

ANALYSING TEACHERS' SKILLS AND KNOWLEDGE IN THE USE OF ICTS FOR TEACHING COMPUTER STUDIES IN MALAWIAN SECONDARY SCHOOLS

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Abstract

The study investigated the instructional skills and knowledge of teachers for teaching Computer Studies in five secondary schools. A case study design was used to collect qualitative data using interview and observation. The population was Computer Studies teachers in secondary schools and ten teachers were identified as informants through purposive sampling. Findings revealed that most of those teaching Computer Studies were not qualified to teach the subject but were rather qualified to teach other science subjects such as Mathematics, Physical Science, Chemistry and Biology. Teachers' skills in using ICT instructional devices such as computers were found to be moderate. However, other teachers lacked hardware and software repair and maintenance of the ICT devices found in classrooms including computers. It was noted that many teachers were willing to undergo training to improve their computer usage skills for instruction and knowledge to advance their competence in the teaching of Computer Studies. The study recommends that government should implement strategies to improve the delivery of Computer Studies in secondary schools, upgrade short courses as well as provide adequate teaching and learning materials and equipment. Limitations of the study included the unwillingness of some participants to respond to questions and others declined to participate in data collection. The views shared are mostly from male participants, although deliberate effort was made to get a good number of female participants.

Keywords: Computer Studies, Teacher skills, ICT devices

1.0 Introduction

Information and Communication Technologies (ICTs) are essential tools for almost everyone in the world. This notion enhances the need for skills and knowledge in their usage in order attain full potential in solving problems. Again, ICT is currently undergoing tremendous advancements in many countries throughout the World. These developments have brought about the need for people to depend on ICTs and Internet in most activities and profession. Similar with other sectors, the education sector has seen an exponential growth in the use of ICTs for completing tasks (Batane & Ngwako, 2017; Henderson 2020). Curricula in most education levels has been changed to include studies in computers and their related

accessories. This development consequently demands skills and knowledge among the teachers of ICTs used to achieve quality delivery and learning in the classroom.

Studies among teachers have shown that teachers' knowledge of a subject, particularly the information content of that subject combined with the pedagogical content knowledge of the teachers themselves, do interact with the teachers' beliefs in delivering the subject (Redmond, P., & Lock, J. 2019; Ruohotie-Lyhty & Moate, 2016). As such, to improve skills in lesson organization and presentation, teachers are required to be resourceful in order to gain more knowledge about the ICTs they access. While teaching the computers, it may be important for teachers to concentrate on improving skills in using computers and their accessories for teaching and learning. Most of the studies conducted on teachers' instructional skills for Computer Studies have pointed out that it is complex to manage the teaching and learning using instructional technologies in the absence of proper knowledge and skills (Schmidt, 2016). However, an increase in computer literacy too has caused a growing interest in developing skills in the usage of ICT devices even among young children all over the world (Goldberg et al., 2013; Hazzan, Lapidot, & Ragonis (2020). The situation might be different in Malawi due to the multiple challenges the country is facing ranging from inadequate budget allocation to purchasing ICT devices by the Government, to the unavailability of enough specialist teachers for Computer Studies (Mkandawire, Mwanjejele, Luo, & Ruzagiriza, 2016). Since the introduction of Computer Studies in Malawian secondary schools in 2000, teaching and learning of Computer Studies has progressed with mixed experiences. Observations show that the Malawi Government made strides in providing infrastructure and equipment to prepare teachers for teaching the subject. Research indicates that the teaching of Computer Studies is marred with multiple challenges including lack of subject specialised teaching staff, lack of proper financial support, and the existence of poor teaching and learning structures (Adhikari, 2021; Yadav, Gretter, Hambrusch, & Sands, 2016). This notion implies that the teaching of Computer Studies might be a challenging task for teachers in the classroom practice. As such, the effective use of ICT for teaching and lesson presentation requires competency and knowledge (Cigdemoglu, Arslan, & Cam, 2017). Teachers are expected to demonstrate competence in teaching Computer Studies with extensive knowledge and skills of the subject they are teaching to build their self-efficacy.

