PREPAREDNESS OF PUBLIC PRIMARY SCHOOLS IN THE IMPLEMENTATION OF LAPTOPS PROJECT IN KENYA; A CASE OF KIMILILI SUB COUNTY, BUNGOMA COUNTY

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DECLARATION

This research project is my original work and has not been submitted to any other university or institution of higher learning for examination for any award.

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This Research Project has been submitted for examination with my approval as the university Supervisor.

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DEDICATION

I dedicate this research project to my wife Judith Wafula. My daughters Purity, Harriet, Dorothy, Vivian and son Fabian for their encouragement and support during my time of studies.

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To all of the aforementioned, I say may God bless you abundantly.

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ABBREVIATIONS AND ACRONYMS

CCK	Communications Commission of Kenya
EFA	Education-For-All
ICT	Information Communications Technology
IDB	Inter-American Development Bank
IICD	International Institute for Communication and Development
IXT	Internet exchange points
KEBS	Kenya Bureau of Standards
KENET	Kenya's Education Network Trust
KESSP	Kenya Education Sector Support Programme
MOE	Ministry of Education
NEPAD	Research and Development
NETS	National Educational Technology Standards
NGOs	Non-Governmental Organizations
OLPC	One Laptop Per Child
PTA	Parents- Teachers Association
STAR	School Technology Assessment of Readiness
SWAP	Sector Wide Approach
TAC	Teacher Advisory Centre
TPB	Theory of Planned Behaviour

ABSTRACT

The laptop project is one of the flagship projects promised by the Jubilee government. The project is earmarked for implementation in the public primary schools with standard one pupils being the beneficiaries. However, there is currently a debate about how the implementation should take place or postponed because of a number of challenges. The purpose of this study was to investigate the preparedness of the public primary schools for the implementation of laptops project in Kimilili Sub County, Bungoma County. The objectives of this study are; to ascertain infrastructural preparedness, to examine teachers' preparedness in computer knowledge, to establish schools preparedness in subject content availability, and to assess preparedness of school management in the implementation of laptop projects in public primary schools in Kimilili Sub-County. Therefore the research questions for the study are; Does the available infrastructure meet the requirements, Do the teachers have computer knowledge and skills, Are schools having access to subject content, Are the school managers prepared for the implementation of the laptops project in public primary schools in Kimilili Sub-County? The study adopted the descriptive survey research design to study the preparedness of public primary schools in the implementation of laptops project. The target population was 45 public primary schools in Kimilili Sub County with 739 teachers and 3 TAC tutors. Therefore the sample for this study was 149 respondents from 9 schools. The sampling technique used was stratified sampling using zones as strata. Purposeful selection was used to obtain the head teachers and TAC tutors while simple random selection was employed to obtain 149 teachers from nine schools. The research instruments used in this study for data collection were questionnaire and interview schedule. The questionnaires were given to teachers and head teachers while interview schedules were administered to the TAC tutors. Data was summarized using SPSS software then frequency tables and percentages were used to analyse the quantitative and qualitative information. From findings, major challenges faced by the schools which have contributed to the unpreparedness for the laptops implementation included lack of adequate training in ICT for teachers and administrators, limited computer hardware dedicated to administrative work, lack of time and absence of appropriate administrative software. The study findings suggest that for successful implementation of the laptops project in Kenya; innovative strategies that include training and the formulation of an ICT policy, ensure adequate supply of electricity and equipping all the teachers in schools and ensuring that the school management committees are at par with ICT use in schools.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

An effective teaching/learning process must stimulate intellectual curiosity and offer a sense of enjoyment that will move the students from the passive role of recipients of information to the active role of builders of knowledge. Yet, engaging the learner in this process can be the most challenging task for teachers. ICTs are effective instructional aides to engage students in the learning process. Videos, television, and computer multimedia software provide information that can be authentic and challenging in addition to stimulating students' sensorial apparatus through images, colour, sound, and movement (Wadi, 2005).

