

# Demystifying The Use of Information Communication Technology in Teaching and Learning in Day Secondary Schools

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DOI: <https://doi.org/10.47772/IJRISS.2023.70559>

Received: 01 May 2023; Accepted: 08 May 2023; Published: 07 June 2023

## ABSTRACT

In recent years, the impact of information communication technology (ICT) on education and society in general has grown substantially and therefore it's considered main enabler of achieving vision 2030 and sustainable development goals (SDGs). This study sought to demystify the use of ICT in teaching and learning in day secondary schools. The specific objectives were to: find out the resources mobilized by boards of management; determine the status of ICT usage and establish the merits of ICT in the teaching/learning and running of day secondary school activities. The study employed cross-sectional survey design to randomly sample 22 principals of secondary schools and teachers. The study established that majority of the teachers had a smart phone that was compatible with ICT and internet facilities and; that the wi-fi internet connectivity in schools was limited to principal's office only and linked with closed circuit television (CCTV) cameras to secure the school against intruders. It concluded that ICT promotes student-centered learning, helps in cooperative learning, promotes higher order thinking and problem-solving, and improves the effectiveness and efficiency of school management. The study recommends that schools board of management and parents association work together to consolidate resources to equip their schools with ICT facilities.

**Keywords.** Use of ICT, teaching and learning, resource mobilization, merits of integrating ICT

## INTRODUCTION

The relevance of ICT in educational management can be felt all over the world, but mainly in Europe and the United States of America pursuant to SDGs (Empirica, 2006). This greatly demystifies the use of ICT in our schools in readiness to fulfilling vision 2030. In the 1970s, educational institutions in North America and Europe began to use ICT. Computers facilitated successful e-learning and provided professional development for many teachers as well as school management systems (SMS). This allowed them to be more effective. According to Brannigan (2010), there is upwards global increase in the use of computers for use in giving instructions, communication, and informational resource aids. In his study on ICT integration in secondary schools, Wahome (2017) notes that while Springdale High School in Ohio City, Ohio, had many computers, there were no school managers committed to ICT integration. Besides, Ogachi (2014) asserts that push to fully integrate technology into classrooms is persuading school administrators to rethink their programs and policies in order to effect ICT integration on school administration.

The impact of ICT on business, education, and society in general has grown substantially in Ireland (Ogachi, 2014). In many ways, Ireland has been a forerunner in terms of technology adoption and capitalizing on its potential to improve education and consequently the economy. In this respect, governments have recently made significant infrastructure investments to guarantee that schools are well-equipped with ICT infrastructure. This infrastructure expansion has necessitated substantial investment, largely from the government, but also from individual schools and institutions.

Oguta, Egesa, and Musienga (2014) pointed out that there are three main rationales for promoting the introduction of ICT projects in schools, namely the economic, the social, and the pedagogical.

As hard as it may be to believe, especially given the large investments being made in this area and the increasing strategic importance of this topic in many countries, basic answers for many questions about the use of technology in school management around Africa remain largely unanswered (Mutisya & Mwanja, 2017). Such questions include: What is the current prevailing status of integration of information communication technology into the management of public secondary schools? How does the secondary schools' principal's awareness affect the use of ICT in the day to day running of their schools' affairs? What resources are mobilized by secondary school boards of management in integrating ICT in the management of their schools? What are the benefits accruing from infusion of in the management of public secondary schools? Seeking answers to these questions has implications on productivity, innovation, and modernization of school activities.

### **Study Objectives**

The study sought to:

1. Find out the resources mobilized by boards of management of secondary school to enable effective teaching and learning processes.
2. Determine the status of ICT usage in teaching and learning activities in a day secondary school
3. Establish the merits of integrating information communication technology in the running of school activities

### **LITERATURE REVIEW**

The Open Systems Theory has profoundly influenced how people think about schools as organizations and the responsibilities imposed on educators. Incorporating ICT applications into some of the areas that make up the educational system could help the school achieve greater success (Tanui, 2016). This is due to the fact that the school administration is responsible for maintaining and coordinating the other aspects of the educational system. If schools heads could have an open system approach to the integration of ICT, it would be much easier for their institutions to benefit from ICT.

