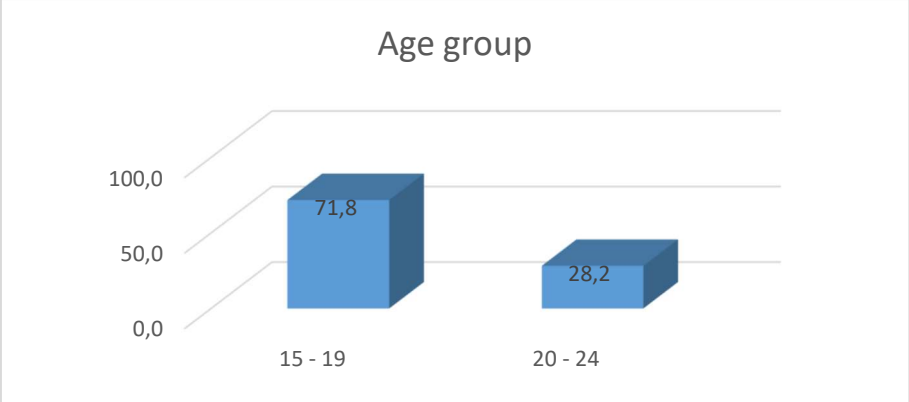


Figure 5: Age of participants (Learners)

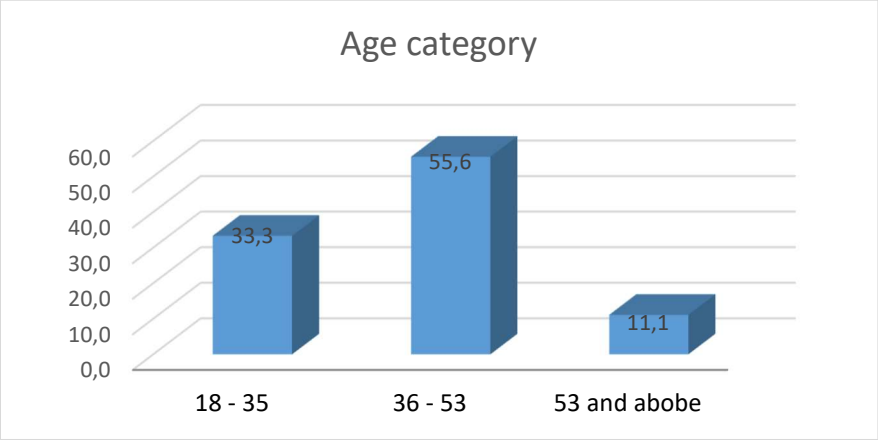


Figure 6: Age of participants (Educators)

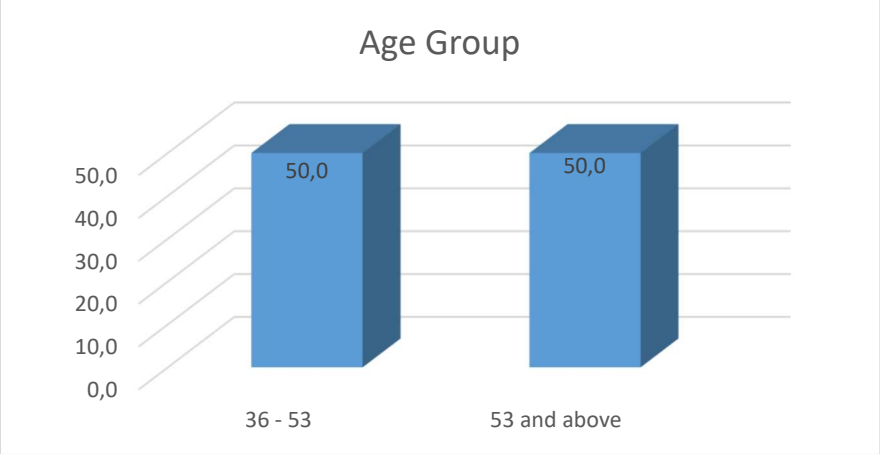


Figure 7: Age of participants (Principal)

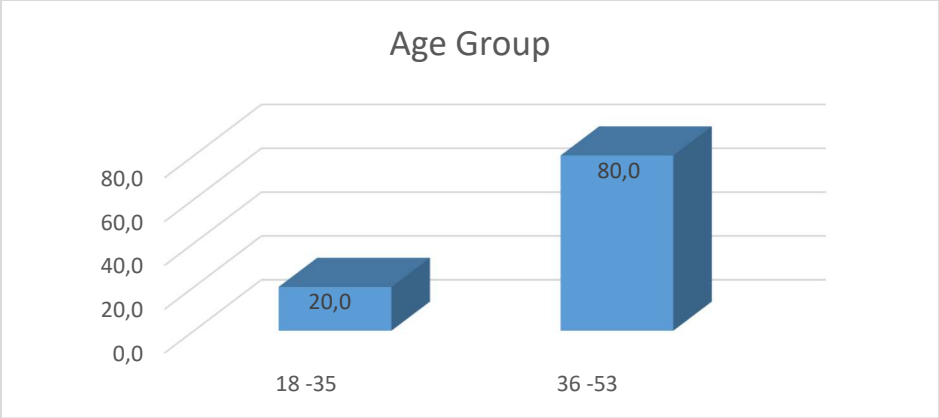


Figure 8: Age of participants (Departmental official)

