

Preparedness of Teachers and Learners in the integration of Information Communication Technologies in the teaching and learning of geography in selected schools of Petauke District of Eastern Province in Zambia

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Abstract: With the coming of Information and Communication Technology (ICT), there has been a realization for the need to have it incorporated in the education sector. This realization came as a result of the wide spread of ICTs in all developmental sectors of countries and the need to achieve Sustainable Development Goal (SDG) number 4 which emphasizes on quality education. With this realization, the Zambian government put in place measures to make possible the integration of ICTs in education. This study, therefore was an attempt to establish preparedness of teachers and learners in the integration of ICTs in the teaching and learning of Geography and in selected schools of Petauke district of Eastern province. A qualitative approach with a descriptive study design was used to collect data through in-depth interviews and observations. A total of twenty-eight (28) respondents were involved in the study and the information collected was thematically analysed with the guidance of Braun and Clarke's (2006) six phase framework. The findings showed that preparedness of teachers and learners to integrate ICTs in the teaching and learning of Geography was reliant on availability of ICT resources. Furthermore, it was established that school administration played a vital role in encouraging usage of ICT resources by both teachers and learners. This was because administration was responsible for maintenance and provision of ICT resources. Therefore, lack of proper maintenance as well as lack of adequate ICT resources proved to have had negatively affected the integration of ICTs in teaching and learning of Geography. The conclusion drawn was that to enhance effective integration of ICTs in the teaching and learning of Geography, teachers and learners need to be provided with adequate ICTs resources in their teaching and learning of Geography. It is also important for school management to provide adequate funding to enable its Teachers to attend workshops where they can gain skills and knowledge for integrating ICTs in the teaching and learning of Geography.

Key words: Education, Information Communication Technology, integration, geography

I. INTRODUCTION

The virtual world is growing vastly as ICT's replace traditional means of doing things. The world has evolved

to the extent that nearly every economic, environmental and social activity is somewhat dependent on ICT's, hence the need for a workforce that is ICT literate and able to stay up to date with modern changes.

The advancement of information technology in the education sector and society at large has given rise to demand for computer literate human capital. One way of ensuring this is through the integration of ICTs in high school subjects and Geography is no exception. Geography being a subject that consists of both natural science and social science is an important subject to learners as it prepares learners for their next level in life, be it tertiary, trades or industry. Therefore, to ensure that these learners have the relevant and up-to-date information and skills, ICTs must be integrated in the teaching of the Geography subject.

While ICT's have penetrated schools in the western countries in great numbers, most African countries have lagged far behind. For several years now, the African education system has been coping with a multitude of problems, such as funding and countries have had to make some hard choices, which generally do not attach much importance to Computer usage. These schools were still struggling with basics of computer processing. With time however, teachers soon got interested in Computer-programmed Teaching (CPT), an innovation developed in North America and Europe. This allowed the teachers in some African countries to offer instruction in certain subjects with the help of technology (Yong et al, 2016).

Zambia, like most developing countries has introduced the use of ICTs in schools at both levels, thus primary and Secondary. Where primary runs from grade one to nine, learners get to interact more with ICTs when they reach grade 8 and 9. At secondary level, ICTs are introduced on-the-go from grade 10 all the way to grade 12. The Zambian government having acknowledged the need for ICT's and via the attainment of Sustainable Development Goals (SDGs number 4) that demand for quality education, introduced ICT's in schools as

tools to enhance the teaching and learning experience (Ministry of Transport and Communication, 2006). The sustainable development goal number four, which is the educational goal, focuses on ensuring inclusive, equitable and quality education and promoting lifelong opportunities for all. To attain this goal, ICT's play a vital role in the education sector (Yadav, 2013). Due to this fact, all schools in Zambia are expected to have at least one computer laboratory from that houses ICT devices (laptops, tablets, desktops, televisions, radio, projectors and printers) and from which learners and teachers can access ICT services

In this 21st century, the use of modern information and communication technologies (ICTs) has greatly enhanced the excitement of geographical learning. This includes the use of communication networks, computers, software, digital data storage and audiovisual systems. Students can benefit greatly from appropriate use of ICTs, particularly geospatial technologies which support spatial thinking and also make the acquisition of knowledge more efficient and engaging (Catling, 2015).

