The Effect of Teachers' Technological Skills on Learning Outcome of Lower Primary School Pupils in Mumbuni Zone, Machakos Sub-County in Machakos County, Kenya

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Abstract

The aim of this study was to assess effect of teachers' technological skills for implementing the Competency-Based Curriculum in lower primary on learning outcome of pupils in Mumbuni Zone, Machakos Sub-County in Machakos County. To ensure accessibility, retention, and completion of primary schooling as per Sustainable Development Goal (SDG), free primary education (FPE) was implemented in 2003. The government intended to ensure that everyone acquires the knowledge and skills necessary to promote sustainable development as per the SDGs. The persistent campaign by worldwide communities to persuade countries to respect human rights and meet basic needs has been one of the major issues of the 21st Century. Smith's theory on structural functionalism informed this study. The study adopted descriptive survey design. A target population of 24 public primary schools, 24 head teachers and 72 teachers in lower primary schools were used. A sample size of eight head teachers and 21 lower primary teachers were selected for the study based on a simple random sampling of 35% of the targeted population. Interviews and questionnaires were used to get the information. Data was collected after acquiring permit from NACOSTI. Data was analyzed both qualitatively and quantitatively. Descriptive analysis was used to analyze quantitative data with the use of Statistical Packages for Social Sciences (SPSS Version 27) in frequencies and percentages and presented using tables and pie charts. Expert judgment was used to improve the validity of the research instruemnts. The reliability of the questionnaire was established through Pearson Product moment correlation. The study found that most of the lower primary teachers (97.8%) were ready to execute CBC, which positively impacted lower primary students' learning. The study also found that a fair percentage of lower primary teachers (69.6%) were not frequent users of the technology in executing their duties in implementing CBC. Notably, the study also noted that malnutrition was directly correlated to cognitive development, thus significantly affecting the learning outcome among students in lower primary schools within the Mumbuni zone. Based on the findings, the study recommends that teachers need training through in-service

training, seminars, and workshops for successful implementation of CBC and positive learning outcomes. Teachers should receive ICT training and be given the necessary tools to apply the curriculum in the classroom.The research concluded that teachers' technological skills significantly influenced learning outcomes of lower primary pupils in Mumbuni Zone, Machakos Sub County Machakos County.

Key Words: Technological Skills, teachers' technological skills, Pupils, Competency-Based Curriculum, Curriculum Implementation, Lower Primary, Learning Outcomes.

1. Introduction

Information Communication ansd Technology (ICT) in education is seen as a means of increasing access to education especially to the rural population and making teaching and learning enjoyable. Different studies have supported the use of ICT in education as an enabler in the process of teaching and learning by assisting the learners to grasp concepts that would otherwise have remained abstract (Kozma, 1991). A term that defines people's willingness to employ technologies to attain goals is "technology readiness" (Buabeng-Andoh, 2012). The ability of instructors to integrate technology into their lessons depends on their awareness, familiarity with its usage, views of it, attitudes toward it, and experience with it. The willingness of instructors to incorporate technology is influenced by various factors, according to a review of recent studies. The use of ICT in education has been widely advocated as much needed 21st-century skills by governments and policymakers. Nevertheless, several challenges in integrating ICT into the curriculum have been reported in previous research according to Murithi and Yoo (2021). These elements include the teachers' personality traits, their topic expertise, technology considerations, and their organizational skills. These elements, which can come from the outside world or a teacher's traits, can either help or impede teachers' use of technology. When introducing technology in classrooms, several scholars, including Curtis, (2013), recommended that four things be considered. These are associated with institutional, organizational, technical, and individual aspects. Other variables, such as teacher technical abilities, teacher confidence, pedagogical teacher training, inadequate access to ICT, the structure of educational systems, and limiting curriculum, were also mentioned by Buabeng-Andoh (2012).