The figure 5 to 8 represents the age groups of the respondents. Majority of the respondents in learners group are between 15 and 19. Figure 6-8 (Educators, principals and departmental officials) the majority of the respondents are 53 years old and above.

The age results of learners show that there is a need to implement ICT at schools. Furthermore, the results of other stakeholders such as educators and principal points to a need to train all the stakeholders for the successful implementation of ICT. Figure 9 present data relating on the awareness of the learners regarding the need for ICT integration in schools and their readiness for the new approach to T&L. The results relate to the prior knowledge and experiences of the respondents.

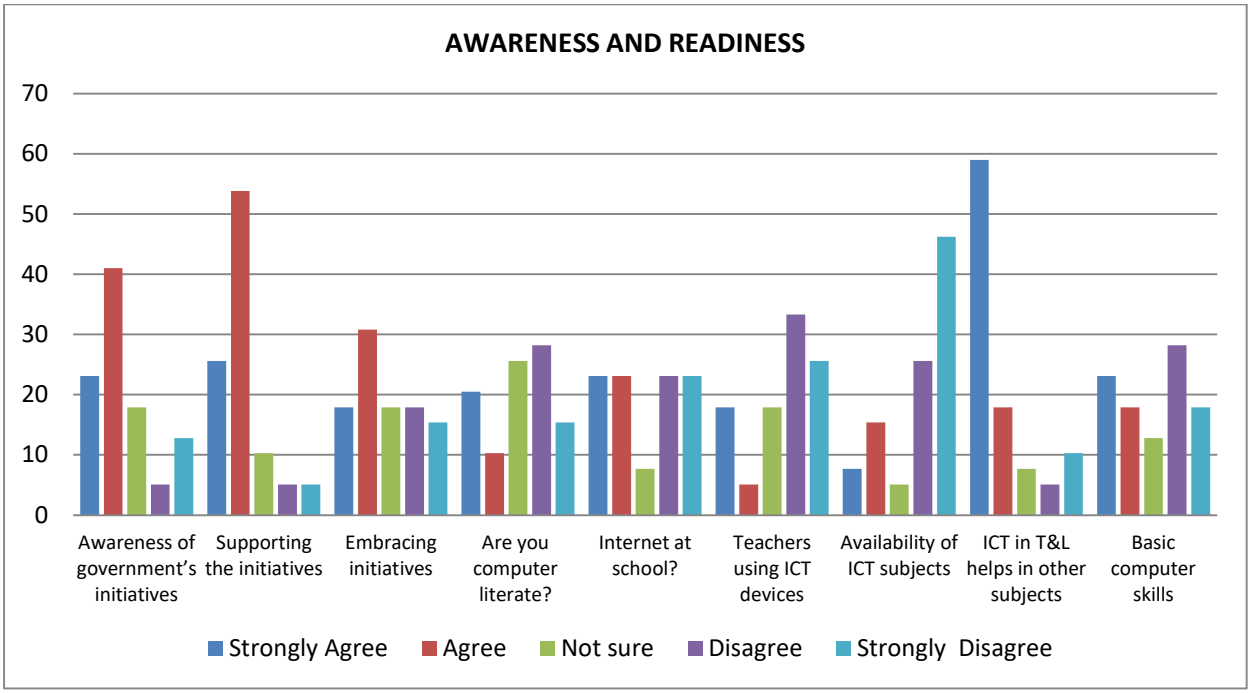


Figure 9: Awareness and readiness (learners)

Figure 9 presents the responses to the questions relating to awareness and readiness of integrating ICT in pedagogical modalities. The respondents were requested to respond to fourteen questions. They were requested to rate each item on a scale of 1 to 5 (1=strongly agree; 2=agree; 3= not sure, 4= disagree and 4= strongly disagree). Accordingly, 64.1%(23.1% and 41%) of the respondents agreed that they were

aware of the government's initiative to integrate ICT in teaching and learning, 79.4%(25.6% and 53.8%) indicated that they supported the government's initiative, 48.7%(17.9% and 30.8%) of the respondents are aware that their school was doing something to embrace this initiative, 43.6%(28.2% and 15.4%) of the respondents are computer illiterate.