Malawi as a country needs technologically literate citizens who are prepared to participate in the development of the country (Malawi National ICT Policy, 2013). The Government of Malawi is determined to build a very skilled and computer literate nation for the future. However, it is still hard to predict how skills in the usage of ICT devices in teaching and learning among secondary school teachers in Malawi will develop. Therefore, understanding what it means for teachers to be skilled in ICT and to be knowledgeable in Computer Studies as well as pedagogical content may help determine the future of Computer Studies as a subject that forms the foundation of technological interests among the youths in Malawian secondary schools. In this case, teachers have the responsibility to apply both their pedagogical content knowledge (PCK) and subject content knowledge (SCK) as they teach their students (Belo, McKenney, Voogt, & Bradley, 2016; Hill, & Uribe-Florez, 2020).

There are various challenges influenced by the misunderstanding and lack of knowledge and skills of technological innovations such as ICTs. This development induced researchers to explore other ways of simplifying the learning and use of technology particularly in the social networking world (Fressoli, Smith, & Thomas, 2014). In developed countries, most people including teachers continue showing interest in improving their knowledge and skills in lesson delivery and presentation using ICTs (Huang, Cotten, & Rikard, 2017). This has helped teachers to gain skills in using computer applications in teaching and learning. Of recent, teachers have widely adopted the use of ICTs such as computers and the Internet for instruction (Crallet, Ismail, & Manyilizu, 2016). This notion reinforces the need for teachers in various disciplines to master necessary computer skills required for them to achieve during lesson presentation (Noor-Ul-Amin, 2013). However, not everyone is interested to use ICT during lesson presentations. This is more commonly noticed in the African context and can be attributed to the limited availability of ICTs and the Internet. Therefore, many teachers tend to refrain from using these ICTs unless their institutions encourage them to do so during lesson presentation.

Cotten, Huang, and Rikard (2017) found that accessing computers regularly in homes and offices makes people learn faster and easier than accessing the computers only at designated times and at designated places. Coupled with access, Reynolds and Chiu (2016) claim that engagement in game design lessons and usage of social media has a potential to close the digital inequality gap among the youth. Again, the findings by Delello and McWhorter (2017) supports the fact that frequent usage of ICTs has the potential to improve knowledge leading towards linking community members through social networking. It can therefore be argued that people capable of using computers all the time have quick and practical access to information research than those who access computers only from designated places such as computer laboratories or libraries. This implies that when teachers have a continuous access to computers and the Internet, they will likely improve their computer skills and consequently grow in confidence and self-efficacy as they teach Computer Studies.

An increased need for ICTs in education and the corporate world has prompted many governments to introduce courses that teach people how to effectively use ICTs. In Africa, Computer Studies in secondary schools were introduced as early as the year 2000. For instance, in countries like Botswana, Computer Studies were introduced into both secondary schools and primary schools in the year 2001 (Batane & Ngwako, 2017; Kabita, 2004). Nevertheless, the Government of Botswana realized the need to prepare school teachers for teaching the subject which was by then newly introduced. The preparations included teachers' formal training in the usage of computer to help them in teaching and learning (Kabita, 2004). Similar initiatives were done in Ghana (Buabeng-Andoh (2015), Kenya, and Tanzania (Komba & David, 2016). Computer and ICT Studies were introduced in the secondary schools' curriculum and through government initiatives that empowered teachers formally prior to their career engagements.

In Malawi, the Government introduced Computer Studies into senior secondary schools all over the country with less effort in preparing teachers for teaching Computer Studies as a

subject (Chikumba, 2010). According to Chikumba, there were little efforts to provide appropriate infrastructure and equipment specifically meant for teaching Computer Studies in many secondary schools, such as equipped computer laboratories. The action taken by the Government of Malawi to introduce Computer Studies in secondary schools may be seen as a direct response to the then-established policy documents such as Malawi Vision 2020 rather than a carefully designed initiative. The government felt the need to implement Malawi's expectations to make science and technology literacy bear fruits among Malawians as quickly as possible come the year 2020. According to Chikumba (2010), soon after the introduction of Computer Studies, some teachers were given training in the use of ICTs with the help of donors. However, there is no empirical evidence to show that teachers were given formal training to acquire skills to use ICTs such as computers, smart boards, and video cameras etc. in teaching Computer Studies as a subject. It may be argued that Computer Studies in secondary schools cannot be meaningful to Malawian students unless teachers are given adequate and specific training in the use of technology for education purposes (Gielnik et al., 2014).