The necessity for school administrators to successfully incorporate ICT in all of their management initiatives, and the current environment, to improve professional productivity, is expanding (Chepkonga, 2015). As a result, school administrators' have a thin line of integrating ICT into school management or risk lagging behind in technology that is driving the 4<sup>th</sup> industrial revolution. Further, Chepkonga (2015) confirms that school principals are responsible for proper organization and could utilize school's available resources in order to achieve the institution's goals. The principal through school boards of management (BoM) can mobilize resources and prioritize the integration of ICT to their schools when generating school budgets.

In most of Sub-Saharan African countries, insufficient technological infrastructure, such as a lack of hardware and software as well as access to the internet, restricts individual and school community members' access to ICT, posing a barrier to adequate school management of school activities (World Bank, 2017). Furthermore, several East African states experience limitations on ICT policy issues, power outages, technical issues, import tariffs, and network configuration matters. For example, Tanzania's national electrical system serves only commercially viable places, excluding the majority of secondary schools in rural areas (ibid).

Such factors have increased the cost of integrating ICT infrastructure into schools (Ngugi, 2012). As a result, access to the integration of ICT in schools has been met with a lot of challenges.

ICT, according to Chepkonga (2015), are critical resources in any organization for planning, policymaking, and decision-making. Information and communication serve to allowing the public to be aware of an organization's existence, activities, and products. Ngugi (2012) articulates that technology is employed in education on at least five levels of presentation, demonstration, drills and practice, interaction, and collaboration. Through teleconferencing, ICTs have the potential to extend formal and non-formal educational opportunities to previously underserved constituencies—scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly (Edward, 2015).

When putting together the school budget, the BoM ensures that ICT resources are incorporated to ensure the school runs smoothly. Computers are utilized in educational administration for timetabling, personnel management, financial control, and exam administration. According to Chepkonga (2015), technology can assist school administrators in dealing with some of the issues they confront, only if ICT is integrated into teaching and learning process. Computers have also aided school administrators in more effectively planning and allocating human and physical resources (ibid).

In Kenya, the schools BoMs and the government have made many steps to ensure schools have adequate ICT infrastructure, such as computers, energy, internet, printers, and ICT personnel (Chris, 2015). Teachers could generate their instructional materials using internet and computers within a short time. This is because, once instructional materials are made on a computer, they are stored in the same location for as long as the teacher desires (Ngugi, 2012). While the Kenya government is doing everything to connect all schools with electricity; public day secondary schools continue to encounter obstacles because majority of them are located in rural areas where electricity is yet to be installed (Chris, 2015).

BOMs regulate secondary schools and middle level colleges where they manage both human and non-human resources such as provision of teaching and learning materials and associated developments (MoE, 2016). This was done to give each school its unique personality and to decentralize power for greater efficiency. The BoMs are charged with facilitating smooth operations, infrastructural development, project evaluation, and the provision of teaching and learning materials (Kipsoi, 2015).

The usage of ICT is causing significant changes in student learning and teaching methods. Over the last 20 years, schools in the Western world have made significant investments in ICT infrastructure, and students are using computers more frequently and for a wider range of purposes (Chepkonga, 2015). Several studies have found that pupils who use ICT facilities make better academic achievement than those who do not. For example, Wahome (2017) established that in the United States, mathematics, natural science, and social science, students who used computer tutorials performed much better on assessments in these disciplines. Students who used simulation software in science received higher grades as well. Furthermore, pupils who utilized word processors or other forms of computer-assisted writing did well on tests of writing ability.

According to Tonui, Kerich, and Koross (2016), there is a widespread view that using ICTs in education leads to more constructivist learning, increased activity, and increased student accountability. Wahome (2017) and Wiley (2003) noted that the influence of ICT in Nigeria on planning and management systems has changed the nature of administration in secondary schools by allowing information to be transferred, stored, retrieved, and processed. This has enabled everyone who works, studies, or interacts within and outside the institutions, to access data at the touch of a button. According to Edward (2015),

this has enhanced efficiency in day-to-day school operations, particularly in handling student, staff, and

resource information.