A total of 46.2% (23.1% and 23.1%) of the respondents have access to a computer and Internet at school, 58.9% (33.3% and 25.6%) of the respondents do not have confident teachers who ought to be using ICT tools in class, 71.8% (25.6% and 46.2%) of the respondents indicated that their schools do not offer computer literacy/ IT/ CAT as a subject, 76.9% (59% and 17.9%) of the respondents noted that their schools have integrated ICT in T&L, and 46.1% (28.2% and 17.9%) of the respondents do not have basic computer skills (Word, Excel, PowerPoint, Access, Outlook, and Internet). These results should help in designing appropriate training programmes.

The results show that there are a number of gaps and needs at schools. They show that schools are not ready for the implementation and the integration of ICT at the rural schools that participated in this study. There is need for awareness and training in the Sector. Figure 10 presents the perceptions of the educators.

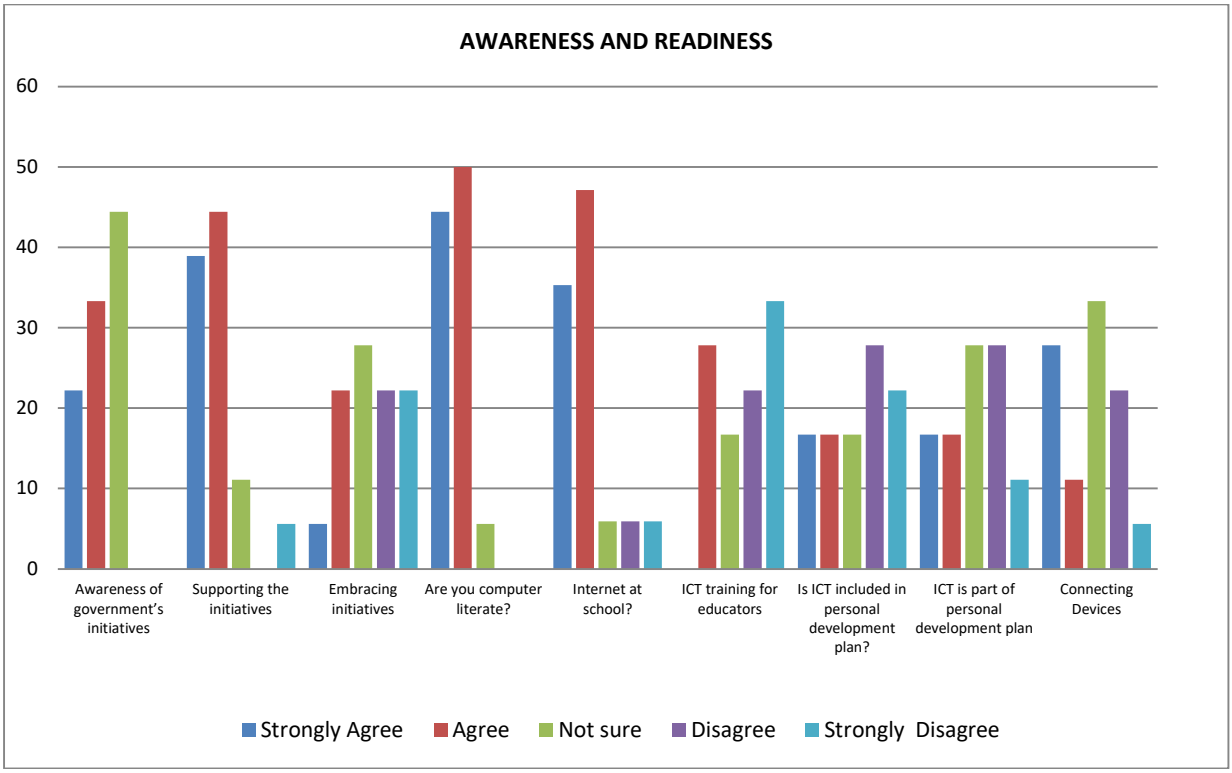


Figure 10: Awareness and readiness (educators)

The educators were requested to respond to the same questions that were posed to the learners. Accordingly, 55.5% (22.2% and 33.3%) of the respondents are aware of the government's initiative to integrate ICT in T&L, 83.3% (38.9% and 44.4%) of the respondents support the government's initiative, 44.4% (22.2% and 22.2%) of the respondents' schools are yet to embrace this government initiative, 94.4% (44.4% and 50%) of the respondents are computer literate, 47.1% of the respondents were not sure whether they were interested to learn or enrol into ICT training courses, and 82.4%(35.3% and 47.1%) of the respondents have no access to Internet and computers at school.