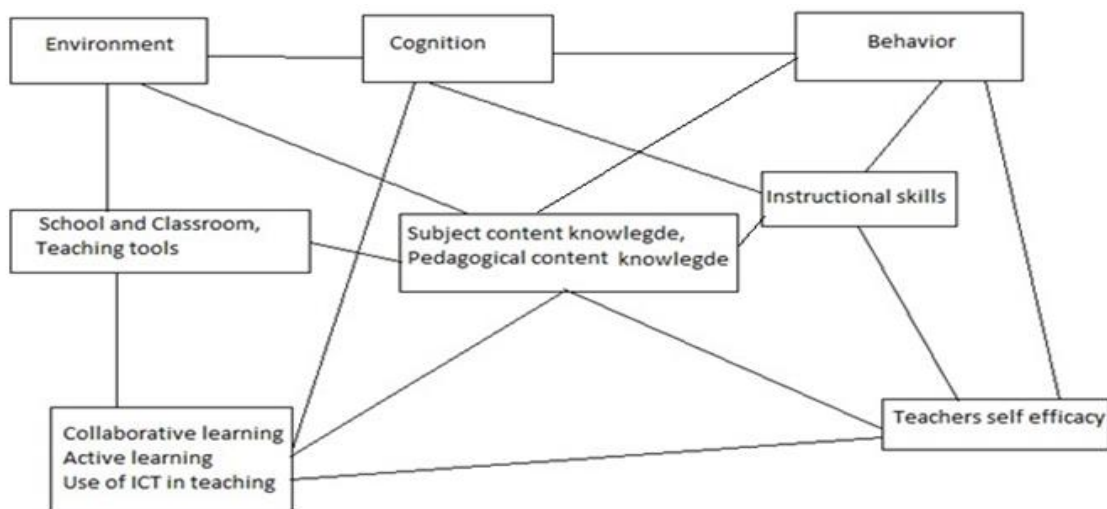
Several studies on computer literacy, computer education and ICT, have been conducted in Malawi over the years by different people and organizations (Banda & Chikumba, 2013; Chikumba & Msendema, 2014). However, not much has been said about skills in using ICT devices in teaching and learning Computer Studies in Malawi. This study will contribute to the knowledge gap between teachers' computer knowledge content (as provided by text books, teachers' guides and syllabuses) and teachers' skills in using ICT devices in teaching and learning. An understanding of this relationship will help to determine whether secondary school students learning Computer Studies have the potential to develop in both creativity and skill in using instructional technology like computers, videos, smart boards, Liquid Display Projectors (LCD), printers, and the Internet.

2.0 Theoretical framework

The phenomenological design was engaged in this study to understand teachers' instructional skills in Computer Studies in secondary schools. As such, among many theoretical lenses, this study used the Social Cognitive Theory (SCT) to explore teacher practices in instructional skills and knowledge used for Computer Studies in secondary schools. The SCT was specifically chosen because it was widely applied in different fields (Cheng & Chu, 2014). According to this SCT, learning occurs when individuals observe the behaviour of an individual within a social setup (Noe, Wilk, Mullen, & Wanek, 2014). An application of the Social Cognitive Theory will among other things help to elaborate how teachers' instructional skills in Computer Studies can take part in problem solving and career development. Teaching and learning require social interaction and participation of both teachers and learners (Lanegård, Kiani, Nielsen, & Svensson, 2021; Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2014). Therefore, the SCT helped to recognise the source of teachers' knowledge on the subject content, and pedagogical content knowledge and also by examining the behaviour of the teachers among one another.