According to Tonui, Kerich, and Koross (2016), heads of secondary schools in South Africa have realized enhanced resource management discipline when they used technology in financial planning and controls. Accordingly, Barakabitze (2019) observes that the budgeting process in schools requires multiple sources of information, which could be achieved by incorporating ICT into school planning and management systems. The advantage of incorporating ICTs into educational planning and development is that it is a complex process that necessitates accurate, timely, and user-friendly data (KEMI, 2015). ICTs is useful in data storage and analysis for student assessments, education indicators, human infrastructure, educational, physical, and cost and financial records (Edward, 2015).

According to Wahome (2017) on a study conducted in Tanzania, the aspects of computing and telecommunications equipment and services that have made businesses efficient and cost-effective could be used in to boost schools' achievements. ICT could assist school BoMs and principals in streamlining processes, monitoring performance, and increasing the efficient use of physical and human resources (Kiilu, 2016). Computer-related technologies have the ability to simplify the planning of complicated and standards-related instructional activities. They can also prompt accountability, public support, and market connectedness by promoting communication among schools, parents, government and other key stakeholders (RoK, 2017).

## METHODOLOGY

This research applied cross-sectional survey design to compare implementation of different ICT facilities in managing teaching and learning processes in day secondary schools (Kothari, 2011). This design enabled assessment of prevalence of use of ICT in implementing curriculum in day secondary schools in GItunguri Sub-County of Kiambu County, Kenya. Data was collected from a randomly selected sample of 100 respondents who included the principals, teachers and board of management from various day secondary schools in Githunguri sub-county. Questionnaires, observation schedules, document analysis and structured interviews were using in gathering data during the filed inquiries. To reach every sampled respondent, the study employed both face to face and online mode of data collection. The data was analyzed using SPSS and presented in tables, pie-charts and bar graphs.

## RESULTS AND DISCUSSION

### ICT resources available in day secondary schools

Using up-to-date hardware and software resources is a key feature to diffusion of technology. The principals were asked to indicate the availability or unavailability of various information communication technologies in their schools. The results were analyzed as presented in table 1.

Table 1: ICT recourses available in day secondary schools

ICT facility	Available & adequate (%)	Available & inadequate (%)	Nat available (%)
Desk top computers	9.0	90.9	0
Smart boards	0	18.1	81.8
Printers	9.0	77.2	13.6
Photocopiers	18.1	72.7	9.0
Projectors	4.5	63.6	31.8

Internet connectivity	9.0	81.8	9.0
Scanners	9.0	40.9	50
Cell-phone	72.7	27.2	0
Television	9.0	72.7	18.1
*CCTV	32.8	40.9	27.2
<b>Source:</b> Field data 2022		*CCTV-closed circuit television	

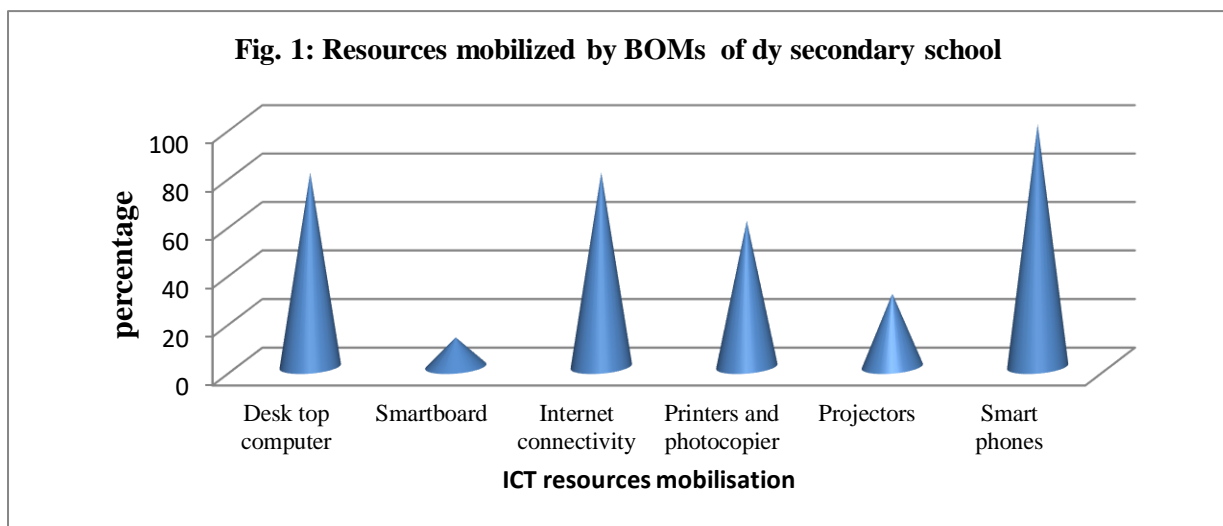
Results in table 1 reveal that only 9% and 81.8% of schools had adequate and inadequate internet (wireless fidelity wi-fi) respectively, while the rest 11 school had no access to internet. On the other hand, majority of the schools indicated to have available and inadequate computers and printers. A few schools reported that they had available and adequate computers and printers. Majority schools reported that they had no smart boards, only a few schools indicated that smart boards were available and inadequate. Besides, 72.7% of the respondents accessed internet through their cell phones. The teachers agreed that they accessed current information such as online notes, teaching models, and graphics from various internet websites. Science teachers confessed that they used experiments from Google YouTube to exemplify what they taught practically in the labs. Cells were also useful in online teaching by teaches and learners especially over school holidays and during difficulty times such a corona period. These finds were strongly supported by Calderón-Garrido, et, all. (2022). who observed that many teachers, parents and pupils possess Cell phones in their lives. Besides communication, these phones are used for education purposes in everyday live.