The results also show that 55.5% (22.2% and 33.3%) of the respondents do not have access to training at their schools

designed for educators who are not computer literate, ICT is not part of personal development plans 50% (27.8% and 22.2%) of the respondents , 38.9% (27.8% and 11.1%) of the respondents are aware that the department encourages educators to study computer skills, 38.9% (16.7% and 22.2%) of the respondents noted that the department supports ICT projects financially, and at least 38.9% (27.8% and 11.1%) of the respondents have the skill to set up and use the following technologies: computer, projector and speakers. The results clearly show that most respondents were either not willing to be trained or they did not have access to training. There is therefore a need to address these barriers for the successful implementation and integration of ICT at the rural schools surveyed in this study. The sector has to embrace ICT as a matter of urgency given the challenges of COVID 19 pandemic. Training programmes which help respondents change their understanding of ICT are ideal. Figure 11 presents the perceptions of the principals.

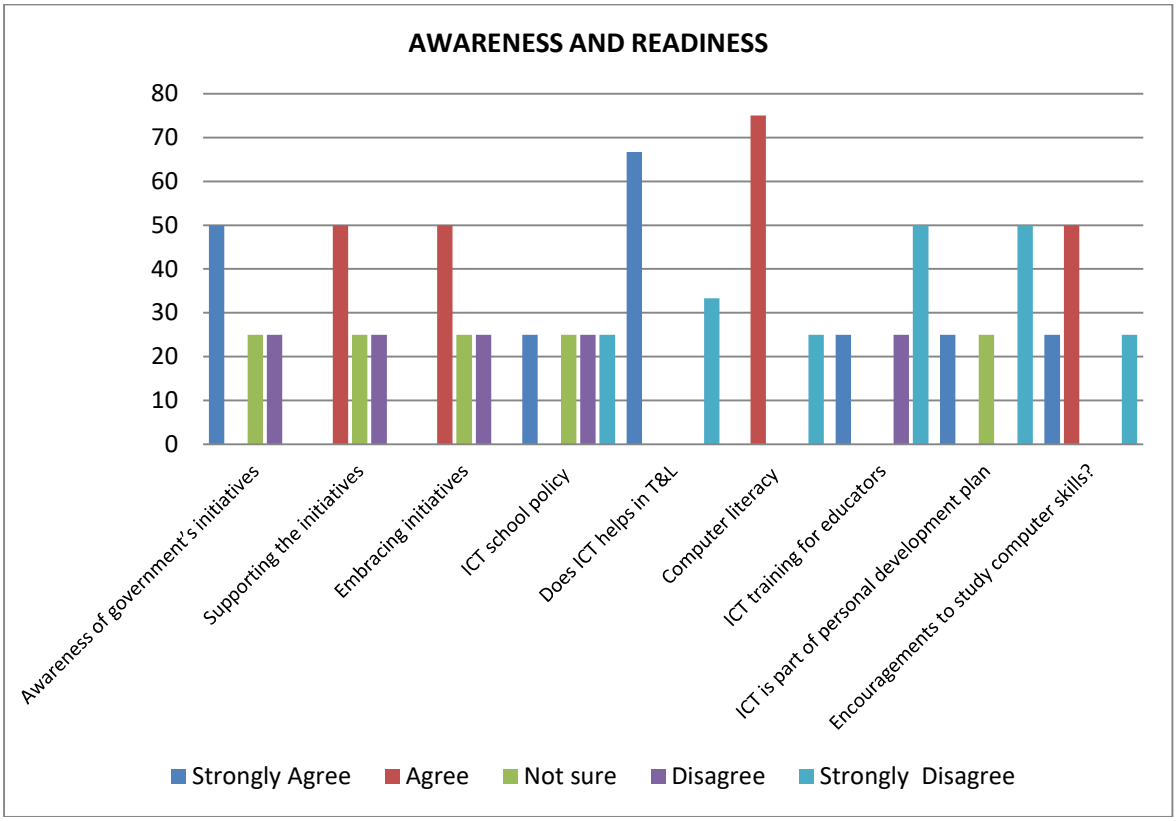


Figure 11: Awareness and readiness (Principal)

The survey show that 50% of the respondents are aware of the government's initiative to integrate ICT in T&L, 50% of the respondents support the government's initiative, 50% of the respondents want to embrace this government initiative, 50% (25% and 25%) of the respondents are not aware of the department's ICT policy for schools, 66.7% of the respondents plan to integrate ICT in T&L, 75% of the respondents are computer literate.

