

Opportunities and Challenges for Use and Integration of Information Communication Technology in Management of Public Secondary Schools in Bungoma South District, Kenya

Anne Nang'unda Kukali

Maseno University, Department of Education Management and Foundations, Maseno, Kenya

Abstract: *World over, most sectors have embraced information communication technology (ICT) as the preferred tool of choice for best management practices regarding service delivery in this 21st century. Despite the Kenya government and other stakeholders' efforts to enhance use and integration of ICT in the education sector, public secondary schools management still lag behind in this area. Reviewed literature revealed that majority of the stakeholders focus on use and integration of ICT more on curriculum delivery as opposed to school management practices. To put ICT use and integration in management of public secondary schools to relevance in this information age, the study sought to establish opportunities available and challenges faced in use and integration of ICT in public secondary schools management in Bungoma South District, Kenya. Specific objectives of the study were to establish challenges faced in use and integration of ICT in management and find out available opportunities for use and integration of ICT in management. The study employed descriptive survey design. The study population comprised of 36 Principals, 36 Deputy Principals, 36 Directors of studies and 4 District Quality Assurance and Standards Officers. Saturated sampling technique was used to select 3 Quality Assurance and Standards Officers, 32 principals, 32 Deputy Principals and 32 Directors of Studies. Data collection instruments were self administered questionnaires and interviews. Quantitative data was analyzed using descriptive statistics in form of frequencies counts and percentages while qualitative data was analyzed on an ongoing process as themes and sub themes emerged. The study findings established that schools that used and integrated ICT in management were major beneficiaries of donors such as the Ministry of Education and the Constituency Development Fund computer project. There was however a wide digital divide in use and integration of ICT in management regarding ICT resources. For instance, an overwhelming 100% of principals and Quality Assurance and Standards Officers cited ICT infrastructure and financial resources as major challenges faced in use and integration of ICT among others. The study recommended that the Ministry of Education increases its budgetary allocation to cater for capacity building and infrastructure to fill the gap in digital divide.*

Keyword: ICT use, integration, management, public secondary, Bungoma, Kenya

1. Introduction

The world today is in a dynamic information age where leadership plays a pivotal role in initiating and implementing school change through the adoption of ICT. Information Communication Technology is critical to a country's future as it impacts on productivity and innovation, modernization of public services. Principals have no option but to embrace use and integration of ICT rich in new knowledge to keep themselves abreast with new techniques in decision making and problem solving based on best management practices. However as an innovation, challenges are likely and principals must look out for opportunities to curb any challenges. According to [18] use and integration of ICT updates the school management on summaries of the subsystems operations.

Computers require highly skilled support and maintenance to operate yet most schools only budget for purchase costs. Total Cost Ownership (TCO) requires a good amount of funds to hire ICT technicians for maintenance and technical support and infrastructure development yet such funds are usually excluded from the budget. Teachers' accessibility to ICT determines their use and integration in management activities at different levels. In baseline survey in Kenya, [22] revealed that 59% of study institutions lack internet connectivity while very few had management software. It was noted that other challenges included lack of computers and skills among teachers to use ICT. The Kenya, [18]

purchased Microsoft Software licenses for schools but due to financial constraints, some schools were unable to renew the license. According to [17] study in the expansive Nandi North District, Kenya lack of electricity power supply was a major challenge that forced some schools to source for other means of power supply such as generators. The frequency at which ICT was used in administration was therefore hampered.