Majority of the schools reported that Projectors and photocopiers were available and inadequate. These findings concurs with findings of Maki (2018) who noted that using up-to-date hardware and software resources is a key feature to diffusion of technology use in teaching and learning process.

These results show that basic ICT facilities such as desktop computers were available in most secondary schools in Githunguri Sub-county. The availability could be due to the fact that the government of Kenya has prioritized investment in ICT infrastructure in educational institutions as articulated by the MOEST (2011) in the National Education Support Sector Programme. This concurs with Wahome (2017) who observes that access to ICT facilities is currently one of the major challenges in Africa and Kenya is no exception. The ratio is even wider in disadvantaged regions and areas.

**Resources mobilized by BoM in integrating ICT in the teaching and learning processes**

The researcher sought to establish the extent to which school boards of management have mobilized ICT resources in their schools as presented in figure 1.

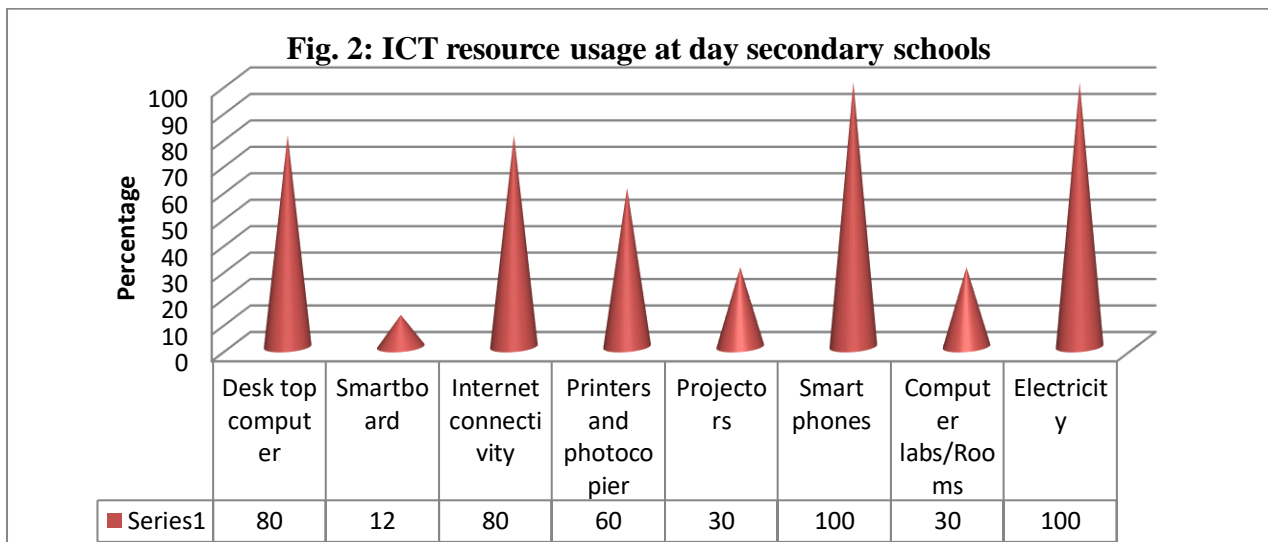


Thus, fig. 1 shows that all the samples teachers had a smart phone that was compatible with ICT and internet facilities. Besides, 75% of the school had wireless-fidelity (wi-fi) internet connectivity. However, this connectivity was limited to principal’s office only. It worked to enable closed-circuit television (CCTV) cameras record images for security reasons.