Teachers are regarded to be the facilitators of learning and they are believed to be the best in making suitable choices of the methods of instruction appropriate to the learners. Therefore, to be able to choose the best instructional method, teachers may be required to learn from their colleagues as to what the majority of teachers think works better. However, teachers may be required to develop different teaching techniques and find ways on how to promote teaching and learning. Figure 1 explains how environment, cognition and behaviour are linked together to influence teaching through social cognitive.

Figure 1: Theoretical Grounding



According to Kola and Sunday (2015), teachers' PCK alone has proved to have the ability to strengthen the capacity of teacher's subject content knowledge capacity. Therefore, it may be suggested that teaching of Computer Studies may not depend on knowledge alone but rather a combination of both PCK and SCK. As such, matters concerning teachers' teaching experiences, knowledge of the subject content, teaching styles and assessment mechanisms may require proper coordination to make teaching effective.

The elements in Figure 1 help to explain the major issues that might be used to improve teaching of Computer Studies in secondary schools. Within the context of teaching Computer Studies, it is believed that PCK facilitates the establishment of a link between the instructional methods which a teacher chooses to follow during lesson presentation and the way students will understand the lesson itself (McNeill, González-Howard, Katsh-Singer, & Loper, 2016). On one hand, the SCK is believed to be essential in addressing challenges of teacher self-efficacy during lesson presentation (Yerdelen-Damar, Boz, & Aydın-Günbatır, 2017). For instance, a teacher's knowledge of ICT is believed to be cognitive instrument for transforming knowledge during lesson presentation if properly used in teaching and learning (Chai, Koh, Lim, & Tsai, 2014). Therefore, it can be suggested that teachers' level of subject content knowledge will influence the teachers' choice of the most appropriate instructional method that

engages learners in knowledge construction. However, a teaching and learning environment that has enough learning materials may be claimed to encourage learners to participate freely with motivation. Therefore, teachers' PCK and SCK will work best in an environment where teaching and learning is done collaboratively with learners (Yücel & Usluel, 2016). As such, learners' ability to understand concepts and practical components of Computer Studies may depend on getting a good lesson from a favourable learning environment and taught by a competent teacher.

Again, teachers' behaviour during classroom activities and his/her character towards fellow teachers can be influenced on one hand by the teacher's status of PCK and SCK. While in the same line, research also claims that teachers' self-confidence and interpersonal behaviour has been observed to promote learners' engagement during classroom activities (Alevriadou & Pavlidou, 2016). As such, teachers PCK and SCK will likely guide the teachers through the choice of the best style of instruction that best suits the available teaching and learning materials. In summary, it can be said that created relationships help teachers' understanding instructional skills when they teach Computer Studies in secondary schools. The relationships have a potential to help determine whether Computer Studies teachers are able to find ways of promoting their instructional skills on their own to improve lesson presentations.

3.0 Literature review

The term ICT is used to describe technologies for sharing information among people. ICT is linked with devices such as computers, radios, satellites, smartphones and almost all devices and gadgets which people may use to deliver messages instantly and correctly and to simplify works (Ciroma, 2014; Garkushenko, 2018).

In this era of information sharing, ICT and computer technology has become the backbone of operations in almost every sector including education. Literature indicates that ICT has dominated the education sector through adult learning and e-learning systems and teaching (Chinapah & Odero, 2017). Many scholars have concluded that ICT usage and adoption in the education sector have directly or indirectly influenced the effectiveness of learning by adding other aspects of teaching designs different from the old styles used before the inception of technology in schools (Adam & Tatnall, 2017).

However, while many developed countries have worked hard to improve the use of classroom technology by teachers, some critics argue that it is challenging for developing countries to implement ICT programmes in education due to inadequate resources and unavailability of proper infrastructures suitable for ICT development (Bariu, 2020; Chinapah & Odero, 2017). Therefore, to ensure that skills owned by teachers in the use of computer technology are transferred to students, teachers need to be well trained as professionals in this field of Computer Studies or in case of those teachers that have no Computer Studies qualifications, to be given suitable training.