Even though the idea of laptop project arose out of political campaigns of the 2013 general elections by the Jubilee Coalition, it provided an avenue or a strategy towards the accelerated adoption of ICT in educational endeavours is the implementation of the laptops project. Therefore for the purpose of this study ICT uptake is closely linked to the laptop project.

Social, economic, and technological changes of the past decades are making education and training for all more crucial than ever. Yet, educational systems, to different degrees worldwide, are struggling to afford educational opportunities for all, to provide their graduates with the necessary knowledge and skills for evolving marketplaces and sophisticated living environments, and to prepare citizens for lifelong learning. To meet these challenges, countries have to focus concurrently on expanding access, improving internal efficiency, promoting the quality of teaching and learning, and improving system management (Wadi, 2005).

Expanding access to education is a matter of both economic development and social justice. It is true that worldwide illiteracy rates have declined in the past 30 years, but it is also true that the demands on knowledge are much higher now than 30 years ago. In the past, an agrarian society could thrive economically even when more than half of its population was barely literate, but this is no longer possible in modern societies in the Information Age. To remain economically competitive and prosper in this global, knowledge-driven economy,

countries cannot afford to have large sectors of their population excluded from education, or at the lower level of the educational process (Sonia, 2005).

Education is positively related to development—that is, a higher proportion of the population of the most developed countries has attained higher educational levels than the population of developing countries. In regions that have stronger economies, such as North America, Western Europe, and parts of Asia, more than half of the college-age youth population is indeed attending college. Tertiary enrolment in the least developed countries is about 3%. Approximately 90 million secondary-school-aged children in Southern Asia were not in school in 2000, and in sub-Saharan Africa, the number of school-aged children who are not in school continues to grow (Sonia, 2005).

The effectiveness of ICTs-the realization of their potential—depends to a large extent on the context and quality of application. Moreover, since ICTs are only tools for education, it is difficult to isolate the factors that may be contributing to a positive result—such as educational philosophy, quality of teaching, parent support, and students' characteristics. With these caveats in mind, evidence from large studies and meta-analyses suggests that use of ICTs, particularly computer technologies, is correlated to positive academic out comes, including higher test scores, better attitudes toward schools, and better understanding of abstract concepts. A longitudinal study of a statewide experiment with computers in the classroom found that those most in need of help— low-income, low-achieving students, and students with learning difficulties (Wadi, 2005).

Digital inclusion must be addressed as a policy priority within all ICT infrastructure issues. There is a clear understanding that ICT penetration based solely on market forces is unlikely to eliminate digital exclusion and in turn impeded the success of the relevant agricultural and rural policies. Traditional "Top down" ICT Adoption dictates are at best partially successful. Coupled with a bottom-up participatory approach for ICT Adoption efforts are highly recommended based as a potential critical success factor (Samii, 2008).

At the Ministry of Education, specific objectives in its Strategic Plan that concern the exploration and implementation of technology are being realised: a ministry website has been developed, a network system linking all sections of administration is being planned, and links to the schools are being negotiated with stakeholders.

Africa has been on path towards achieving ICT and during the 10th Meeting of the Africa Partnership Forum in Tokyo on 7-8 April 2008, it was stated; Africa is on the move, and information and communications technologies (ICT) are a powerful tool to boost economic growth and poverty reduction. ICT increase efficiency, provide access to new markets or services, create new opportunities for income generation and improving governance and give poor people a voice. Taking into account Africa's complexity and diversity, specific interventions are required rather than "one-size-fits-all" approaches (Buchele, 2009).

1.2 Problem statement

Access to educational opportunities is not only important for adopting and adapting ICTs to promote economic growth, but ICTs can also improve the quality of education a country provides. Theoretically, Warschauer notes many similarities between traditional literacy and ICT literacy. Both share many important characteristics in the process of human capital development, which is paramount in succeeding in the knowledge economy. Both literacy and ICT access are essential to human communication and knowledge production (Warschauer, 2002).