It is interesting to note that 100% of the respondents are willing to learn or pursue ICT training courses, 75% (25% and 50%) of the respondents noted that there was no ICT training for educators, 66.7% (33.3% and 33.4%) of the respondents who have access to training are of the view that training is not effective. The respondents should be given an opportunity to construct new knowledge based on prior knowledge. It should be noted that 50% of the respondents indicated that ICT was not part

of their personal development plans however, 75% (25% and 50%) of the respondents observed that the department encouraged educators to study computer skills. On the other hand, 75% (25% and 50%) of the respondents noted that the department supports ICT initiatives financially. The study also shows that a significant number, 75% of the respondents are computer literate in Microsoft applications (Word, Excel, PowerPoint, Access, Outlook, E-mail, and Internet), while 75% of the respondents are able to connect/the following: computer, projector and speakers.

The ICT integration project should target the principals of schools as gate keepers. The positive involvement and acceptance of ICT by principals could have a positive ripple effect at all the institutions of learning. It is encouraging that principals are willing to learn or to pursue ICT training courses. The implementation and integration of ICT at schools may take advantage of this positive outcome of this study. Furthermore, the majority of educators (75%,) according to this study are computer literate as shown in Figure 11. One may argue that their knowledge of ICT is basic and it is not appropriate for the implementation of ICT at schools. However, this should be considered as a positive starting point since prior knowledge could be used to construct new knowledge, a foundation upon which future training can be anchored on. It can be used as a scaffold to support ICT implementation. In pursuit of new knowledge, advanced training and courses may be considered for the majority of principals and these principals be considered as future trainers through the train the trainers' concept. Figure 12 presents the perceptions of the departmental officials.

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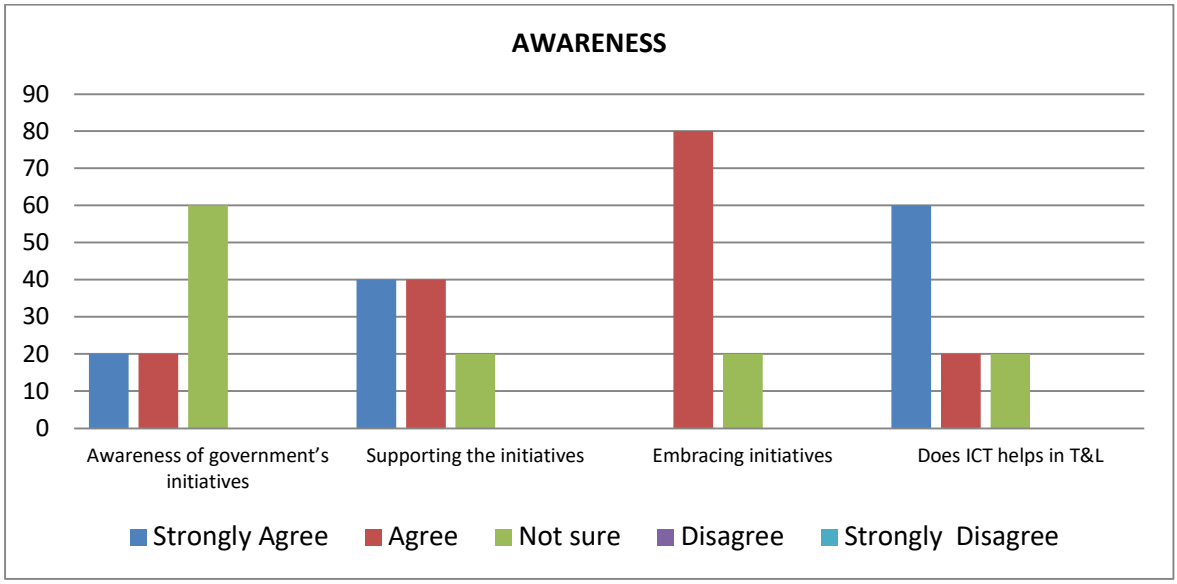


Figure 12: Awareness and readiness (Departmental officials)

The results show that 60% of the respondents were not aware of the government's initiative to integrate ICT in T&L while 80% (40% and 40%) supports the government's initiative. It can also be seen that 80% of the respondents have embraced this government initiative. The 80% of the respondents are considering integrating ICT in T&L.

It is, however, a concern that sixty percent of the department officials were not aware of the effects of the government initiative. These officials happen to be the implementers of the same government

project. Any intervention strategy may target these officials to raise awareness at their level and generate interest and support. The challenges of COVID 19 in 2020, 2021 and 2022 presented an opportunity for accelerated ICT integration though in a very difficult context. It is, however, encouraging to note that the majority of the respondents, 80% as shown in Figure 12, supports government's initiatives to integrate ICT in T&L. This is a positive finding of the study encouraging the integration of the ICT at schools to enrich T&L initiatives. Figure 13 presents the attitudes of learners towards the integration of ICT in T&L.