A generation ago, teachers expected that what they taught would last their students a lifetime. Today, because of rapid economic and social change, schools have to prepare students for jobs that have not yet been created, technologies that have not yet been invented and problems that we don't yet know will arise. These technologies have not just become tools of learning, but networking and knowledge sharing, as well as innovation and entrepreneurship (Schleicher 2019).

ICTs specific to geography include data visualization tools and geospatial technologies. Data visualization tools can include graphing applications such as Microsoft Excel or Gapminder, infographics, and even 3D rendering tools such as Google Earth and SketchU. Geospatial technologies relate to data that is associated with key ideas unique to Geography that help students to make sense of the world, thus location, distribution, distance, movement, region, scale, spatial association, spatial interaction and change over time (Reinfried et al, 2007).

From a career perspective, geospatial technologies are also relevant as most professional geographers use them in some way in their practice. There is a rapidly increasing need for geospatial technologies and subsequently, geospatial professionals across the world. These professionals work in environmental management, mining, statistics, demographics, utilities, agriculture, defense and the public service. They use a broad range of technologies including remote sensing, geospatial mapping applications and Global Positioning Systems (GPS) (Schleicher 2019).

The use of ICT helps a lot in many different settings of learning geography. There are many benefits from the use of ICT in geographical education. The benefits of the use of ICT contribute to the attainment of objectives of geographical knowledge and also aim to attain the goals of education for sustainable education. Education for sustainable development in a sense that ICT helps to update information, to have access

in the latest results of sciences, and to re-correct any contradictions and wrong information that circulate (Ofsted, 2002). It is against this background that the study was conducted to establish preparedness of teachers and learners in the integration of ICTs in the teaching and learning of Geography in selected schools of Petauke district of Eastern province.

II. THEORETICAL FRAMEWORK

The theory of ICT integration as explained by the United Nations Education Science and Culture Organization (UNESCO, 2005) was adopted to guide this study. The integration of ICT has been studied by the UNESCO (2005) during which it developed the criteria for assessing the effectiveness of integration of ICT into the teaching and learning process. According to UNESCO (2005), if ICT is to be effectively integrated, the teacher must set high targets for their learners with clear descriptions of the objectives and how ICT's will help them achieve those goals. In addition, a good number of technological and assessment tools are to be well developed. Learner-centered approaches must to learning also is a must and learners must have access to adequate material and content to work with.

Conceptual Framework

This study adopted the Technological Pedagogical and Content Knowledge (TPACK) model as explained by Shulman (2004). The TPACK is a pedagogical framework to understand the different but related kinds of knowledge needed by the teacher for the effective and efficient pedagogical practice in a technological enhanced learning environment. It argues that the introduction and effective use of ICT in the geography classroom, requires teacher's understanding and negotiating the relationships between these three major components, namely, pedagogy, technology, and content. In order to integrate ICT in the geography classroom effectively, there has to be technological knowledge, content knowledge and pedagogical knowledge. According to Mishra and Koehler (2006) the TPACK model is the foundation of good teaching with technology and requires an understanding of the representation of concepts using technologies, pedagogical techniques that utilize technologies in constructive way to teach content, knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems students face.

Figure 1 diagrammatically summarizes the TPACK model.

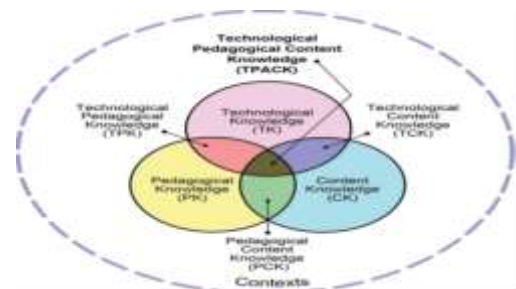


Figure 1: source: (Shulman, 2004)

III. METHODOLOGY

Study Approach

The study was conducted over a period of eight months within which participants were selected, data was collected and analyzed for presentation as well as documentation.

This study used a qualitative research approach. Aryet. al. (2010) concurs suggesting that qualitative research focuses on understanding social phenomena from the perspective of the human participants in natural settings. Qualitative research enables human thinking and reasoning for doing something to be matched and understood. Various human qualities that may be difficult to quantify can be studied better using the qualitative research method. That is why it is important for this study to find out ways in preparedness of Geography educators and learners to integrate technology in Geography, a qualitative research design was appropriate for this study.