Through the use of a variety of digital tools, including desktop computers, laptops, digital cameras, mobile phones, and smart boards, digital technology enables students and instructors to connect with the curriculum (Du Plessis & Webb 2012). When properly included in the curriculum and education, these technologies significantly improve learning. Through the use of innovative techniques for data collection and recording, communication, and sharing of learning experiences with teachers, these tools can provide students and teachers with access to primary source learning materials. Additionally, students can publish and present their knowledge (Eady & Lockyer, 2013). Twitter, blogs, wikis, and YouTube are just a few examples of additional electronic resources that might complement a digital curriculum. Other apps can engage students, impart knowledge, and evaluate their learning. Students and instructors are always expected to access these materials while studying and utilize technology to tailor their education (Moeller & Reitzes, 2011).

The Ministry of Education introduced a brand-new educational system called the Kenyan Competency Based Curriculum (CBC) in 2017. The Kenya Institute of Curriculum Development (KICD) team created it. The CBC is made to stress the importance of learning new things and applying what one has learned to actual circumstances. Competency based curriculum place emphasis on attainment of relevant skills as opposed to academic certificates The National Goals of Education from the foundation of the CBC framework is to support the industrial and technological requirements for national growth. It is said that education should instill in students the skills they need for the nation's technological and industrial growth in line with global trends.

The designers of the competency-based curriculum hoped that every student would attain digital literacy as one of the key competencies by the conclusion of the learning time. The ability to use various digital devices and materials efficiently and safely may be characterized as having a high level of digital literacy. Mobile phones, tablets, laptops, and desktop computers are a few examples of such gadgets. These are all examples of network-

enabled gadgets. Computer literacy abilities should not be mistaken for digital literacy, primarily focusing on network-enabled devices. Traditional literacy and computer literacy, however, are facilitators in the development of digital literacy abilities. If someone has a wide variety of digital skills and knowledge and is fundamentally aware of the possible applications of computer equipment, they are said to be digitally literate. Digital literacy entails the ability to use computer communication networks, participate in online social networks, understand and follow ethical behavior guidelines, be aware of societal issues brought up by digital media, and search, evaluate, and use information sourced from digital platforms.

In supporting and improving the environment, the digitally literate person should also be able to utilize technology safely and securely while evaluating the nature of the information collected. Therefore, digital literacy as a competency includes knowledge and abilities relating to the proper use of a range of hardware platforms such as computers, tablets, and mobile devices, as well as their software, including but not limited to online search or internet application software. Due to the rapidly evolving field of information and communication technology and the continual development of technical equipment and the software that goes with them, it is also a dynamic skill. As the industry works to meet the rising need for effective and efficient communication technology worldwide, this field is always innovating and developing. Digital literacy is regarded as one of the primary basic competencies for education and daily living in the twenty-first century. It pushes the boundaries of conventional wisdom and practice while encouraging more original, imaginative, and frequently transformative learning. At the preschool level, digital literacy would be integrated into all subjects. One of the learning goals for middle school students is using digital literacy skills for communication and education. ICT would be integrated into every topic in upper primary. All instructors and students are obliged to utilize ICT to assist and improve their teaching and learning activities due to the increased value of ICT in education. In the knowledge society and digital era, ICT is a way of life. ICT should be used in designing, producing, and distributing educational materials to guarantee their relevance and alignment with people's lifestyles. The empowerment of instructors and students to function in the modern workplace is enhanced by using ICT as a tool in teaching and learning. ICT may be utilized for problem-solving, research, creativity, teaching and learning as noted by Premartech (2017).

According to research on facilitators' perceptions of the idea of competency-based education and training (CBET) conducted by Msuya (2016), 33.3% of the facilitators could not precisely explain the teaching and learning methodologies and methods utilized in CBET. If the facilitators did not have a sufficient understanding of the same yet were required to impart the same knowledge and abilities to instructors, it would demonstrate that the teachers' competency and skills would be in doubt.