In addition to these proposed training and professions, there are those teachers who are already well qualified in the Computer Studies field. These teachers ought to be empowered

with pedagogical skills and knowledge to ensure that they are assistants to their counterparts who are less knowledgeable. Empowering teachers will enhance their ability to provide a wide choice of learning techniques. Again, there are other benefits attached to giving of support to fellow workers in an organization. These may include improved workers relationships, group interaction, and improved problem sharing (Dixit, S., Stefanska, A., Musiuk, A., & Singh, P. 2021). Velmurugan, 2016). Many people feel secured and stable when they get support from their fellow workers on issues that bother them at their workplaces.

Teachers all over the world play an important role in informing learners of the new discoveries in life and in education. Computer Studies and ICT require much more skills and knowledge in order to work with them comfortably. Today, the application and use of ICT devices in the classroom environment has seen the replacement of many traditional tools such as chalkboards replaced by smart boards, and projectors. This paper is centred around two terms; computer literacy and skill. As such, it is unavoidable to mention the relationship between computer teachers' skills in using ICTs in teaching and learning and computer literacy itself without making clear definitions about these terms.

An understanding of the above concepts is helpful as it links the meaning of teacher's instructional skills with teaching. There are however, mixed views in the understanding of teachers' instructional skills especially when delivering a Computer Studies lesson. Teachers' competence in ICTs is characterised the ability to the use for instance a computer to solve daily problems. Specifically, Claro et al. (2012) describes ICT skills as the capacity to solve problems of information, communication and knowledge in digital environments. It is argued that, employing several skills, techniques and strategies in effectively delivering Computer Studies lesson enables teachers to build self-efficacy and approach issues with confidence (Yeşilyurt, Ulaş, & Akan, 2016). However, it is assumed that teachers' ability to use ICTs in lesson presentation is supported by teachers' ability to understand the general concepts of how ICTs work and also teachers' knowledge of the existence of Computers and other devices that are suitable for education purposes.

In summary therefore, Information and Communications Technologies are tools that bridge between individuals' ability to carry out essential activities in life and quality work. On the one hand, a secondary school teacher has the duty to understand how Computers and other devices operate in order for them to make concrete judgements on which ICTs are best for a particular topic. This might help teachers in developing appropriate methods of teaching and assessment related to values and technological needs of the students (Sayah, 2013). On the other hand, teachers' failure to include ICT in teaching and learning has been attributed to a number of factors such as lack of competences and interest in using ICT and software applications by many teachers (Ahmad, 2014; Mynaříková, & Novotný, 2020).

Another factor influencing limited or underuse of ICTs for instructional practices is the teachers' failure to choose appropriate and strategic teaching methods in Computer Studies lesson planning (Bukar, Bello, & Ibi, 2016). When teachers who teach Computer Studies in secondary schools gain experience and full knowledge about how computers and related ICTs

are used, operated and even repaired, including software applications, they stand a chance to flexibly decide the best practices in instruction for their students (Kale & Goh, 2014).

It has been argued that despite teachers knowledge on ICTs operations, external factors such as the design of the school curriculum have a bearing on how teachers put into practice their skills and knowledge into teaching and learning of Computer Studies (Rana, 2016). Nonetheless, knowledge of both pedagogical content and how ICTs are being operated complement one another and give the teacher confidence for teaching Computer Studies. Teachers' knowledge of the available ICTs for instruction such as laptops, smart phones and Tablet PCs, smart boards, projectors, education software, may have an impact in deciding if the institution or learners can afford to buy the devices for use in schools. Studies indicate that using ICTs such as iPads, in teaching and learning has helped teachers develop new ways of organizing teaching and learning programs effectively (Burbules, Fan, & Repp, 2020; Pegrum, Howitt, & Striepe, 2013).

4.0 Methodology

A qualitative approach was used in an attempt to investigate the knowledge and skills in the use of ICTs for instruction in secondary schools when teaching Computer Studies. A case study design was appropriate to understand teachers' instructional skills for teaching Computer Studies in secondary schools. A case study is as a qualitative research approach that focuses on a single unit, group, organization or community (Ary, Jacobs, Irvine, & Walker, 2018). In this study, the problem of teachers' knowledge and skills in using ICTs for Computer Studies lessons delivery was studied in detail in the five secondary schools in Lilongwe City namely: Chipasula, Bwaila, Likuni Boys, Chinsapo and Lilongwe Girls.