In enhancing efficiency in running of schools activities, secondary education boards of management should engage alternative sources of generating additional revenues. Management of schools are made easier via alternative sources of funds (Muhangi, 2019; and Gongera, & Okoth, 2013), since such funds would be used to pay workers on time and also enable the school to source for extra required resources to expedite teaching and learning (Omukoba, Simatwa, & Ayodo, 2011).

Status of usage of ICT resources in day secondary schools

Further the respondents provided their views on the status of usage of ICT resources at the school level as presented in fig, 2.



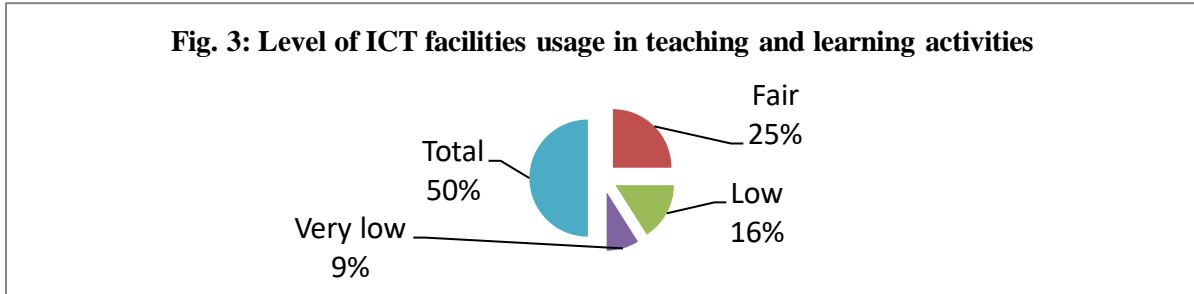
From the findings in figure 2, a majority (80%) of the principals reported that computers and the internet are available in their schools but they are not adequate while and 60% of the principals reported that their school have printers and photocopiers. Only thirty percent of schools had projectors. Most of the computers available in public day secondary schools were only accessible to principals, deputy principals, accountants, senior teachers and secretaries. There was one school where board of management had set up a computer laboratory for students. On availability of other ICT facilities apart from computers used in management, the principals said that they had laptops assigned to specific teachers; and other ICT facilities such as internet, printers, UPSs, projectors as well as smart boards.

In supporting these findings, Muhangi, (2019), Sa’ad & Sadiq, (2014) aver that the school should strive to strengthen its relationship with the neighbouring communities who would in turn contribute to supporting the school activities. A case in point is the school’s parent-association should take its useful role in school management by reaching out to community philanthropists to assist the school activities through funding, materials and in kind.

**Level of ICT usage in day secondary schools’ teaching and learning activities**

The growth of the global economy and the information-based society has pressured education systems around the world to use technology to teach students the knowledge and skills they need. Therefore, the study sought from principals the level of ICT usage in teaching and learning activities in school as presented

in fig 3. From figure 3, 50% of the respondents indicated that teachers were able to use ICT in teaching and learning at fair level. 25% revealed that some teachers were able to use power point presentations at low level. This implies that an increasing number of teachers are embracing use of ICT in education hence the promoting the teaching and learning activities.



In supporting the findings, Nweze (2018) asserts that ICT facilities are useful in assisting a learner in solving assignment, while increasing self-confidence of the learner. Moreover, ICT resources facilitate the learner to acquire new knowledge useful in building relevant skills for improved achievement. Therefore, application of ICT facilities support in effective and quality learning that helps students in sharing information with other students in other schools.