The 21st Century has seen a great deal of change, and it continues to influence many societal sectors. In offering and educating on the information and skills necessary for the 21st Century ICT demand is rising, according to Buageng Andoh (2012). The use of technology, however, is essential for facilitating and increasing the productivity of the teaching and learning process to bring about these important improvements (Bernauer & Tomei, 2015). ICT combines resources and techniques to create, disseminate, convey, keep and regulate information. ICT thus includes, among other things, equipment like radio, television, projectors, cellular phones, computers, and satellite systems (Malapile & Keengwe, 2014). To realize Vision 2030, the Kenyan government envisions a technologically advanced nation as the foundation for Kenya's ascent to knowledge economy status.

To transition seamlessly from conventional teaching materials to more modern and digital tools, teachers must be ready for the new curriculum. They are to be given all the necessary teaching tools to embrace and integrate ICT into the schools' curriculum effectively and efficiently (Al-Awidi & Aldhafeeri, 2017). The adoption and integration of ICT into the learning and teaching activities and curriculum must be successful for teachers' readiness and desire (Singh & Chan, 2014). Digital technology may thus not be deployed if instructors are not well-prepared and involved in all aspects of its integration into the curriculum.

Only 13.75% of teachers in Kiambu County, Kenya, felt extremely confident in their capacity to utilize ICT in the classroom, according to research done by Chege (2014) on the variables influencing teachers' preparedness to use ICT there. This indicates that most instructors lack the technical expertise to integrate ICT into the classroom. The majority of the instructors, according to the report, advocated for ICT training for teachers.

Higgins and Moseley (2011) observed in their study that instructors who do not grasp ICT inhibit its implementation. Less emphasis is placed on how to use ICT in most educational institutions than on what it is. Therefore, in-service training for instructors working in the field should educate them on the fundamentals of ICT and how to utilize it to enhance student learning. According to research by Harrison and Wamakate (2010), teachers' lack of basic ICT training is the greatest barrier to ICT deployment in schools. Sixty one percent of instructors do not have ICT training, according to a KICD (2018) study on Competence Based Curriculum activities on teachers educated in ICT integration.

This purpose of this study was to assess whether teachers' technological skills for implementing the Competency-Based Curriculum in lower primary affect learning outcomes of pupils in Mumbuni Zone, Machakos Sub-County in Machakos County.

The study was guided by the following objective:
  i)   To assess whether teachers' technological skills influence the implementation of the competence-based curriculum for lower primary pupils in Mumbuni Zone, Machakos Sub-County in Machakos County.

2.0 Research Design

The research design for the study was a descriptive survey. The descriptive survey study methodology is the most popular approach for gathering data on people's views, beliefs, habits, or educational concerns (Nzoka & Orodho, 2014). It was acceptable to use a descriptive design because it would allow the researcher to learn about the participants' perceptions of the variables influencing learning outcomes for lower primary students in Mumbuni Zone, Machakos Sub County, Machakos County.

3.0 Findings and Discussions

3.1   Response Rate

The researcher randomly administered 25 questionnaires to selected lower primary school teachers and interviewed 7 head teachers out of 8 head teachers. Among the 25 questionnaires administered to lower primary teachers from randomly selected schools, 23 questionnaires where returned. This yielded response rates shown in Table 1;

Table 1

Response Rate

Description	Sample	Returned	Percentage
Lower Primary Teachers	25	23	92.0
Head Teachers	8	7	87.5
Total	**33**	**30**	**90.9**

Source: Field Data (2022)

Table 1 indicates a response rate of 92% for lower primary teachers and 87.5% for head teachers who participated in the interview. As per the achieved response rate, above 80% for the respondents, the study was thus identified as viable for data analysis. This concurred with Mugenda and Mugenda (2003), who proposed that a response rate above 50% is viable.

3.2   Demographic Information of the Respondents

It was required that the lower primary school teachers provide details such as their gender, age, educational background, and the number of years in the profession. The following section presents all of the relevant information.

3.2.1 Gender of Lower Primary Teachers

Lower primary school teachers were asked to indicate their gender. Results are shown in Table 2.