Purposive sampling was used to identify skills and knowledge of the teachers. The choice of teachers at each school was based on the nature of their work (subject they are teaching) and the work station. Again, the schools were purposively selected. As such, schools in Lilongwe City which were within the proximity and accessibility from where the researcher lives were selected. The schools identified were day secondary schools (operating double shift system where one group of students attend classes in the morning hours while another group attend classes in the afternoon hours) and boarding secondary schools. The sampled schools included one secondary school that had all girls' students and one school had all boys while the rest of the schools had both boys and girls as students.

The research also considered issues of gender by looking at how many male teachers taught Computer Studies and how many female teachers taught Computer Studies in the schools. It was observed that only one female teacher emerged. Her views were very critical and enhanced the understanding of how the particular teacher used her skill and knowledge to deliver Computer Studies. Apart from gender, the criteria included age of the teachers in relation to their experience in teaching Computer Studies and teacher qualification.

This study used two instruments for data collection. These instruments are interview guide and observation. The interview guide included semi-structured questions designed in such a way that the respondents find it easy to answer. The interview guide questions were arranged in the order of relevance to the objectives of the study. All data was collected from the teachers on a face-to-face basis while at their respective working places. Prior arrangement was made by applying to the schools' head teacher explaining the intent to collect data from their members of staff. This again followed another request to the individual teachers inviting them to participate in the data collection exercise.

5.0 Findings and discussion

5.1 Emerging themes

Teachers' skills and knowledge in the use of ICTs for teaching Computer Studies were analysed. The interview provided a guide to themes that emerged through interviews and observations. The most prevailing issues raised by the teachers included Computer and ICTs' operational skills and knowledge and teachers' interest in the use of ICTs for teaching. The purpose was to give out a clear understanding of the general issues related to how teachers' skills were affected both negatively and positively.

5.2 ICTs Operational knowledge and skills

The most prevailing issues in all data were the outcry of teachers in terms of their proper knowledge in Computer and ICTs. Many teachers acknowledged that they were not professionally trained as Computer Studies teachers. However, they had the knowledge of computer either from reading library books and internet. Therefore, teachers needed proper support by the government to send them for a professional training course in Computer Studies so that they obtain a proper qualification to teach the subject. Following the attainment of their qualification they will have to be provided with regular refresher courses and seminars to strengthen their professional knowledge in the subject of Computer Studies (Ahmed, Arshad, & Tayyab, 2019).

The Knowledge of ICT is changing rapidly hence teachers need to be up to date on the trends in ICT and computer world. However, teachers' inadequate knowledge and skills is a serious challenge both in usage of ICT at secondary schools level (Bingimlas, 2009; Sabiri, 2020). The government may be required to take care of its existing teachers by creating an opportunity to enrol them into a training course that will give a qualification in Computer Studies. However, it may be argued here that seeking knowledge is not necessarily attributed to government alone or to any other organization, but rather it is the responsibility of the teachers themselves. According to Fu (2013), it is observed that learning of ICT no longer depend of printed materials and a classroom setup. People have access to education any time through internet where knowledge can be acquired through various forms.

5.3 Interest in the use of ICT

Many participants reported that they faced various challenges in their work as Computer Studies teachers enough to reduce their interest in the subject. For example, some participants reported that they lacked confidence while others reported that they felt they were not the right people to teach Computer Studies unlike their colleagues who were purely subject teachers

e.g., mathematics and sciences teachers. In the end they were not excited and their interest in the subject was compromised. Consider Excerpt 1:

I teach this subject because there is no teacher to teach not that I like it. I have 12 years' experience in teaching mathematics and physical sciences. When there was no teacher for Computer Studies, I decided to take it and teach the students. Therefore, we need more qualified teachers.