[25] states that Cambodia as a country is a great beneficiary of partnerships both higher and basic education reforms, human resource development and rural infrastructure. Cambodia currently competes in close measures with other developing countries in terms of ICT access and use in schools. [12] case study in Namibia points out that the Ministry of Education (MoE) through the National Educational Technology Service and Support (NETSS) centre supported schools through free technical support services. Partnership contribution in Benin and Uganda enabled schools acquire computers through Non Governmental Organizations (NGOs), donor programs and projects such as Microsoft Partners in learning program, cyber school technology solutions, New Partnership in African Development (NEPAD), Uganda connect program and computer for schools program [10]

[4] through the same partnerships schools benefitted in acquisition of hardware and software which developed the ICT status in Uganda. Through the Kenya Education Schools

Support Program (KESPP), schools were funded for acquisition of Microsoft Software licenses and renewal was up to schools [18] Due to financial constraints some schools were unable to renew the licenses due to financial constraints. [6] Comparative study in Kenya revealed that through UNESCO, NEPAD and Computer for Schools Kenya (CFSK) national schools obtained computers besides training of teachers and principals at in-service level. Since there were few national schools in the country, majority of schools did not benefit from this pilot program. [9] survey findings revealed that Non Governmental Organizations (NGOs) and donors in partnership with the MoE have variously contributed computers to schools. [14] Comparative study of ICT Use in Special Education Schools in Bungoma County, Kenya established that most of the special schools acquired computers and other school infrastructure through the MoE, Constituency Development Funds (CDF) and international donors. It was evident that despite the fact that there were several opportunities that schools could depend on for ICT use and integration in management, schools are on the contrary faced with similar magnitude of challenges. It was against this background that this study was conducted to establish opportunities available and challenges faced in ICT use and integration in public secondary schools management in Bungoma South district, Kenya.

2. Challenges faced in use and integration of ICT in Management

2.1. Financial Constraints

Technology is undoubtedly expensive and financial plans are essential for schools to catch up with rapid changes and improvement in hardware, software and networks. According to [24] study in Cyprus, the introduction of ICT as a teaching tool is viewed as an innovation where a lot of school changes call for huge amounts of funds for investment in ICT infrastructure and maintenance. [25] said that Cambodia suffered a setback in use of ICT in schools due to financial constraints for acquisition and maintenance. The two scenarios are an indication that financial resources may be a challenge to school leadership on use and integration of ICT in management. [2] study in Nigeria indicated that 83 (47%) respondents cited high cost of ICT facilities while 78 (44%) attributed low budgetary allocation as hindering application of ICT in schools. The high costs involved in computer and internet rates affected acquisition and installation of ICT. [12] case study findings in secondary schools in Namibia found that financial resources are essential to initiate and sustain ICT use and integration. Computer use requires adequate funds to facilitate construction of relevant infrastructure, safeguard equipment, capacity building and employment of ICT technicians to provide technical support and maintenance. However, there was no evidence of availability of such funds in schools. [17] study established that lack of funds was a major challenge on acquisition of ICT software and hardware in secondary schools in Nandi North District, Kenya. While discussing school leadership role on use and integration of ICT in secondary schools in Bungoma County, Kenya [13] said that 100% of principals

listed financial constraints as a major factor influencing use and integration of ICT in management.

2.2: Lack/ Inadequate ICT Infrastructure

The establishment for ICT use and integration in an institution requires renovation and innovation of infrastructures because of its newness. [27] study on “adequacy of ICT resources and the right ICT Skills for teachers in integrating ICT tools in teaching and learning of English Language in Malaysian” revealed that 81.7% indicated schools had computer laboratories, 64.2% said personal computers were connected to the central server and 48.6% had computers for use. However majority of computer laboratories were inadequate in specifications and quality hence inadequate use. [25] secondary data on ‘the state of ICT in Cambodia indicated that by 2004, only 13% of 698 secondary schools used electricity, 8% used generators while 4% used solar panels. He said that only 6% of lower and 35% of upper secondary schools managed to get 1-2 computers mainly for administrative purposes. These findings mirror the poor state of ICT infrastructure in secondary schools in Cambodia. [12] observes that teachers in Namibia study schools had computers with no internet connectivity which hindered use of the internet and email. Similarly, [28] study in rural areas had issues with internet connectivity costs and poor electricity connections. Consequently, computer and internet usage and installation were hampered hence minimal use in management. [21], [9] survey findings in Kenya revealed that 58.9% of computers in all schools were not connected to the internet except one school with all 50 computers connected; that schools in rural set up were unable to use ICT due to internet inaccessibility and affordability, limited rural electrification and frequent power disruptions.