Furthermore, "Literacy acquisition obviously requires the development of a variety of skills, knowledge, and attitude, including cognitive processing skills; background knowledge about the world; and the motivation, desire, and confidence to read – and this has important parallels to the kind of skills, knowledge, and attitudes necessary to make meaningful use of ICT"(Warschauer, 2002). In addition to important pedagogical ties, ICT initiatives in education typically emphasize the provision of technology resources to both teachers and students.

Currently, several international programs such as the World Links program and the Global Learning Portal instruct teachers in ICTs competency and encourage them to use them in their own classrooms. Otherwise, most programs encourage placing Internet-enabled computers in schools and learning centres to allow specialized learning opportunities. In the future, it is feasible that ICTs will foster global educational opportunities. For example, Pippa (2000), a noted digital divide scholar portends that increased Internet access can, "widen access to training and education" particularly through distance learning programs. Ultimately, ICTs can

potentially expand and improve educational opportunities for developing countries seeking entrance into the global knowledge economy (Pippa, 2000).

To be successful, the one laptop per child (OLPC) experiment cannot end at the distribution of the laptops to the countries. There are a myriad of further logistical problems, as well as implementation and adoption hurdles to overcome. From a purely logistical view, the laptops must be transported within the country to the students, probably using existing textbook distribution methods. The "bitfrost" security features on the laptop require some effort (and ideally Internet connections) to activate the laptops, but this hinders mass theft of the machines (Buchele, 2009).

Further technical issues are that while the laptop can be manually powered for short periods of time, it requires some access to electricity, as will the per-school servers which will provide resource storage (a virtual library) as well as back-up services and perhaps an Internet gateway for the school. Internet access, if provided via satellite, will require technical effort to set up. The mesh network may need to be extended in cases where a child lives too far from other members of the mesh to connect to them at home (Camfield, 2007).

Individually, none of these hurdles are insurmountable, but as a group, and happening across the country as the government attempts to deploy a million or more laptops simultaneously, poses some difficulty.

As the implementation of the laptop project looms, Most Counties in Kenya, just like in similar cases sighted in other development Countries, are likely not to realise smooth rollout of the project. Kimilili Sub County is facing infrastructural challenges in terms of sources of power (electricity), well equipped schools and space. Teacher preparedness and training is yet to take place. The whereabouts on the development and delivery of subject content is still unknown while the logic on the choice of standard one pupils has still not sunk and many are still sceptical about it. The interplay of all these factors poses a serious hurdle on the roll out of the OLPC project which these study seeks to address.

1.3 Purpose of the study

The purpose of this study was to investigate the preparedness of public primary schools in the implementation of the laptops project in Kimilili Sub County, Bungoma County.

1.4 Research objectives

The objectives of this study were;

1. To ascertain the infrastructural preparedness in the implementation of laptops project in public primary schools in Kimilili Sub-County.
2. To examine teachers preparedness in Computer Knowledge and skills towards implementation of laptops project in Public Primary schools in Kimilili Sub-County
3. To establish schools preparedness in subject content availability in implementation of laptops project in public primary schools in Kimilili Sub-County.
4. To assess preparedness of school management in the implementation of laptops project in public primary schools in Kimilili Sub County.

1.5 Research questions

The study sought to answer the following questions;

1. Does the available infrastructure meet the requirements for implementation of laptops project in public primary schools in Kimilili Sub County?
2. Do the teachers have Computer Knowledge and skills in implementation of laptops project in public primary schools in Kimilili Sub County?
3. Are schools having access to subject content for the laptops project implementation in public primary schools in Kimilili Sub County?
4. Are the schools managers prepared for the implementation of the laptops project in public primary schools in Kimilili Sub County?

1.6 Significance of the study

It is hoped that the findings of this study will help stakeholders in the ICT sector to devise appropriate strategies enhance the implementation of laptops project in public primary schools. The teachers will benefit from the study by embracing ICT which will enhance efficiency in curriculum delivery. Curriculum developers will be assisted to develop teaching and learning materials as well as syllabi development. The government will be able to create policies that will facilitate the development of e-learning and provide financial resources for ICT development in the rural areas. Non-Governmental Organizations (NGOs) and private sector will be able to identify the gaps that exist in provision of ICT and direct their effort to those areas of need.