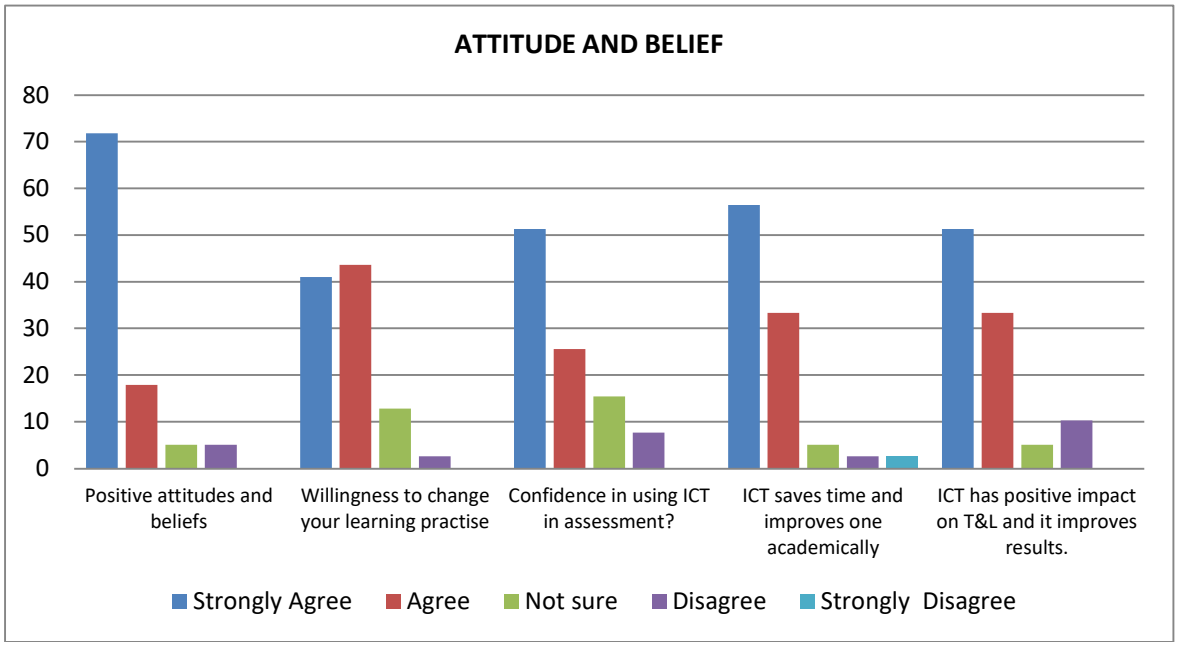


Figure 13: Attitude and belief (learners)

The results on attitude and belief show that 89.7% (71.8% and 17.9%) of the respondents have positive attitudes and beliefs towards ICT technology while 84.6% (41% and 43.6%) of the respondents are willing to change their learning practices by integrating ICT. The results also show that 76.9% (51.3% and 25.6%) of the respondents have confidence in using ICT tools even for assessment while 89.7% (56.4% and 33.3%) noted that ICT is efficient, saves time and it does enhance T&L. In general, 84.6% (51.3% and 33.3%) of the respondents believe that ICT has a positive impact on T&L and that it can improve results. It is encouraging to note that the results on attitudes and beliefs are encouraging amongst the learners which augurs well for the integration of ICT in T&L at institutions of learning. Figure 14 shows the beliefs and attitudes results of the educators.