2.3: Training in Information Communication Technology Use and Integration

Training enables one acquire knowledge and skills in ICT use and integration. [27] established that only 15% of respondents cited lack of training as a barrier to ICT use and integration in teaching English. The irony of these findings is that majority had essential required ICT skills but did not use the available ICT resources. [2] investigated into “factors associated with low ICT application in Nigerian secondary schools”. Teachers were purposively sampled to respondents from Edo and Delta states. Out of 176 respondents, 91(52%) cited inadequate ICT manpower, 71 (40%) lack and or limited ICT skills while 75% from NEPAD e-schools were short of ICT experience and expertise. These findings explicitly demonstrate the importance of training in ICT use and integration in management. Heads of institutions in Kenya are required to undergo constant in-service training to acquire current administrative skills necessary for best management practices [29]. In their [21] on “ICT capacities and capabilities in secondary schools in Kenya”, [18] national secondary schools were purposively selected. The findings revealed that 73% of teachers were ICT trained compared to 27% untrained. However variations arose in levels of ICT training showing 57% had beginners’ basic skills, 29% intermediate and only 14% had advanced basic skills. Despite the relatively high percentage of ICT trained

teachers, certification type of training shows low levels of literacy among degree and diploma holders (3%) and majority being certificate holders (67%), as university unit (6%) and totally no ICT training (18%). While the percentage of trained teachers is impressive, the study was done in national schools that are arguably established in terms of ICT requirements. [6] comparative study sought to find out the input of ICT in education and development in Kenya. In NEPAD schools (N= 21), 33% were certificate holders, (14%) diploma and 54% degree while in non NEPAD schools (N=9), 11% were certificate, 56% diploma and 33% degree holders in ICT. The statistical differences on levels of ICT training shows majority of teachers in both categories of schools have ICT training but no evidence of principals. [17] observe that 53.9% of administrators attended introductory courses on computers, 33.3% on application programs and 17.5% on programs for teaching while only 21.8% attended courses for performing administrative tasks. Although 31% of teachers underwent either formal training or school workshops, 60% could not use computers for administrative activities due to inadequate training. [16] study in western province Kenya revealed that 73 (38.8%) principals lack training in ICT, 82 (43.6%) had informal training while 33 (33.7%) had certificate level training. The findings indicate that lack of training in ICT could affect use and integration in management. [30] state that effective implementation of educational technology requires adequate training to enable teachers confidently use and integrate ICT in professional operations.

2.4. Resistance to Change

The development of ICT brings the dynamism that provides grounds for drastic changes in resource development and running of the system. [26] study findings in Queensland State, Australia points out that teachers' resistance to change is known among the aged than the young because the former believes in status quo despite the changing times. This means that age has an influence on an individual's bid to embrace change. [20] study sought to establish teachers' perceptions on conditions facilitating the use of computers in teaching mathematics in secondary schools in Malaysia. The findings revealed that computer-based technology is an accepted norm and teachers are weary of it though they appear slow in adoption due to the many would describe as the stubborn nature of accepting change. [12] in his literature review observes that teachers resist change because of unpreparedness on the benefits of such change and fear for job security. Where change requires teachers to belabor in the implementation requiring new knowledge and skills and lacks administrative support, they would resist ICT infusion. In the Kenyan education system, ICT is a contemporary concept characterized with aspects of change in infrastructure, stakeholders' attitudes and school management practices. Administrative and technical supports are necessary in assisting the management for use and integration of ICT variously.

3. Opportunities for ICT Use and Integration in Management

Time and again secondary schools have been major beneficiaries from Public Private Partnerships in terms of funding, training and infrastructure. [25] stated that the American Assistance for Cambodia funded internet connections to rural schools and in collaboration with Japan Relief for Cambodia solicited funds and constructed schools, installed solar panels and internet connectivity. Cambodia now competes favorably with other developing countries in terms of ICT access and use in secondary schools. [27] study indicated that MoE-Malaysia facilitated capacity building for administrators, teachers and other school managers from rural areas in ICT to enhance literacy levels and match the continuously introduced software and hardware in the market. The Brunei-MoE provided ICT infrastructure through unlimited internet facility to both teachers and students while 18 schools in Malaysia received computer laboratories [7]. According to [5] study in Thailand, the MoE provided both financial and material support in terms of servers and computers per school. The role of the MoE and international organizations could be counted on as future prospects in these countries.