Study Design

Research design is defined as a plan used to study a problem or question. In the same line, Orodho and Kombo (2002) define a research design as the scheme, outline or plan that is used to generate answers to research problems. Meanwhile, Msabila and Nalaila (2013:27) point out that a research design is a plan on how a study will be conducted or a detailed outline on how an investigation will take place. This research utilized a descriptive research design. Being a qualitative study, this research sought to identify characteristics, trends and categories as observed in the field, therefore, a descriptive design proved most appropriate for the study so as to attain the set objectives of the study (Creswell, 2015).

Target Population

Target population refers to the total number of items or units in any field of inquiry or the total number of items about which information is desired (Sidhu, 2009). In this study, the target population was all basic and secondary school teachers and learners in the selected schools of Petauke district of eastern province. This population was selected on the basis that this was where the phenomena under study had been observed by the researcher.

Sampling Technique

With reference to Kombo and Tromp (2006), sampling technique is that part of the research plan that indicates how objects are to be selected for the study. Sampling technique or procedure is the process of selecting units from the target population of the researcher's interest. A non-probability sampling method was used, specifically homogeneous purposive sampling. Scholars like Singleton et al (1988) note that purposive sampling is a type of sampling which is based entirely on the judgment of the researcher. In this technique, a sample is composed of elements which contain the most characteristic, representative of typical attributes of the population.

White (2003) observes that purposive sampling is based on the researchers' knowledge of the population and a judgment is made about which subjects should be selected to provide the best information to address the purpose of the research. Msabila and Nalaila (2013) add that purposive sampling involves nothing but purposely handpicking individuals from the population based on the authority or the researcher's knowledge and judgment. With regards to the study, homogeneous purposive sampling was used to select teachers and learners who taught and learnt Geography, respectively. Homogeneous purposive sampling is a purposive sampling technique that aims to achieve a homogeneous sample; that is, a sample whose units share the same or very similar characteristics or traits (Kombo and Tromb, 2006). Therefore, two teachers of Geography per school participated and five learners who took Geography as a subject per selected school were selected as participants in the study.

Sample size

According to Sidhu (2009), a sample is a small proportion of the population selected for observation and analysis. For the purpose of this study, four schools in Petauke district of eastern province were selected. Two primary schools, Mizyu primary school and Petauke primary school, as well as two secondary schools; Petauke Day Secondary School and Nyamphande Boarding. These schools were selected on basis that they were government schools which were connected to the national electricity grid and had been examination centers for over 10 years. This selection criterion ensured that the selected school were regarded as government-gazetted established schools. By selecting gazetted schools, the study ensured that findings were representative of most government schools

Primary schools were included on the basis that they had grade 8s and 9s who took Social studies in which Geography is a sub-subject. Two (2) teachers from each school participated giving a total of eight (8) teachers. In addition to this, five (5) learners from each school participated giving a total of 20 learners. The total number of participants therefore came to twenty-eight 28.

Table one summarizes the sample size of this study.

Table 1: Sample Size

School	Teachers	Learners	Total
Petauke Day Secondary	2	5	7
Mizyu Primary school	2	5	7
Petauke Primary school	2	5	7
Nyamphande Boarding Secondary school	2	5	7
Total	8	20	28

Source: field data, 2020.

Research Instruments

On the basis of being a qualitative descriptive study design study, this research mostly used inductive data collection methods which were unstructured interview guide and an observation guide.

Data Collection Procedures

Before commencement of the data collection, a pilot study was conducted whose purpose was to test the unstructured interview guide and the observation guide in one school which were not part of the sample but were equipped with ICT facilities which were used for teaching and learning. This was done so as to find out ambiguous or poorly worded items on the instruments which were to be amended afterwards. The pilot study generally served as an assurance of the reliability of the instruments and their outcome.

Individual based interviews were conducted to collect data. In order to determine validity of the interview findings, the data collected was verified via participant validation. According to Bergold and Thomas (2012) this technique involves testing initial results with participants to see if they still ring true. To attain this, this research had all interviews recorded on an audio recording device then later transcribed and presented to participants for validation before analysis was done.

Classroom and infrastructure observations was one of the two methods that was used to collect data on the integration of ICTs in teaching and learning of Geography in the selected schools of Petauke. Cohen et al (2007) suggest that the distinctive feature of observation is that it offers an investigator the opportunity to gather live data from naturally occurring social situations. In this study, non-participatory approach towards observation was used thus the researcher did not get involved or influence the observed so as to ensure accuracy of information. The researcher therefore, whilst being as unnoticeable as possible, observed teachers and learners as they utilized ICTs in the teaching and learning process during classes which were 40 minute sessions. ICT facilities were also observed so as to take note of the available ICT resources.