There were however some exceptional cases where other teachers were interested in to teach Computer Studies but on condition that they be provided with relevant training and teaching materials for Computer Studies. Teachers' interest in the use of ICTs, just like most elderly people has been believed to lead to a development of self-directed learning and resurfacing of other skills both in the use of computers and ICTs (Vacek & Rybenska, 2015). Bingimlas (2009) found that lack of interest in ICTs by teachers contributes to lack of confidence, lack of competence, and inadequate access to resources. According to Bingimlas, these factors are rated as the main challenges affecting the integration of ICTs in schools. Therefore, it is important that teachers be encouraged to access and engage with ICTs to build their confidence and discover more learning grounds. This implies that government should initiate and ensure that schools are adequately resourced with ICT software and hardware, training for career development, and other positive re-enforcement activities.

5.4 Experience and age of teachers

There were mixed feelings based on teaching experiences and the age of teachers. For instance, the teachers with more years of teaching experience accepted that they were not originally qualified to teach Computer Studies. It was noted that, some young and less experienced teachers were qualified to teach Computer Studies. These qualified teachers however complained that their workload was too heavy, and teaching was challenging due to lack of basic required materials. Consider Excerpt 2

Most of the available computers are not working ...they completely need changing some of the motherboards...and if you spare time repairing them, you end up losing time to prepare lesson. So, there is too much work to make this subject outstanding.

Experience in teaching has been related to the development of critical thinking because an experienced teacher is believed to play a very big role when it comes to solving problems (Bailey & Mentz, 2015). However, it may be argued that experienced teachers have a difficulty to accept and implement changes in the new teaching and learning strategies despite their wish to develop their career due to lack of confidence, beliefs and attitudes towards computer and ICT. Bailey and Mentz (2015) observed that many elderly and experienced teachers do not seem to understand the importance of adopting new technologies in their teaching profession. This was reflected in this study whereby experienced teachers particularly those who had taught for as long as 12 years had many complaints that could force the government, (if presented) to cancel teaching of Computer Studies in Malawi Secondary schools. Therefore, these findings

demonstrate the teachers' loss of confidence in the future of Computer Studies in Malawi's secondary schools' education.

5.5 ICT teaching skills

Many respondents in this study felt that teaching of computer studies requires hands-on knowledge and skills in using computer hardware and software. However, teachers were not satisfied with the current skills and knowledge they possessed while teaching Computer Studies. Teachers who had the ability to handle some of the necessary computer software packages and operating systems felt the need to go further than that level. They felt the need to be exposed to more professional and advanced skills so that they can apply the skills in teaching and be able to impart these skills on to their learners. However, teaching of Computer Studies can only be meaningful if teachers were equipped with adequate knowledge in the use and application of ICT devices for instruction. Excerpt 3 states that "I have pre-requisite knowledge of the subject matter but need more training to increase and advance my skills". Therefore, a teacher is expected to be knowledgeable and conversant with at least the basic skills in ICT and computer. Literature suggests that basic skills in computer includes the ability to switch on and off a computer, ability to manage electronic files, manage data base, create and save information and manipulate other files using graphics or built in software packages such as office and internet packages (Mendonça, Crespo, & Simões, 2015). The teachers in this study were found to have adequate knowledge in the basic computer and ICT skills. However, their responses indicated that they still needed to be trained in the advanced Computer knowledge and skills particularly in programming languages and website development as well as pure hardware and software maintenance. Computer Studies teaching skills as a main theme produced sub themes such as infrastructure, usage of ICT devices and troubleshooting. These sub themes were seen to be directly linked to the main theme of Computer Studies teaching as follows:

5.6 Infrastructure development

Teachers raised concerns over the teaching environment and infrastructures such as computer laboratories and computer maintenance workshops. All schools where Computer Studies was being taught were equipped with computers and connected to electricity power supply. However, other facilities such as continuous internet connectivity were not seen. Issues of connecting secondary schools computers to internet are a common challenge all over Africa (Adeleke, Lawal, Adio, & Adebisi, 2015; Egielewa, Idogho, Iyalomhe & Cirella (2022). The situation is not different from that in Malawi where in many schools one can hardly find uninterrupted internet connectivity. Therefore, it may be necessary for the government to make it a priority in the supply of computers in secondary schools other than engaging itself in purchasing internet bundles for use in schools.