Public secondary schools in Kenya are governed by BOMs and PTA bodies. These bodies are charged with decision making on material and equipment acquisition among other management duties [1]. [12] study findings revealed that schools in Namibia acquired computers through the MoE deployment of computers section while NETSS supported schools through computer maintenance. [10] study indicate that various organizations including Uganda Communications Commission Support/ Rural development Fund, Cyber School Technology solutions and Computer for schools contributed computers to different schools in great numbers. According to [22] study findings, 16.07% of schools received computers through PTA projects, 17.86% CFSK, 7% individual donations while 54% school funds. The PPP is then one of the future prospects for ICT use and integration in secondary school management. [6] in their study in Kenya revealed that through NEPAD e-schools project, six secondary schools in Kenya received computers and trained teachers in ICT. The schools are comparatively ICT complaint in terms of infrastructure and skilled manpower than non NEPAD schools. [17] found that 60% of schools acquired computers either through foreign or local well wishers while [14] study found that 100% sample schools acquired computers and infrastructure through international, individual, MoE and CDF. The above reviewed literature provides a wide knowledge gap which the current study attempted to fill by focusing on challenges and opportunities for ICT use and integration in public secondary schools management.

4. Methodology

The study adopted a descriptive survey design which was suitable to this study as it provided a window to generate answers to research problems and facilitated research in an efficient possible way to yield maximum information [23]. The study was carried out in Bungoma South District,

Bungoma County, Kenya. The district borders Bungoma East on the East, Bungoma North to the North-East, Kimilili to the North-East, Bungoma Central to the North-West, Bungoma West to the North- West, Bumula to the West and Mumias District to the South. The District is inhabited mostly by the Bukusu Sub-tribe of the Luhya community of Western Kenya. Major economic activities include sugarcane and maize farming [8]. Through rural electrification, most parts of the District are well toned with electricity power supply as an ICT infrastructural requisite for use and integration in schools. The study population consisted of 36 principals, 36 Deputy Principals, 36 Director of Studies and four Quality Assurance and Standards Officers (QASOs). Simple random sampling technique was used to select 1% of the population who took part in the pilot study and not the actual study. Saturated sampling technique was used to select 32 Principals, 32 Deputy Principals, 32 Director of Studies and three QASOs to take part in the study as respondents. Data was collected through self administered questionnaires and interviews. Quantitative data was analyzed using descriptive statistics in form of frequency counts and percentages while qualitative data was analyzed on an ongoing process as themes and sub themes emerged.

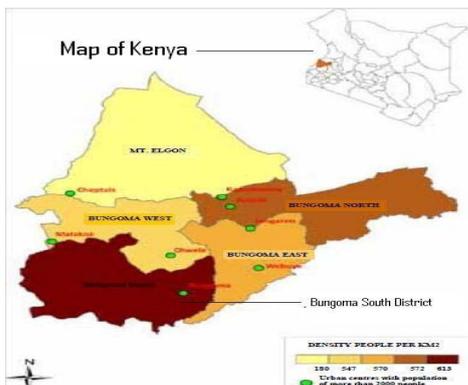


Figure 1: Map of Bungoma South District

5. Challenges Faced in Use and Integration of ICT in Public Secondary Schools Management in Bungoma South District

Respondents: Principals (n=32), DPs (n=32) and DoS (n=32)