1.7 Delimitation of the Study

The study was carried out in Kimilili Sub County, Bungoma County in Western Province. The District has three zones namely; Kimilili Central, Kimilili East and Kimilili West. According the Kimilili District education office, the District has 45 public primary schools with 739 TSC teachers and three TAC tutors manning the education zones. Kimilili is one of the three administrative centers in Kimilili Sub County.

The study was confined to public primary school teachers, head teachers. This is because the government has earmarked these schools for the roll out of laptop project. The study was concerned with factors inhibiting the implementation of laptops project in public primary schools in Kimilili Sub County. Only public primary school teachers and head teachers and the TAC tutors participated in the study because public primary schools have similar set up guided by policies from the Ministry of Education.

1.8 Limitations of the study

The following were some of the limitations; inadequate finances weighed heavily on the success of this research especially covering the entire district needed a substantial sum of money to facilitate movement and the overall process. This process therefore depended on volunteer research assistants and resources were pooled together coupled with proper strategic and logistical planning to cut on the cost.

Time constraint due to the magnitude of the research was expected but the researcher devoted extra hours in order to accomplish this research project. To minimise on the cost of the study and save on time, an appropriate sample that represented the target population was picked.

1.9 Assumptions of the study

During the study, the following assumptions were considered; that all respondents would give honest responses. It was also assumed that the sample taken would represent the population adequately. The data collection instrument had validity and measured the desired outcomes for the study. The respondents would answer questions correctly and faithfully.

1.10 Definition of significant terms used in the study

ICT: A diverse set of information, communication and, technological tools and resources used to transmit, store, create, share or exchange information.

Infrastructure: Refer to networks, cables, wireless links or satellite dishes, as well as other important elements such as optimal use of these physical assets like electricity (power sources) and facilities.

Teachers' computer knowledge: Refer to how much information the teachers know, their attitudes and practice regarding computer.

Subject content: Scope of information or knowledge available for the teachers or the teacher intends to pass to the learners.

School management: Refer to a group of individuals chosen, elected or appointed and charged with the responsibility of overseeing the smooth running of primary schools.

Preparedness: The setting up of infrastructure and human resource towards laptop project implementation in public primary schools.

Implementation: Effectively carrying out laptops project in public primary school

1.11 Organization of the study

The study is organized in five chapters: Introduction, Literature review, Methodology, Data analysis, Findings, Conclusion and Recommendations. It has a cover page with the title and the details of the researcher. The preliminary pages contain declaration, dedication, and acknowledgement, abstract, table of content, list of figures, list of tables, abbreviations and acronyms and the pagination is in roman numbers.

Chapter one (Introduction) contains; background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, delimitation of the study, limitations of the study, assumptions of the study, definition of significant terms and the organization of the study.

Chapter two (Literature review) contains; Introduction, infrastructure, teachers' knowledge and attitude, subject content availability and school management committee, theoretical framework, conceptual framework, extraneous variables and summary.

Chapter three (Research methodology) contains; Introduction, research design, target population, sampling procedures and sample size, data collection instruments and their validity and reliability, methods of data collection, data analysis techniques, operational definition of variables, ethical considerations and summary.

Chapter four (Data analysis, presentations and interpretations) contains; Introduction, questionnaire return rate, demographic characteristics of the respondents, infrastructure, teachers' knowledge and attitude, subject content availability and school management committee and the implementation of laptops project in public primary schools.

Chapter five (Summary, conclusion and recommendation) contains; Introduction, summary of the study, conclusions, recommendations and suggestions for further studies

The report also has references clearly outlined in the APA style and appendices; letters of transmission. Questionnaires for the school teachers and head teachers, interview schedule for TAC tutors, relevant tables, time schedule and research budget.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides the reviewed literature of the studies that have been done on the factors inhibiting the implementation of laptops project in public primary schools. The chapter deals with the factors such as; infrastructure, teachers' knowledge and attitude, subject content availability and cohort choice.