Using classroom and infrastructure observations as well as interviews showed a correlation of what was said and what was seen on the actual ground thus providing some form of triangulation to validate the collated data.

Data Analysis

The data collected in this study was analyzed by use of thematic analysis. Interviews were recorded and common themes were categorized and put together under each research question so as to enable qualitative content analysis (Bergold and Thomas, 2012). This thematic analysis was guided by Braun and Clarke’s (2006) six phase framework. Table two summarizes the analysis procedures.

Table 2: Six Phase framework for thematic analysis

Phase	Activity
Familiarization	Transcribed data, read and reread, and noted down initial codes.
Coding	Coded interesting features of the data in a systematic fashion across the data-set and collected data relevant to each other.
Generating themes	Assembled codes into potential themes and gathered all data relevant to each potential theme.
Reviewing themes	Themes were checked if they worked in relation to the coded extracts and the entire data-set so as to generate a thematic ‘map’.
Defining and naming themes	Ongoing analysis refined the specifics of each theme and generation of clear names for each theme was established.
Writing up	Appropriate extracts were selected, discussion of the analysis was done in relation to research question and literature and later on a report was produce.

Source (Braun and Clarke, 2006)

IV. FINDINGS

Description of Study Participants

The study had 28 participants and all gave both written and verbal consent to participate in the study. The study took place in Petauke district in four schools namely, Petauke day secondary school, Mizyu primary school, Petauke primary school, and Nyamphande boarding secondary school. Table 3 summarizes the description of participants that took part in the study.

Table 3: Description of study participants

School	Teachers	Learners	Total
Petauke Day Secondary	2	5	7
Mizyu Primary school	2	5	7
Petauke Primary school	2	5	7
Nyamphande Boarding Secondary school	2	5	7
Total	8	20	28

Source: field data, (2020)

The study included only teachers of Geography as well as learners of Geography as summarized in table 4

Table 4: Social Demographic Characteristics

Category		Learners	Teachers
Gender	Male	11	5
	Female	9	3
Academic Qualifications	Degree (BAEd)	-	3
	Diploma	-	5
Years of Service	0-5	N/A	4
	6 to10	N/A	2
	>10	N/A	2

Source: field data, (2020)

Among the participants of the study were eleven male learners and nine female learners along with five male teachers and three female teachers. Three of the teachers were degree holders and five were diploma holders. Two of the teachers who participated in the study had taught for over ten years and two others had been teaching for not more than ten years. The remaining four teachers had all been teaching for not more than five years.

Teacher's and learner's preparedness in the use of ICTs in Geography

The objective of this study was to establish teacher's and learner's preparedness in integrating ICTs in the teaching and learning of Geography in selected schools of Petauke district.

The study identified some ICT devices and facilities that were available in selected schools of Petauke district. Through observations and interviews, it was established that all schools visited had ICT facilities and devices useful for the teaching and learning process. The most common devices found in all the visited schools were; Computers (laptop and desktops), televisions (with DSTV subscription), radios, printers and internet facilities. However, one primary school did not have a projector, as it was damaged and has not been repaired since. This was because, according to one of the teacher participants, there were very few activities that required the use of projectors in primary schools. This was because only grade 8's and 9's needed such services.

Despite the availability of these devices, it was noted in all schools visited that there was a shortage of these ICT resources. The ratio of resource to user was not evenly distributed as there were drastically more users (teachers and learners) than the available resources. It was also observed that most computers available were outdated and were running on old operating systems.

The study established that there are various ICT devices and platforms being utilized in the teaching of Geography. Amongst these laptops, printers, tablets/iPads, projector and smartphones proved to be the most widely used ICT devices that are integrated in the teaching and learning of geography. However, it was observed and noted that there is little known knowledge on how to incorporate most geographical applications and software available on laptops in their teaching and learning process. Most teachers and learners during interaction with these devices only limited their usage to note taking, as one would do with a hardcopy book thus teachers had the concepts but lacked adequate pedagogical techniques that utilize technologies in constructive way to teach Geographic content. Therefore, learners did not attain the skill of manipulating information on these devices to attain the intended skill.