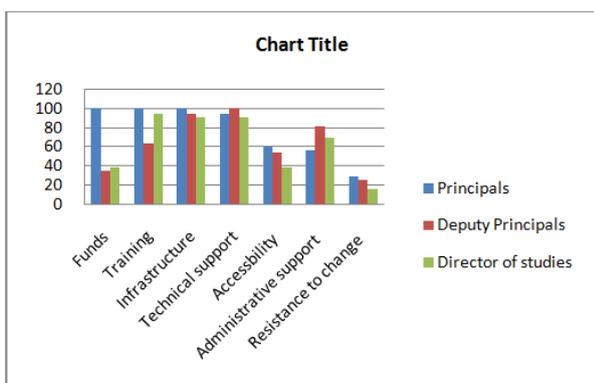


Figure 2: Challenges Faced in Use and Integration of ICT in Public Secondary Schools Management

Figure 1 presents the study findings on challenges faced in use and integration of ICT in secondary schools management in Bungoma South District, Kenya. It was noted that reasons

attributed to the challenges were divergent in regard to the schools' ICT status. The results indicated that an overwhelming 100% of principals, 34.4% of Deputy Principals and 37.5% of Director of studies cited financial constraints as major challenge. Principals argued that ICT as an innovation requires adequate funds for infrastructural development, acquisition and maintenance, hiring of ICT technicians and capacity building. Unfortunately, schools operated on shoe string budgets hence unable to meet the requirements for use and integration of ICT in management. While a smaller percentage of Deputy Principals and Directors of studies held the view that financial resources were a challenge, majority argued that the problem was not funds but failure to get priorities right. The principals (100%); deputy principals (62.5%) and director of studies (93.8%) stated that lack of training was a barrier to most teachers regarding use and integration of ICT in management. Respondents observed that teachers feared to use and integrate ICT in management activities because of unforeseen computer malfunctions and lack of technical support. Conversely, some teachers had basic knowledge and skills including database, word processing, PowerPoint and internet operations which enabled them to use and integrate ICT in management.

Information Communication Technology is an innovation and most school principals were tasked to innovate and renovate physical infrastructure. This study finding revealed that 100% of principals, 93.8% of Deputy Principals and 90.6% of Director of studies cited lack of adequate ICT infrastructure as a major challenge in use and integration of ICT in management. In 50% of the schools, respondents observed that there was inadequate room for ICT equipment hence congestion limiting teachers to make maximum use of computers and the internet. Most respondents complained of either lack of or poor internet connectivity which was a hindrance to communication and linkages through email and fax. The school management did not make adequate use of the internet for purposes of professional and educational resource; yet such processes brings into best management practices such as decision making and problem solving. Electricity power supply is a major ICT infrastructural necessity however while some in some respondents pointed out lack of while others complaint of frequent power interruptions which demoralized teachers in use and integration of ICT. There was evidence of great digital divide in ICT use in that 50% of schools had more than ten computers with internet connectivity in 37.5% of schools while 31.25% had no single computer in schools. The economic status of the schools may well explain use and integration of ICT in management. This study finding agreed with [25] study in Cambodia which revealed that there was poor ICT infrastructure in secondary schools and only 6% of 698 schools were connected on electric grid, 8% used generators and 4% used solar panels.

The ICT technicians are rare and may be expensive to hire. The principals (93.8%), Deputy Principals (100%) and Director of studies (90.6%) observed that lack of technical support was a great barrier to use and integration of ICT. The study established that while only 6.25% of the schools employed an ICT technician, 34.38% who out sourced complained of shoddy work. Teachers from schools without

ICT technicians had fear and lacked confidence in use and integration of ICT. These findings concurred with earlier studies by [12] indicating that computer breakdowns without technical support interfered with teachers use of computer especially where there were no repairs. Availability of technical support encourages teachers to use and integrate ICT without fear of troubleshooting and device malfunction. The study finding revealed that 59.4% of principals, 53.7% of Deputy Principals and 37.5% of Director of studies indicated that accessibility to ICT equipment was a issue in schools. While some schools had computers and internet connectivity, teachers were denied access because the devices were meant for administrative activities like secretarial and financial transactions. The other subsystem managers such as Deputy Principals, Director of studies and heads of departments were limited in use and integration of ICT for communication, record keeping, examination processing and analysis. In other incidences, there was complete lack of physical infrastructure, computers and internet hence inaccessibility. The current study findings agree with [3] that both developing and developed countries find access to computer a major barrier to ICT adoption and integration. Only 30.9% of principals accessed computers everyday because they have them in their offices