2.2 Infrastructure and implementation of laptops project

The lack of adequate infrastructure has hampered the implementation of the laptops project in public primary schools in the country. Emphasis will be placed on; provision of support infrastructure, such as, energy and roads, supporting software development, promotion of local manufacture and assembly of laptops equipment and accessories; and provision of incentives for the provision of ICT infrastructure (GoK, 2006).

In 2007, the Government of Peru ordered 290,000 OLPC laptops to be used individually by children in rural one-room schools, and Lima has reportedly ordered another 230,000 to 260,000 for future distribution. A preliminary evaluation carried out by the Inter-American Development Bank (IDB) and an independent investigation both suggest that the program, though viewed positively by teachers and parents, is mired in infrastructure difficulties (Warschauer, 2010).

A number of the country's rural schools still lack electricity access and those that do have electricity access sometimes have only one outlet in the principal's office, making charging—and subsequently using—the laptops nearly impossible. Most schools lack Internet access, further limiting how the laptops can be used. According to the IDB evaluation, only 10.5 percent of teachers receive technical support and 7 percent receive pedagogical support for use of the laptops (Warschauer, 2010).

ICT infrastructure mainly refers to networks, cables, wireless links or satellite dishes, as well as other important elements such as optimal use of these physical assets (interconnection of different networks or the management of the frequency spectrum) and their maintenance. ICT infrastructure in Africa has increased over the past years, in spite of the challenges of low

population density, low incomes and large rural populations. Particularly noteworthy is the virtual explosion of mobile phones in many African countries, which surpassed 200 million subscribers in early 2007 and continues to grow at higher rates than any other region. This has been particularly beneficial for rural areas. It is estimated that there are around 400,000 localities in Sub-Saharan Africa, of which 99% are villages. According to the ITU, less than 3% of these have a fixed line telephone connection, while 7% of rural households had a mobile service subscription in 2006 (APF, 2008).

The primary obstacle in making use of ICT for economic growth or poverty reduction for many is the absence or limited scope of existing ICT infrastructure, particularly in rural areas. Basic ICT infrastructure is concentrated in urban settings. For most of Kenya's rural population, ICT are physically out of reach. Where ICT infrastructure is in place, its use is often constrained due to inadequate supportive infrastructure, in particular electricity and, to a lesser extent, transport systems.

Africa's available ICT infrastructure is not fully utilised due to its low physical and technological capacity (as is the case for Internet bandwidth) and due to gaps in interconnectivity, both at regional and international levels. This means in practice that much of Africa's Internet and telephone communication is routed via networks and technologies located in North America or Europe, resulting in substantially higher costs for the end user than in other regions of the world.

While there are numerous initiatives to address the lack of infrastructure, many of them are moving forward slowly and/or lagging behind schedule. Implementation is hindered by a lack of long-term commitment, available investment capital and capacity and an absence of sustained support from implementing parties. In view of imminent increases in international bandwidth access, national infrastructure has become a much higher priority, and many countries are making strong efforts to establish national backbones. Alongside the roll-out of national fibre backbones has been the simultaneous emergence of microwave transmission networks. In the last decade Kenyan mobile operators, for example, have built between three and five times as much transmission network as fixed-line incumbents have in total. Mobile operators are now also upgrading their transmission networks in order to provide the capacity to support the delivery of 3G services.

To take maximum advantage of these developments, national interconnection between networks still needs improvement, along with increased deployment and lower-cost access in the last mile. Interconnection rates between telephony operators are often costly and the links often congested. Similarly, local Internet service providers usually have to interconnect over expensive congested international circuits due to the limited number of local Internet exchange points (IXP) – only seventeen countries in Africa have so far established an independent IXP (APF, 2008).

Supporting resources and capacities are also essential in order to fully benefit from ICT. Apart from reliable electricity supply – which is needed to run any ICT infrastructure – transport networks such as roads or rail are required to support increased economic and social activities – otherwise distances which were removed by ICT will remain an obstacle. A recent report from the World Bank pointed out that a country's capacity to absorb and benefit from new technology depends on the availability of more basic forms of infrastructure. This also implies that there are limits to technologies which can leapfrog (APF, 2008).