During the study, performance of the learner was measured by the daily and ongoing progression of the learner by the teacher. The teachers interviewed agreed to the fact that ICT's assisted in improving performance in both the learners and the

teacher's delivery of geography lessons. In the interviews, it was mentioned that ICTs made work much easier and faster. One of the participant explained as follows:

I use my laptop during lessons because its faster than having to write down notes on a piece of paper, it is even better when a projector is used so that learners can have access to accurate diagrams (Participant, T04).

Furthermore, it was observed that in all schools, there was a shortage of resources other than ICT devices, such as text books. This seemed to re-enforce the usage of ICT devices during lesson delivery. This was because the use of devices such as a projector during geography lessons meant completely cutting out time spent on drawing diagrams on the board. These drawn diagrams risk being inaccurate due to human error, therefore diagrams from text books placed in PowerPoint presentations proved accurate. Learners were also given a printed copy of the diagrams used in every lesson. Therefore, both the teachers and learners would progress at the same pace and this proved progressive. One of the teachers explained to say:

I am able to cover more syllabus content much faster now via the use of PowerPoint presentations and sharing files with learners through Email or WhatsApp. As a result, we have enough time to revise for the exams when the syllabus content is covered and this ultimately results in good results by pupils when exams are written (Participant, T07).

Learners also explained that they find learning Geography more interesting when ICT devices were used unlike the traditional chalkboard lessons, thereby improving their performance in the subject. The use of the projector to display notes made it easy for learners to know which areas to focus on when studying. Furthermore, learners preferred the use of ICT because it proved easy for learners who missed a class to catch up. This was because the PowerPoint slides were always shared through WhatsApp after the lesson through the class representative who later circulates the information to fellow learners. Those that had no smart device would have the information printed out, sometime by the teacher when they submitted their names and other times, they did it at their own expense from the market.

Administration's role in management of ICT devices and facilities in school

The provision and maintenance of ICT devices and facilities in schools was the responsibility of the school management/administration body. As such, they were the referral point for teachers whenever there were challenges being faced regarding ICT's. The teachers in the visited schools all expressed displeasure as to how the Geography section was neglected and how the ICT devices are not enough. The teachers explained that even with the few devices present, management failed to maintain the facilities adequately. One of the teachers explained this as follows:

Not until recently we had no computer lab and so we depended on our own personally owned devices. Its only recent that I manage to utilize a projector in class because we never had one as a school. The fact that this is a primary school with only two junior high classes, 8 and 9, the management was reluctant in acquiring computers till ICT was introduced as an examinable subject. So, thanks to that, even us Geography teachers have access to computers available (Participant, T01).

Teachers from the visited secondary schools had a similar argument. They explained that the computer laboratories were somewhat viewed as property belonging to the mathematics department. Therefore, when the Social Science Department, specifically the Geography section, requested for funds to purchase data bundles to conduct research, management was very reluctant in approving the budget which in most cases was declined. Furthermore, management neglected maintenance of the devices until exams were close because that's when ICT pupils would need the facilities most. This showed that the computer laboratories were not available to Geography teachers and learners as much as they could have been.

During interviews, a good number of the teachers commended their management over providing security for their ICT devices and facilities. One of the teachers expressed it as follows:

There is always a teacher in the computer lab whenever it is unlocked to ensure that nothing is stolen. There is also a security guard in school premises at night who secures the area at night times till morning when we report for work and so we have not recorded any loss of our ICT devices from theft (participant, T06).

Despite providing security for the devices, management in all schools visited found a challenge in maintenance of the ICT devices. All the schools visited schools never had technical personnel responsible for maintenance of these devices, the school instead depended on ICT teachers who had little knowledge on most hardware and software problems that were being faced. This lack of personnel knowledgeable in the fixing and maintenance of ICT devices or providing support in usage resulted to as one of the reasons some Geography teachers shunned the usage of ICT's in their lessons.

In view of maintaining sustainable use of the available ICT facilities and devices, school managements in three of the visited schools had purchased petrol propelled electric generators. These were purchased to curb the effect brought about by electric load-shedding currently ongoing nationwide. Therefore, the school management is further tasked to ensure that these generators were always ready to be used whenever needed, thus should have fuel at all times, which happened not to have been the case. Due to the high fuel prices, the generators are only available on "need to use" basis that is to say emergencies, thus Geography teachers and learners who

wished to use the computers during load shedding hours would have to wait until electricity was restored.