### Merits of integrating ICT in running of a day public secondary school activities

The respondents were asked to state some of the strengths of integrating ICT in running of schools activities. While they used different words, their responses were summarized as in fig.4:

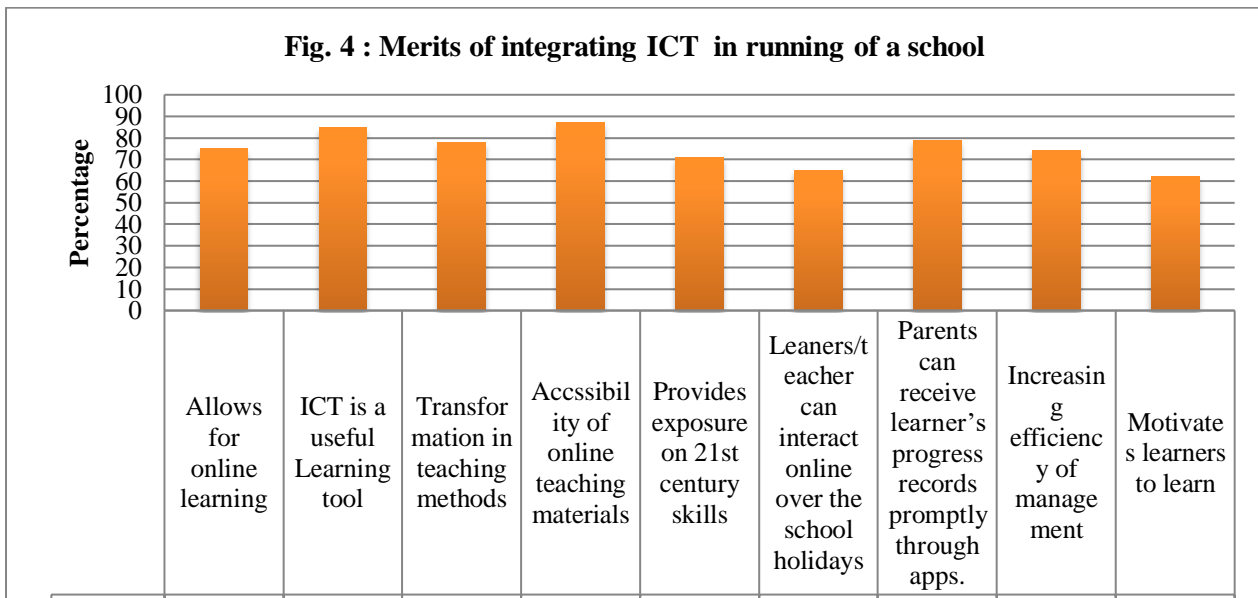


Figure 4 shows that the majority (87%) of the respondents perceived that ICT provides accessibility to online teaching and learning materials; while 85% opined that ICT is a useful learning tool. Furthermore, 79% of the respondents agreed that parents could easily access monitor and access their children's academic performance through specific apps used by their schools.

Training principals in ICT was emphasized by the respondents as a way towards faster integration of ICT in management of public secondary schools. In this respect, Akula, Anyona and Kanga (2018) and Kozma (2008) agree that employing the use of ICT in school management is useful and reliable means of data storage and provides efficiency in-terms of school data retrieval and achieving. This also provides a good platform for collaboration with key stake holders and accurate maintenance of school records in sharing soft

materials.

### Status of benefits of ICT realized in day secondary schools

The study sought to understand the extent to which benefits of integrating ICT in school management have been achieved. The findings presents are presented in table 2.

Table 2: Level of ICT benefits realized in day secondary schools

Benefits	Agree	Disagree	Not sure	Total
ICT promotes autonomous learning	67	10	23	<b>100</b>
Through ICT we have a differentiated curriculum	53	30	17	<b>100</b>
ICT promotes student-centered learning	68	11	21	<b>100</b>
ICT helps in cooperative learning	62	19	19	<b>100</b>
Use of ICT promotes higher order thinking and problem-solving	76	10	14	<b>100</b>
ICT improves the effectiveness and efficiency of school management	85	5	10	<b>100</b>
Source: Field data 2021				

From table 2 above, 67 % of the respondents agree that ICT promotes autonomous learning, 68 % of the respondents agree that ICT promotes student-centered learning and 62 % of the respondents agree that ICT helps in cooperative learning. 76 % of the respondents agree that the use of ICT promotes higher order thinking and problem-solving. 85% of the respondents agree that ICT improves the effectiveness and efficiency of school management. In general, ICT integration offers many benefits that far outweigh the cost of integration.