The school administration is central to implementation of programs in schools and is expected to provide support to other managers in the system. The study revealed that 56.3% of principals, 81.1% of Deputy Principals and 68.8% of Director of studies observed that effective use and integration of ICT calls for administrative support. While principals felt they were offering enough administrative support to teachers, 34.38% of principals with inadequate ICT infrastructure or totally no ICT equipment observed that principals too need support from relevant stakeholders such as MoE, Parents Teachers Association, CDF and Teachers Service Commission to facilitate ICT acquisition, capacity building, hiring of technicians and physical infrastructure. According to the Deputy principals and Director of studies who were expected to use computers and email regularly, felt administrative support was not enough regarding provision of ICT equipment as evidenced in the ratio of computers to teachers, room, power supply and internet connectivity. This finding raised questions on the role of the principal in ICT use and integration in Management. These findings agreed with [24] study findings in Cyprus which established that principals too require support from MoE such as installation of management programs and technical support for repair and maintenance. Administrative support came out variously depending on the school's ICT status.

Although schools were faced with several challenges, only 28.1% of principals, 25% of Deputy Principals and 15.6% of Director of studies cited resistance to change as a challenge. Respondents stated that through school initiatives to train teachers in basics of ICT use and integration, there was minimal resistance from teachers but those who resisted were treated as normal. This study finding disagrees with [26] study in Queensland State, Australia that teachers' resistance to change was common among older teachers than young with the former embracing status quo despite the changing times in this 21st century. The issue of age did not arise as reason for resistance in this study.

Table1: Challenges Faced on Use and Integration of ICT in Management (QASOs n=3)

Challenge	Frequency (f)	Percentage (%)
Infrastructure	3	100
Financial Resources	3	100
Knowledge and Skills	3	100
Resistance to change	2	66.7

Table 1 presents percentage of QASOs' views on challenges faced in use and integration of ICT in management. There was some kind of consensus among QASOs that 100% of the schools have issues with various forms of ICT infrastructure, financial constraints, lack of skilled manpower in use and integration of ICT and electricity problems. QASOs argued that most schools either totally lack or have inadequate ICT equipment such as computers, internet connectivity, classrooms and electricity. Some schools did not even have electricity. Apart from the mobile phone, only 50% of the schools with internet connectivity communicated through email to the Ministry of Education, Kenya Revenue Authority and Teachers Service Commission while an equal percentage (50%) outsourced internet services. The implication was a serious digital divide in use and integration of ICT in management of secondary schools. It was established that most schools lack ICT infrastructure due to financial constraints. These findings concurred with [12] who stated that computer use requires adequate funds to facilitate relevant infrastructure, safeguard equipment, capacity building and employment of technicians to provide technical support and maintenance. Although ICT is a technical area that requires knowledge and skills, the study finding revealed that there was inadequate skilled manpower in the use and integration of ICT. The finding was in agreement with [2] study in Nigeria which indicated that 52% of the respondents cited lack of manpower in use of ICT while 40% cited lack of skills training in ICT. There were 66.7% QASOs indicating that ICT is an innovation and teachers resist its use especially due to lack of skills, administrative and technical support.

6. Opportunities for use and integration of ICT in secondary schools management

Respondents: Principals (n=32) and QASOs (n=3)

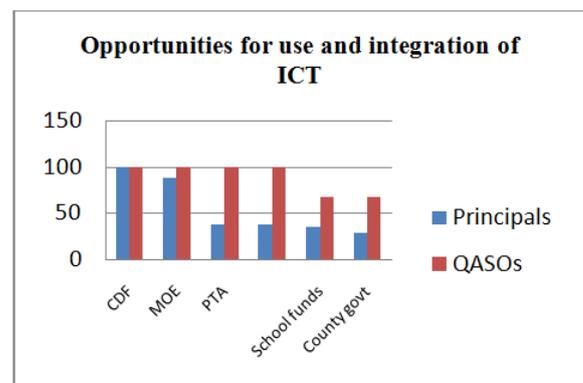


Figure 3: Opportunities for use and integration of ICT in public secondary schools management