For one school visited which had no generator, the school management hires one from the market and this was costly. Similarly, the use of a generator was only on "need to use" basis. This situation had led to most teachers at that school refraining from the use of ICT's. As a result, both Geography teachers and learners at that visited school have little to no experience as to how integrate ICT's in their lessons.

V. DISCUSSION OF FINDINGS

Description of Study Participants/ Social-Demographic Characteristics

The study had 28 participants and all gave both written and verbal consent to participate in the study. The sample size was equally distributed amongst all four schools as illustrated in table three. This sample comprised of two teachers per school and five learners per school. The sample size was evenly distributed to ensure an equitable representation of findings from all four schools. The study further sought to fairly distribute respondents according to gender so as to tell if usage of ICTs is somehow gender dependent. However, this was not possible as shown in table four, there were more male respondents amongst both teachers and learners. This did not affect the study as there appeared to have been no indication assuming that the use of ICT was dependent on gender. The results of the study did not collaborate with a study by Hernandez (2017) who demonstrated that females had more positive attitudes towards ICT usage than males.

With regards to academic qualifications of teachers, there was no evident data showing a difference in skill or knowledge on content matter on Geography or integrating of ICTs with Geography. Both degree and diploma holders proved to have been at par with regards to competence and this was established during the interviews and classroom observations conducted in all four schools.

The number of years served by teachers in service proved to have had a slight impact on their willingness to utilize ICT resources. Mostly it was the teachers who had served less than five years who were more willing to use ICT resources. This is because this group of teachers were fresh out of collage or universities and were more exposed to the use of ICT resources as compared to the elderly teachers

Preparedness of teachers and learners in the integration of ICT's in the teaching and learning of Geography

The findings of this study revealed that the readiness of teachers and learners to utilize ICTs was very much linked to the availability, maintenance and cost of ICT devices and platforms as well as the skill set of both the learners and teachers. In most of the visited schools, it was observed and noted that ICT resources were very few and as such this demotivated most teachers and learners from using them so as

to avoid the scramble for the few available resources. The study revealed that most teachers had little knowledge beyond using ICTs such as Laptops for data presentation only disregarding data manipulations. The focus on this showed that despite their readiness to use ICTs, teachers were not fully utilizing these devices to the best of their potential hence falling short of what the TPACK model suggests in order to efficiently integrate ICTs in the teaching and learning of Geography. The teachers thus lacked the needed understanding to tap into the vast geographic capabilities that these devices may offer. Learners on the other hand proved to only mirror the teacher's knowledge and skill with regards to the use of ICTs in geography lessons. For this reason, learners too did not get the most out of the ICTs as they should.

Tezci (2010) argues that there is a significant correlation between the levels of knowledge about ICT and the use of ICT in education. His study revealed that the higher the level of knowledge on ICT, the higher its level of use in education. Another finding supporting this result is the significant differences observed between teachers in terms of their previous participation in a computer course. The study also showed that teachers who had participated in the computer course showed a positive attitude towards ICT use in the teaching and learning of Geography than those that had not participated in any computer course.

Furthermore, there was a tendency by teachers of not utilizing ICT's due to the overwhelming number of learners in class that made it difficult for the teachers to make illustrations on ICT devices such as computers. This was similar to Alshowaye's (2002) study that revealed that ICT provision and facilities in schools were found to be poorly equipped to deliver adequate ICT integrated lessons, not least because some still operated in buildings that were not purpose-built to serve as schools, shortages of computer equipment.

The findings of this study further showed that schools had financial challenges which hindered them from buying the various ICT devices and platforms. This challenge was also noted by Lako and Mubita (2021) who mentioned that schools and resource centers were constrained financially and funding to schools was less and erratic, reducing

The findings of this study further showed that both teachers and learners had limited knowledge on the use of various ICT devices and platforms. This was observed during class observation and further confirmed during interviews where teachers admitted to not knowing other geographically beneficial applications and software available on laptops, computers, tablets and smart phones.

The study further revealed that the school administration had a challenge maintaining ICT devices and this was mostly due to not having an ICT technician specialist within the school. As a result, maintenance cost is high due to hiring ICT technicians to fix or troubleshoot the ICT devices. According to Bingimlas (2009) ICT resources including hardware and software, effective professionals' development, sufficient time

and technical support need to be provided to teachers. No one component in itself is sufficient to provide good teaching. However, the presence of all components increases the possibility of excellent integration of ICT in teaching and learning opportunities.