Table 2

Gender of Lower Primary Teachers

Gender	Frequency	Percentage%
Male	3	13
Female	20	87
Total	**23**	**100**

Source: Field Data (2022)

The information in table 2 suggests that when it comes to the number of lower primary instructors, women make up the biggest percentage (87%) while men make up 13.0%. This has an adverse effect on a boy child's education since many schools lack male lower primary instructors who may serve as role models for them. According to research by Dee (2007), being taught by a teacher of a different gender has a negative impact on students' academic performance and other school-related activities. Dee (2007) continues to argue that different gender may post varied performance results for boys and girls by around 4% at a standard deviation based on the data of his study.

3.2.2 Age of Lower Primary School Teachers

The age of the Lower Primary School Teachers was distributed as presented in the table 3 below:

Table 3

Age of Lower Primary Teachers

Age	Frequency	Percentage%
20-29	0	0.0
30-39	4	17.34
40-49	8	34.8
Above 50	11	47.86
Total	**23**	**100**

Source: Field Data (2022

According to table 3, majority (47.86%) of the lower primary teachers are above 50 years between 40-49 years 34.8%, between 30-39 17.8%, and no teacher between 20-29 years. As noted by Bebell et al. (2004) teachers' age and years of work may not be conclusive in the measurement of teachers' use of technology.

3.2.3 Lower primary Teachers Academic Qualification

The lower primary teachers were requested to indicate their academic qualifications. Their responses were analyzed and the results are presented in Table 4.

Table 6
Lower Primary Academic Qualifications

Academic qualification	Frequency	Percentage%
Certificate	8	34.8
Diploma	7	34.4
Degree	5	21.7
Masters	3	9.1
Any other	0	0.0
Total	**23**	**100**

Source: Field Data (2022)

The data in table 4 demonstrates that the majority of lower primary school teachers at certificate level with 34.8%, diploma with 34.4%, degree with 21.7%, and masters with 9.1%. Of the sampled teachers, no one is above a master's level of education. The table shows that all the teachers have the minimum education level required in lower primary schools.

3.3 Lower Primary School Teachers Technological Skills in use of Information Computer Technology

Lower primary school teachers were requested to indicate their technological skills in the use of ICT to establish their preparedness in implementing CBC and learning outcomes. They were asked whether they used computers to teach learners in class. Secondly, the researcher sought to know whether the teachers used the internet as a source of teaching materials, whether they used computers in preparing lessons, whether they used downloaded content to teach and whether they shared downloaded content with learners. Further, the study sought to establish head teachers' opinions on technological skills preparedness of the teachers. This was to help build an evidence-based conclusion based on both teachers and head teachers' opinions.

3.4 Views of Lower Primary School Teachers on the Use of Computers to Teach Learners in Class

The study sought to establish the frequency on the use of computers by the lower primary school teachers during teaching and the results are as shown in table 5.

Table 5
Use of Computers to Teach Learners in Class

Response	Frequency	Percentage%
Very frequently	0	0
Often	2	8.7
Sometimes	2	8.7
Rarely	18	78.2
Never	1	4.4
Total	**23**	**100**

Source: Field Data (2022)

The information in table 5 indicates that the majority (78.2%) of lower primary teachers in Mumbuni Zone, Machakos Sub County Machakos County rarely use computers in learning, teachers who use computers very frequently in their teaching are 8.7%, teachers who sometimes use computers are 8.7% also. Teachers who rarely used computers in their learning process were at 4.4%. There was no teacher who used computers very frequently in their teaching process. This does not indicate an ideal teaching space because digital literacy is one of the fundamental skills in a competency-based program. The study concurred with Oduor, (2018) and Wanzala and Nyamai, (2018) studies on a survey by the Teachers Service Commission that purposefully targeted some schools and 1200 respondents which revealed that teachers in public institutions had serious challenges in using ICT in their teaching and that 84.2% of the teachers who responded to the survey agreed that they had problems with the use of technology in classrooms. The survey ranked technology integration as the top professional skills gap affecting the delivery of services by teachers. Aktaruzzaman et al. (2011) further assert that, when used in the right manner, ICTs in education can bring several benefits such as increased access to education making it more relevant, as well as improving the quality since they make teaching and learning an active process.