5.7 Use of ICTs practices

Many teachers said that they were not completely familiar with the skills needed to trouble shoot these devices whenever they malfunctioned. Therefore, using the devices alone may not be enough but they believed they required some technical skills to be able to manage

them if at all possible. Accessibility to suitable devices for teaching and learning may require that the government provides enough resources to purchase these devices for use by teachers during lesson presentation. Excerpt 4 says “Our time is limited, and we are not technicians to start repairing these broken devices. It is the responsibility of the school management to take care of the damaged equipment”. Teachers may not give good guidance to school management on what type of ICT devices should be purchased unless they are well knowledgeable on the functions of the devices and how to use them. One of the major challenges teachers face as they use these ICT devices, is failure to carry out maintenance works when the devices malfunction. That is where teachers require special training in at least the basic knowledge in maintenance and troubleshooting (Saud, Kamin, Latib, & Amin, 2018; Sikhakhane, Govender & Maphalala, 2021). During data collection, many teachers found it time consuming to start maintenance of broken computers instead of concentrating on sourcing information to teach students. As a result, many functional computers, and other peripherals such as malfunctioned mouse, keyboard, computer main boards, hard disks, printer/scanners, etc. could not be maintained.

5.8 Troubleshooting and repair of computers

Computer skills may be extended to issues related to faults during the use and during teaching of computer studies. One notable example is when the computer is attacked by viruses and or fails to reboot properly. These are minor cases that computer teachers should be able to solve. However, many computer teachers failed to confirm they had repair and troubleshooting skill except for a few who were able to state that they repaired damaged computer hardware and software by installing new packages whenever they faced abnormalities. Excerpt 5 states “I usually update the antivirus software regularly. I also install operating systems when the computers fail to operate.”

Therefore, teachers’ skills in the use of ICT devices in instruction were found to be moderate since many teachers reported that they were not familiar with general repairs of the ICT devices or general maintenance of the ICT devices found in classrooms. The challenge by teachers to fail to repair or troubleshoot computers and other ICT devices was also observed by Correos (2014) and Simbeye, (2020), in which it was claimed that in the absence of ICT troubleshooting experts, ICT devices are left unused until such a time when an expert is hired to fix the devices. This is a big problem especially in Malawi where reliable ICT experts are not commonly available besides that the available ones are usually expensive to hire. Therefore, it is common knowledge that teachers handling computer Studies be equipped with adequate knowledge to troubleshoot and maintain ICTs in schools.

6.0 Conclusion and recommendations

The study established that the knowledge of computer studies teachers use of ICTs in selected secondary schools in Malawi was diverse. Teachers differed in their technological and pedagogical content knowledge. This observation created a difference in teachers’ competences in usage of ICT for teaching computer studies. Further, it was observed that, not all involved teaching computer were qualified teachers for the subject. Most of the teachers

were graduates of pure Computer Sciences not teachers or graduated from other departments who were specialist in especially other science subjects. Furthermore, it was established the schools' computer laboratories had few computers working due to minor faults which easily be attended to if the teachers had received adequate training. Related to availability of ICTs was the lack of other amenities like the Internet. This situation limited the use to full potential of the available ICTs. Another issue that limited interest to teach computer studies the high workload for experienced teachers who were willing to support the teaching of computer studies.

In view of the findings above, we recommend that the Government should ensure enforce policy on using qualified and competent teachers to handle computer studies. However, the curriculum and training should be tailored towards subject content, professionalism and building skills in handling ICT related devices. The teaching of Computer Studies should be addressed right from the college level or from the Teacher Training Institutions. The curriculum at Teacher Training Institutions should support and include advanced skills and knowledge in ICTs software and hardware related devices for use in a classroom. Again as a recommendation, the government should set aside measures that are aimed at giving full support to teachers in terms of provision of teaching and learning materials such as the Internet in entire secondary schools' education sector.

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