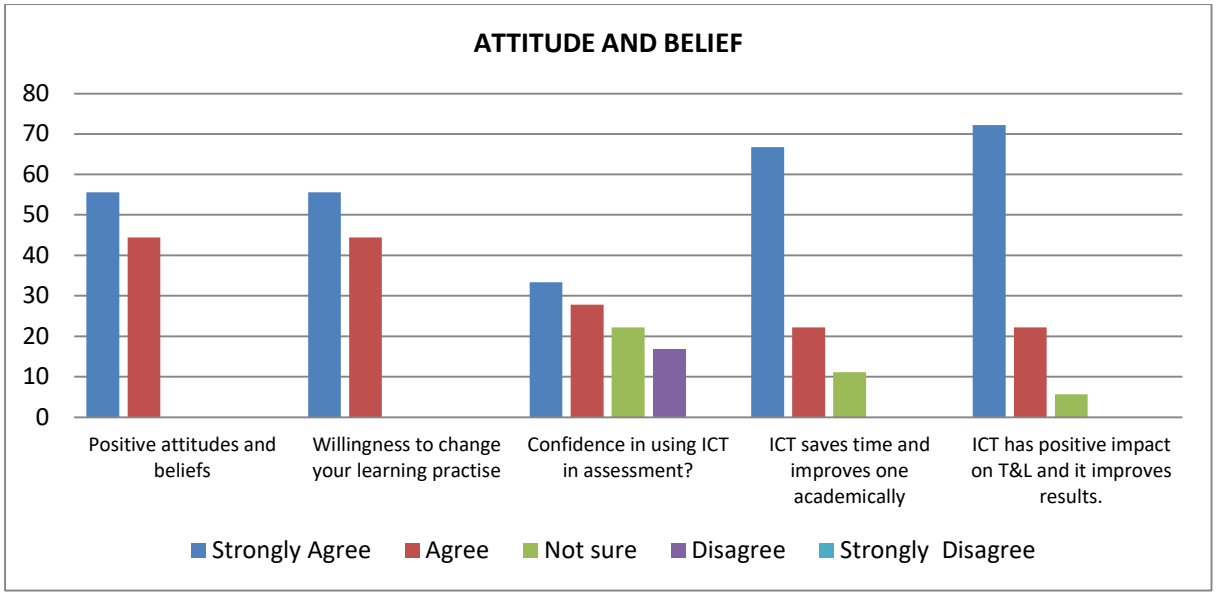


Figure 14: Attitude and belief (Educators)

The educators have a positive attitudes and beliefs regarding ICT integration (100 % (55.6% and 44.4%)). They are also willing to change their teaching practices to integrate ICT. The educators see value in ICT integration (88.9% (66.7% and 22.2%)) and regard it as having a positive impact on T&L, and that can improve results. ICT integration also saves time, and it does enrich and simplify the teaching efforts of educators (94.4% (72.2% and 22.2%)). These positive results are encouraging.

DISCUSSION OF FINDINGS

The study established that 35.9% of learners, 44.5% of Educators, 50 % of Principals, and 40% of Departmental officials, which is 27 (40.9%) out of 66 (100%) respondents are not aware of the government initiative. Accordingly, 89.7% and 100% of the respondents (learners and educators respectively) had positive beliefs and attitudes towards ICT technology and that they were interested in changing their learning practices by integrating ICT. They are confident in using ICT for both teaching and assessment. They value ICT and regard it efficient as it saves time and improves results. ICT integration has a positive impact on T&L and it can improve results. The findings of the study are somewhat conflicting and contradictory at points. The attitudes and beliefs results are positive and can be used as a basis for ICT integration. However, the awareness results are a concern. The implementation may consider adoption, implementation, constructivism and change management theories. This should be an all-inclusive approach embracing all the stakeholders.

CONCLUSION

ICT implementation and integration in T&L is vital and crucial to all stakeholders. The integration must be encouraged and be embraced by all stakeholders. The South Africa government, specifically the Department of Education, has to prioritize the integration and adopt appropriate strategies to ensure that ICT is successfully integrated in rural schools. This cannot be overemphasized during the era of COVID 19 which demands the urgent implementation of the ICT at all the institutions of learning ranging from primary to tertiary levels. The pandemic has brought to the surface the challenges of digital divide and its negative impact on the education sector. The results suggest that here is a need for extensive awareness campaign to raise the ICT integration awareness in schools to drive the adoption and implementation of ICT in

T&L across the Sector. Furthermore, the results show that most of educators are willing to use ICT for T&L. They have a good and a positive attitude towards the integration. The study further shows that educators are ready for the new development in T&L. These results could be used as the spring board for the implementation of ICT in T&L. The Department of Education ought to adopt the appropriate strategies to raise the awareness. The department can do this using both print and electronic media campaigns. They can also hold ICT indabas, seminars, and educational campaigns at rural schools. The awareness campaign may be informed by various theories such as adoption of technologies, constructivism change management, and persuasive strategic management. The Department could also explore possible ways to establish ICT information centres in all districts, circuit offices, and cluster areas to encourage interest in ICT integration. The COVID 19 pandemic affords an opportunity to revisit the need to implement and integrate ICT in T&L. The pandemic has forced the education sector to consider online education and the implementation of ICT. The pandemic has exposed the effects and the disadvantages of digital divide (Muslikhah, 2020) and (Pokhrel 2021). The private schools which are well resourced were not impacted negatively by lookdowns and the need to adopt ICT and online learning. The private schools managed to continue with T&L on the online platforms using various learning management systems and ICT tools such as video conferencing tools. Unfortunately, a number of public and rural schools were impacted negatively by the pandemic. They could not implement online teaching effectively due to lack of and access to ICT. This points to an urgent need to draft an ICT implementation and integration policy to drive the computerization of schools and all the T&L processes and events. The implementation and integration of ICT in T&L should not only respond to the challenges posed by the current pandemic (Mahyoob, 2020) and (Maatuk, 2021). In the main, it is necessary and a catalyst for future advancement, development and generation of new knowledge. ICT should be implemented and integrated with future pandemics in mind. The positive results of the study could be refined for the implementation and integration of ICT in T&L notwithstanding negative results which call for the intervention strategies. The results of this study could be used in conjunction with the results of similar studies in literature such Maruping and Velempini (2019). A number of barriers to ICT integration in rural schools were identified and reported on. The results of the study put into perspective what needs to be done in terms of barriers to implementation and integration of ICT in rural schools. ICT integration is part of all the facets of the economy and the education sector cannot be an exception. Therefore, it has to be addressed with a sense of urgency while addressing the current digital divide in peri urban and rural schools. In addition, the digital divide between well-resourced private schools and under-resourced public schools should also be addressed.