These results are confirmed by Kipsoi, Chang'ach, and Sang (2017), who suggests that ICT can provide some concrete and unique opportunities such as: first, offering new technologies in simulations of specific skills through micro and mini lessons. Secondly, appropriate parts of teacher education can be provided virtually therefore saving time and travel costs and related inconveniences.

## CONCLUSION

The study concluded that few schools had adequate internet access (wireless fidelity wi-fi) and computer infrastructure which include, computers and their accessories, computer labs and internet connectivity. Secondly, majority of the teachers had a smart phone that was compatible with ICT and internet facilities and; that the wi-fi internet connectivity in schools was limited to principal's office only and linked with CCTV cameras to secure the school against intruders. Thirdly, the study concluded that training of school principals in ICT would enable fast tracking of integration of ICT in management of public secondary schools. Finally it was concluded that ICT promotes student-centered learning, helps in cooperative learning, promotes higher order thinking and problem-solving, and improves the effectiveness and efficiency of school management.

## RECOMMENDATIONS

The study recommend that schools board of management and parents association should work together to consolidate resources to equip their schools with ICT facilities. They should move fast in working with neighbouring community philanthropists for the welfare of their schools. The teachers lead by their



principals should be in-serviced on use of ICT in school teaching, learning and management so as to make greater strides in learners' achievements and for the safety of schools records.

## REFERENCES

1. Akula H. L. , Anyona J., & Kanga, A. (2018). Effectiveness of Integrating Information Communication Technology in Enabling E-Leadership of Public Secondary Schools, Busia County, Kenya. *International Journal of Scientific and Engineering Research* volume 9, Issue 9, September 2018
2. Barakabitze A. A. (2019). "Transforming African Education Systems in Science, Technology, Engineering, and Mathematics (STEM) Using ICTs: Challenges and Opportunities," *Educ. Res. Int.*, vol. 2019.
3. Brannigan, N. (2010). Enhancing Leadership Capacity in ICTs in Education through technology Enabled collaboration, Pedagogy for Technology Enhanced Learning. *The Turkish Online Journal of Educational Technology*, 7 (4), 89-112.
4. Calderón-Garrido, D., Ramos-Pardo, F. J., & Suárez-Guerrero, C. (2022). The Use of Mobile Phones in Classrooms: A Systematic Review. *International Journal of Emerging Technologies in Learning (iJET)*, 17(06), pp. 194–210. <https://doi.org/10.3991/ijet.v17i06.29181>
5. Chepkonga, S. (2015). A preliminary study of relationship between principal's gender and ICT integration in management of public secondary schools in Nairobi County perspective, Kenya. *International journal of Education and Research*. 3 (5), 425-432.
6. Chris L. A. (2015). "Barriers Hindering Implementation, Innovation, and Adoption of ICT in Primary Schools in Kenya," *Int. J. Innov. Res. Dev.*, vol. 4, no. 2, pp. 1–11.
7. Edward, R. (2015). Principals characteristics influencing integration of Information and Communication Technology in management of secondary schools in Makueni County,
8. Empirica. (2006). Use of computers and internet in schools in Europe: Country brief, European Commission Information Society and Directorate General. Lisbon, Germany. Accessed on November 10, 2020 at [http://ec.europa.eu/information\\_society/Europe/i2010/benchmarking/index\\_en.htm](http://ec.europa.eu/information_society/Europe/i2010/benchmarking/index_en.htm).
9. Gongera, E & Okoth, N.O. (2013). Alternative sources of financing secondary schools in rural Kenya: A case of Kisii County, Kenya. *Journal of Education and Practice*, 4 (4) 104-108
10. KEMI, (2015) Diploma in Education Management – Curriculum Management. Nairobi: Kenya.
11. Kiilu R. (2016). "An E-Learning Approach to Secondary School Education": E- Readiness Implications in Kenya. Masinde Muliro University. Retrieved January, 2021 from <http://www.iiste.org/Journals/index.php/JEB/article/viewfile/3707/3756>
12. Kipsoi, E J., Chang'ach, J K., & Sang H C. (2017). Challenges Facing Adoption of Information Communication Technology (ICT) In Educational Management in Schools in Kenya. *Journal of Sociological Research*, 3(1), 18-28.
13. Kothari, C. (2011). *Research Methodology; Methods and Techniques* New Delhi: New Age International Publishers.
14. Ministry of Education, Kenya, (2016) National ICT strategy for Education and Training, Challenges in the Implementation of ICT in Public Secondary Schools in Kenya, Government printer, Nairobi Kenya.
15. MHEST (2011). ICT capacities and capabilities in secondary schools in Kenya 2009/2010 NCST no: 046 Ministry of Higher Education, Science and Technology and National Council for Science and Technology. REPUBLIC OF KENYA.
16. Muhandi G. T. (2019). Secondary Education in Uganda: Resource Mobilization and Efficiency. *Journal of Education and Practice* [www.iiste.org](http://www.iiste.org) ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) DOI: 10.7176/JEP Vol.10, No.20, 2019.
17. Mutisya, A. M., & Mwanja, J. M. (2017). The Extent of ICT Integration in the Management of Public Secondary Schools in Kitui County, Kenya.
18. Ngugi, P. (2012). An investigation into the extent of the use of ICT in education management in