The government in its ICT policy outlines measures that will be put in place to encourage the provision of infrastructure for access to local, national and international information resources. The aim will be to provide sufficient internet capacity for schools, colleges, businesses; and to provide a reliable and secure internet infrastructure. A nationwide network consisting of fibre optic, satellite and terrestrial radio communication networks will be established (ICT policy, 2006).

The study therefore sets out to investigate how infrastructural concerns in the public primary schools in Kimilili Sub County would affect the implementation of the laptop project locally and even nationwide.

2.3 Teachers' computer knowledge and implementation of laptops project

Educators' knowledge and willingness to adopt ICT is often associated with sociological factors such as age and teaching experience using ICT (Cox & Marshall, 2007). Educators' approach to pedagogy may have an impact on whether the ICTs could be integrated into the teaching and learning process. If an educator believes in and holds on to traditional methods of teaching, he/she may not be likely to change his/her pedagogy to embrace ICT in teaching and

learning. Conversely educators with belief systems more inclined to constructivist principles are more likely to view learners as active participants in the learning process and therefore, readily integrate ICT in their teaching and learning practices (Fredriksson et al, 2007; Niederhauser & Stoddart, 2000).

It is a fact that teachers are at the centre of curriculum change and they control the teaching and learning process. Therefore, they must be able to prepare young people for the knowledge society in which the competency to use ICT to acquire and process information is very important (Plomp et al., 1996).

As a classroom tool, the computer has captured the attention of the education community. This versatile instrument can store, manipulate, and retrieve information, and is has the capability not only of engaging students in instructional activities to increase their learning, but of helping them to solve complex problems to enhance their cognitive skills (Jonassen & Reeves, 1996).

In addition, educational factors including levels of teachers‟ own education and literacy rates, and access to professional development play an important role. Indeed many studies indicate that it is teachers‟ attitudes, expertise, lack of autonomy and lack of knowledge to evaluate the use and role of ICT in teaching (or technophobia in teachers) that are the prominent factors hindering teachers‟ readiness and confidence in using ICT support. There is also a general inadequacy of learning resources, course curricula and other learning materials that incorporate ICT use.

It is a common misconception that access to technology on its own motivates teachers to apply it in their teaching. The biggest barriers to the use of computers identified by teachers participating in the 1998-1999 survey assessing the World Links schools programme were the lack of time available in classes, and in their own schedules for planning; and the lack of a national policy on the use of computers in schools (Kozma, McGhee, Quellmalz, & Zalles, 2004, p. 376).

Relatively few teachers identified infrastructure problems, such as the lack of computers in working condition, unreliable electricity or lack of access to the internet, although these varied by country. As less technologically advanced countries joined the programme in 1999-2000, the major barriers to ICT classroom use became the lack of computer hardware (60%), software

(56%) and reliable internet connections (52%), particularly in African countries such as Mauritania, Ghana and Zimbabwe.

Lack of access to technology is inevitably a major barrier in its application, but availability does not necessarily translate into use. However, in the study of Nigerian secondary school teachers by Tella et al (2007), a lack of technical support in the schools, and teachers‟ lack of expertise in using ICT, were the prominent factors hindering teachers‟ readiness and confidence in using ICT.

Teachers' characteristics (e.g. individual's educational level, age, gender, educational experience, experience with the computer for educational purposes and financial position) can influence the adoption of an innovation (Rogers, 1995, Schiller, 2003). The report by the National Center for Education Statistics (2000) indicated that teachers with fewer years of experience were more likely to use computers in their classes than teachers with more years of experience.

More specifically, teachers with three years or less teaching experience reported using computers 48% of the time; teachers with 4-9 years, 45% of the time; those with 10-19 years, 47% of the time, while teachers with 20 years or more reportedly used computers only 33% of the time. This may be due, in part, to the fact that new teachers have been exposed to computers during their training and therefore, have more experience using this tool. Then, one of the factors that determine the extent to which teachers use computers in their classes may be the number of years they have been teaching.