In addition, the study discovered that some teachers had very little knowledge on integrating ICTs in their Geography lessons. Lack of knowledge by teachers was also noted by Mubita (2016) in school related safety issues. Despite having the basic know-how on usage of ICT devices, most teachers found it very hard indicating how the ICT device would aid the achievement of the geographic concept intended for the lesson. Learners' lack of exposure to various ICTs which translated to their lack of skill also proved to have been a challenging factor leading to ICTs not being used. This is so as some teachers felt the ICTs will grab the learner's attention and due to this curiosity of these devices, learners would miss out on the intended lesson concepts. This was observed during classroom observations where learners at some point completely shifted their attention of the geographical content and on to explore the functions that the ICT device had.

These findings are similar to the study in Chile by Claro et al, (2013) the findings revealed that the classroom observations did not reveal any innovative teaching strategies, related to the use of new technology. The study showed that amongst the main reasons for this traditional and sporadic use of the ICTs are a lack of targeted teacher training and preparation time, and insufficient technical and pedagogical support during the phases of implementation and integration to the pedagogical practices.

VI. CONCLUSION AND RECOMMENDATIONS

Conclusion

This study aimed to establish preparedness of teachers and learners in the integration of ICT's in the teaching and learning of geography in selected schools of Petauke district so as to ensure relevance of the Geography subject to the current and ongoing technological developments that are shaping the country's social and economic growth. The rationale was to find strategies to enhance effective integration of ICTs in the teaching and learning of Geography in the selected schools of Petauke district by exploring how ICTs are being integrated in Geography lessons so as to realize the benefits of ICTs.

From the findings, there proved to be very minimal integration of ICTs in the teaching and learning of Geography. It was established that no reliable pedagogy had been developed yet by teachers to meet the demands of ICT integration in a constructivist approach and teachers were still stuck in the pedagogy of yester years. The study showed that perceptions about the value of ICTs for teaching did not tally with the realities of trying to integrate ICT's in the classroom. This was evident with learners just as much as with the teachers. The findings point out that all respondents, teachers

and learners, were of the view that integrating ICTs in Geography lesson made it easy to teach the subject and for learners to grasp concepts easily. There were a number of barriers noted leading to the failure of effective integration of ICTs in Geography, some of these included limited ICT knowledge from the learners and the teachers, the cost of running and maintaining ICTs, power disruption, and the availability of ICT resources.

A paradigm shift is needed for both the teachers and learners to appreciate ICTs as learning tools and this is a process that calls for patience from all stakeholders to achieve full ICT integration

Recommendations

The study revealed that the application of ICTs can help prepare learners to be self-reliant after school. It is therefore, recommended there is need to set up Continuous Professional Development (CPD's) programs as well as workshops for Geography teachers to educate and train them on pedagogical skills that will equip them with strategies to effectively integrate ICTs in lessons.

The findings of the study show that some learners come from areas of Petauke with no electricity. In view of this, there is need for the ministry of general education to encourage government to speed up the on-going rural electrification process so that rural households may benefit from the being connected on the national electricity grid. Furthermore, due to the prolonged on-going electricity load-shedding, it can be recommended that there is need for the adoption of solar energy to replace electric generators as a source of electricity as it is less costly to maintain. Schools should seek partnership willing with dealerships in solar commodities rather than relying only on government funding to purchase or provide solar equipment. This will ease the expenditure on buying of fuel needed to run electric generators. This money would be best diverted to the maintenance and acquisition of more ICT devices.

The findings of this study also revealed that management in the four selected schools does not plan for unforeseen occurrences that would hinder the normal operations of the schools. In light of this it can be recommended that strategic planning be adopted that caters for possible unforeseen eventualities. This would include allocation of resources or funds to be used in such eventualities.

The study findings revealed that there was inadequate security to man computer laboratories as all the visited schools only had one security guard in school to man the whole school overnight. Therefore, it can be recommended that security measures be revised and more guards be employed to avoid possible theft and vandalism of ICT devices should also be put in place.

Suggestions for further study

This study focused only on government schools found in Petauke district leaving out private schools. Therefore, it was not established if private schools encounter similar challenges as government schools, this calls for further research.

Furthermore, this study was localised to only four selected schools of Petauke district therefore the findings cannot be entirely representative to schools in other districts and this calls for further research in other areas of Zambia.

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