- public secondary schools in Naivasha District, Kenya. Unpublished Master's Thesis.
19. Nweze, C. A. (2018). Utilization of ICT Facilities for Quality Teaching and Learning in the 21st Century: An Overview of Public Secondary Schools in Rivers State. *African Journal of Educational Research and Development (AJERD)*, Vol. 11, No. 2, Dec. 2018
  20. Ogachi, N. M. (2014). Factors Influencing Principals Integration of ICT in Administration of Public Secondary Schools in Isinya Sub-county, Kenya. Masters Thesis, Unpublished: University of Nairobi.
  21. Oguta, J.O., Egesa, R.K.W., & Musienga, D. (2014). Effects of Information Communication and Technology (ICT) Application on Strategic Educational Quality Standards Management in Bungoma County, Kenya. *International Journal of Business and Management Invention* ISSN (Online): 2319 – 8028, ISSN (Print): 2319 – 801X [www.ijbmi.org](http://www.ijbmi.org) 3 (5)? November 2020. PP.11-17 [www.ijbmi.org](http://www.ijbmi.org) 11 |
  22. Omukoba, H.O, Simatwa, E.M. & Ayodo, T.M. (2011). Contribution of income generating activities to financing secondary school education in Kenya: A case study of Eldoret municipality. *Education Research*, 2(2), 884- 897.
  23. Republic of Kenya, (2017) Millennium Development Goals Status Report for Kenya 2016. Nairobi: Government Printer.
  24. Sa'ad, T.U & Sadiq, A.M. (2014). The Relevance of School Community Relationship on the Development of Primary Education in Azare Metropolis of Bauchi State, Nigeria. *OSR Journal of Research & Method in Education (IOSR-JRME)*. 4(6), 23-29
  25. Tanui, M., (2016) Principals' Role In Promoting Use and Integration Of Information and Communication Technology In Public Secondary Schools In Wareng Sub-County, Kenya. Unpublished Masters Thesis, Catholic University of East Africa.
  26. Tonui B., Kerich E., and Koross R. (2016). "An Investigation into Implementation of ICT in Primary Schools, in Kenya, in the Light of Free Laptops at Primary One: A Case Study of Teachers Implementing ICT into Their Teaching Practice," *J. Educ. Pract.*, vol. 7, no. 13, pp. 12–16.
  27. Wahome S. K. (2017) Challenges Facing Effective Information and Communication Technology (ICT) Implementation in Selected Public Secondary Schools in Nakuru North District Nakuru County, Kenya.
  28. Wiley, J. (2003). *The school administrator's complete letter book with CD-ROM*; [2nd ed]. New York: Jessey-Bass.
  29. World Bank. (2017). *World Development Report Knowledge for Development*. New York: Oxford University Press.
  30. Zainally, H. (2008). Administration of faculties by information and communication technology and its obstacles. *International Journal of Education and Information Technologies*, 2 (1) 24-30.