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REFERENCES

Amedzo, E.K. 2007. The integration of Information Communication and technology into rural schools of South Africa. Stellenbosch University.

Brown, T. 2010. The implication of Web 2.0 for learning and teaching.

Interactive Learning. *Educational Journal* 8(1), 1-10.

Capper, J. 2003. Complexities and challenges of integrating technology into the curriculum. *Techknologia*. January – March [online] Available: http://www.Techknowlogia.org

Creswell J.W. 2003. *Research design: Qualitative, Quantitative and mixed methods approaches* (2nd ed.). Thousand Oaks: Sage.

Desai, M., Hart, J., & Richards, T. 2008. E-learning: Paradigm shift in education. *Education,129(2), 327-334.*

Ellison, N. 2002. Facebook use on campus: A social capital perspective on social network. sites. Paper presented at the Sixth ECAR Symposium. USA: Boca Raton.

Hartley, J. 2007. Teaching, Learning and New Technology: a review for teachers. *British Journal of Educational Technology*, *38*(1), 42-62.

Hawkins, R.J. 2002. Ten Lessons for ICT and Education in the Developing World.http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan008676.pdf

Jenkin, T.2012. The rural development strategy of the government of national unity. Retrieved from: http://www.polity.org.za/govdocs/rdp/rural17.html.

König, J.,. Jäger-Biela J.D. & Nina Glutsch. 2020. Adapting to online teaching during COVID-19 school closure: Teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education,* 43:4, 608-622, DOI: 10.1080/02619768.2020.1809650

Lorente, L.M.L.; Arrabal, A.A.; Pulido-Montes, C. The Right to Education and ICT during COVID-19: An International Perspective. *Sustainability* 12, 9091. https://doi.org/10.3390/su12219091

Lubbe, S.I. & Klopper, R. 2012. Introduction to Research Design: An Interdisciplinary Approach (2nd ed.). Durban: Dolphin Coast Publishers.

Maatuk, A.M., Elberkawi, E.K., Aljawarneh, S. et al. The COVID-19 pandemic and E-learning: challenges and opportunities from the perspective of students and instructors. J Comput High Educ (2021). https://doi.org/10.1007/s12528-021-09274-2

Mahyoob, M. 2020). Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners. *Arab World English Journal*, 11 (4) 351-362. DOI: https://dx.doi.org/10.24093/awej/vol11no4.23

Maruping, T.E., & and Velempini, M. (2020). Main Barriers that Rural Schools are Faced with in Integrating ICT in Teaching and Learning. *PONTE e - Multidisciplinary Journal of Sciences and Research*, 76(1), 176 –190. DOI: 10.21506/j.ponte.2020.1.12

McLoughlin, C., & Lee, M. 2008. Social software and the World Wide Web – A paradigm for learning. Paper presented at the ASCILITE conference. Perth, Australia.

Muslikhah SE, 2020, The Challenges of Online Learning in Covid-19 Pandemic Era. Proceedings of the 6th International Conference on Social and Political Sciences (ICOSAPS 2020), pp 64-74},

https://doi.org/10.2991/assehr.k.201219.011, publisher Atlantis Press.

Pokhrel S, Chhetri R. 2021. A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, 8(1):133-141. doi:10.1177/2347631120983481

Ramzan, M. 2004. Does level of knowledge impact Librarians' attitude towards Information Technology (IT) Applications? 2nd International CALIBER 2004, Dew Dell:11-13 February

Tay, E., & Allen, M. 2011. Designing social media into university learning: Technology of collaboration or collaboration for technology? *Educational Media International*, 48(3), 151-163.

Tinio, V. 2002. ICT in Education: UN Development Programme. Retrieved from http://www.eprmers.org .

United Nations Educational, Scientific and Cultural Organization (UNESCO). 2003. Information and Communication Technology Education: A Curriculum for Schools and Programme for Teacher Development [online] Available: http://unescodoe.unesco.org/image/0012/001295/12953e.pdf

Wheeler, S., Yeomans, P., & Wheeler, D. 2008. The good, the bad and the Wiki: Evaluating student-generated content for collaborative learning. *British Journal of Educational Technology*, 39(6), 987 – 9