The results from head teachers' interviews showed that a fair majority (65%) of lower elementary teachers lacked ICT skills and expertise. The head teachers admitted that while they had some academic understanding of ICT, the actual application was lacking. This was in line with the teacher's suggestion that they rarely used computers in class. This observation concurred with Ondimu(2018) that lack of information, communication and technology (ICT) skills among the majority of teachers was one of the challenges facing the implementation of the competency based curriculum and most of the teachers are not able to integrate information, communication and technology (ICT) in the learning and teaching within the competency based curriculum. When technology is used as a partner then it assists the learners and teachers to develop access to new ideas and tasks and it also assists them to find a new way of handling the previous known tasks and to explore further perspectives of knowledge (Goos, 2010). Therefore, if teachers still do not have these ICT skills then it is not easy for them to implement the curriculum during this technological advancement era.

As well, this study was consistent with Chege's (2014) research that found that just 13.75% of instructors felt highly confident in their capacity to use ICT - based instruction for teaching. This was also in line with 2011 research by Higgins and Moseley, which discovered that instructors' lack of ICT proficiency prevents technology usage in the classroom. Hennessy, Harrison and Wamakote (2010) found that lack of ICT expertise and knowledge was the greatest barrier to ICT deployment. Therefore, head teachers should be prepared with technical abilities to ease the delivery of the curriculum to achieve successful competency-based curriculum implementation. As one of the competencies of a competency-based curriculum, digital literacy, instructors should be well versed in ICT.

3.4 Use of the Internet as a Source of Learning Materials

The study also sought to find out how frequent did the lower primary teachers used internet to source for teaching and learning resources. The results are as detailed in table 6.

Table 6:
Use of the Internet as a Source of Learning Materials

Response	Frequency	Percentage%
Very frequently	0	0
Often	2	8.7
Sometimes	2	8.7
Rarely	18	78.2
Never	1	4.4
Total	**23**	**100**

Source: Field Data (2022)

The data in table 6 reveals that 78.2% of lower primary school teachers' seldomly ever utilize the internet as a source of educational materials. Given that digital literacy is one of the basic abilities of a Competency-Based Curriculum, this suggests that lower primary school teachers may not be able to execute it effectively. These observations are also in concurrence with the assertions of Karsenti et al. (2012) that in over ten Kenyan schools, varied factors were reported as hindrances to the pedagogical integration of Information Communication Technology in teaching and learning as teachers felt that ICT was time consuming and an additional workload. Technological phobia was also cited as a factor hampering the implementation of Competency Based Curriculum by older teachers as compared to young teachers.

Consequently, according to head teachers, the majority (72%) of lower primary teachers agreed that lower primary teachers rarely use internet as a learning material source in the implementation of CBC. Head teachers had the opinion that the majority needed more training, especially on the practical part. It was evident that the majority of lower primary teachers have basic theoretical knowledge about ICT and the vast knowledge available from the internet.

The study is in line with a survey published by KCID (2018), which noted that the majority of respondents (more than 70%) had not used internet as a tool for learning materials. Therefore, lower elementary instructors must use the internet effectively for successful digitalization.

4.0 Conclusion

5.0 Recommendations for Practice

Following are the study's recommendations, which are based on the study's findings:

i. For the curriculum to be implemented successfully for positive learning outcomes, teachers must be sufficiently trained through in-service training, seminars, and workshops.

ii. Teachers should receive ICT training and be given the necessary tools to apply the curriculum in the classroom.

iii. Parents to support teachers and pupils with necessary materials to facilitate easy delivery of competence-based curriculum.

iv. The ministry of education through the County government to avail necessary resources in implementing the competence-based curriculum.

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