The Constituency Development Fund has been on the forefront in infrastructural development of constituencies in

Kenya. All the 100% of principals and QASOs were unanimous that schools banked their hopes on the CDF. Some 46.87% of the schools received ten computers from CDF computer project in the district and respondents from such schools still expected CDF to fully equip them to total ICT compliancy. On the other hand none beneficiaries of CDF computer project were hopeful that CDF would remember them on this. The present study finding concurred with [15] who observed that most schools in Bungoma East District, Kenya benefitted from CDF in terms of infrastructure development and maintenance.

The MoE is a major stakeholder in secondary schools development. The study established that 87.5% of principals and 100% of QASOs were of the view that the MoE would assist schools to be fully equipped in ICT. In the recent past, the MoE donated computers, projectors, laptops and internet connectivity and trained at least two teachers from the District. This gesture gave respondents hope that the MoE would facilitate them in ICT use and integration in management. This finding agreed with [12] study in Namibia where case study schools received computers and technical support from MoE.

The PTA is a huge contributor towards secondary schools infrastructure projects. While only 37.5% of principals were of the view that PTA would help schools on ICT use and integration in management, all QASOs were in agreement. Although few principals from established schools cited PTA, majority from poor or less established schools observed that PTA would be overwhelmed with school projects and were likely to resist any request for contribution towards ICT. However QASOs stated that schools should not shy away from asking PTA to assist in ICT establishment and development because it is part of cost sharing. According to [22] study findings 16.07% of schools acquired computers through PTA projects.

Donors and well wishers are greatly associated with computer initiation in schools. While only 37.5% of principals cited donors/well wishers, 100% of QASOs concurred. Principals observed that some donors had been handy in managing school website (6.25) and capacity building (3.13%) which made a difference. According to QASOs, schools should form a habit of out sourcing for financial and material resources from well wishers both locally and internationally through proposal writing.

Not very many schools in the district were economically established and only 34.4% of principals and 66.7% QASOs indicated that school funds would assist in ICT acquisition of equipment. Majority of the respondents were silent on this opportunity in which principals decried financial constraints schools faced. While QASOs stated that schools had enough funds and it was just a question of attitude and priorities, principals observed that ICT use and integration in management was not a priority but classrooms, dormitories, sanitation among others were. An earlier study by [22] found that 53.57% of schools acquired computers through school funds

The County government is expected to factor into their budgets school development projects however; only 28.1%

of principals and 66.7% of QASOs cited County government. Most principals argued that the County government like CDF may be selective based on unknown criterion on funding for ICT while QASOs stated that it's within the county development project.

7. Recommendations

This study recommended that the MOE increases its budgetary allocation to cater for capacity building. Inequalities in access to ICT hardware and software should be addressed to minimize gap in digital divide. The school leadership should source for funding to enhance ICT resources for management. The TSC should post more ICT technical personnel/teacher to public secondary schools in the County.

8. Conclusion

This study concluded that there was greater digital divide in use and integration of ICT in public secondary schools management in terms of ICT resources. There were causal factors for digital divide which included lack of funds, ICT management software and hardware, skilled manpower and general physical infrastructure. Teachers had basic skills in ICT which were not adequate for use and integration in management operations. Despite the challenges experienced, there were several opportunities to rely on for ICT use and integration in public secondary schools management in Bungoma District.

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Author Profile



Anne Nang'unda Kukali is currently pursuing her PhD in Educational Management at Maseno University, Kenya and set to graduate in 2014. She earlier on received her M.ED degree in the same area of study and University in 2010 and B.ED (Honours) in Special Education from Kenyatta University, Kenya in 2004. She works with Teachers Service Commission Bungoma County, Kenya.