Moreover, Venkatesh and Morris (2000) investigated about age and gender differences in the overlooked context of individual adoption and sustained usage of technology in the workplace using the Theory of Planned Behavior (TPB). They studied on user reactions and technology usage behavior over a 5-month period among 355 workers being introduced to a new software technology application. The results showed that the decisions of men and younger worker were more strongly influenced by their attitude toward using the new technology. In contrast, women and older worker were more strongly influenced by subjective norm and perceived behavioral control. Then, these groups of people adopt very different decision processes in evaluating new technologies. On the other hand, Albirini (2006) found that age was not a significant factor in

relation to teachers' attitudes towards ICT. However, it was revealed in the current study that age correlated negatively with the Jordanian EFL teachers' attitudes towards ICT in Jordan ($r = -.13$, $p < .01$).

Furthermore, there are other personal characteristics that may influence how teachers use computer applications in their classrooms. The teacher's own learning style is certainly one such factor. For example, if a teacher is a creative thinker who likes the idea of constructing knowledge, is a life-long learner, a social learner, and a decision maker, he may be more likely to use computers in more integrative and transformational ways that are useful and valuable to students instead of ways that promote and support traditional classroom practices (Bielaczyc & Collins, 1999; Carvin, 1999). Therefore, personal characteristics of teachers are an important influence on how easily they take up an innovation. Support for this is provided by a classic American study of the diffusion of innovations. Rogers (1995) found that innovators are divided into five categories, depending on the stage at which they take up an innovation.

The initial innovators typically form the first 2-3 % to take up an innovation, while early adopters make up the next 13-14%. These two groups together might be called the earlier adopters. This is important when looking for ways to encourage further take-up, because Rogers identifies a tendency for there to be distinctive differences in the personality characteristics of earlier and later adopters. As he summarizes it, earlier adopters differ from later ones in tending to show greater empathy, less dogmatism, a greater ability to deal with abstractions, greater rationality, a more favorable attitude towards change, a better ability to cope with uncertainty and risk, a more favorable attitude toward science, less fatalism and higher aspirations. This characterization implies a distinctly unfavorable perception of later adopters. However a positive description of later adopters is not hard to provide. Compared to earlier adopters, later adopters could equally well be described as more realistic, steadier in their judgments, with a concrete grip on problems, having a dislike for fads, being less willing to take unnecessary chances, having a preference for being guided by experience and with a more realistic appreciation of possibilities than earlier adopters.

Many school leaders still perceive the lack of ICT-related knowledge of teachers as a major obstacle to the realization of their ICT-related goals (Pelgrum, 2002). The literature describes

the kind of skills teachers may need when integrating ICT in new student-centred learning approaches. However, identifying which competencies each teacher needs to acquire is far from simple, as this depends very much on the circumstances of their particular school. Personal teaching styles also play a major role. Again, „one size fits all" does not usually work (Davis, Preston, & Sahin, 2009). We also need to recognize that substantial learning can take place while teaching, and even learning, from students.

The aspect of teacher training and preparedness is very crucial for the implementation of the project due to their role in back stopping the project and therefore it is imperative for this study to investigate how this will impact the overall project implementation.

2.4 Subject content availability and implementation of laptops project

The local development of indigenous digital or electronic education content in Africa is very limited. Within a formal school education context, this often refers to the development of digital curriculum content aligned with or directed by national curriculum frameworks. In addition to print-based media, there are also examples of the use of video, audio, and computer-based multimedia formats.

In Kenya, the development of audio-based curriculum content is widespread under the leadership of the Kenya Institute of Education. This role is also played by the Open Learning Systems Education Trust in South Africa, which produces audio content for use by teachers in a number of African countries.In South Africa, Mindset Network and the Learning Channel specialize in the development of curriculum-aligned video content in a range of subject areas offered in South African schools. In Botswana, the Mochudi Media Centre also trains teachers in the development and use of video content.

There is a growing trend towards the development of curriculum content in multimedia format. In Uganda, the work of CurriculumNet, a project of the National Curriculum Development Centre in partnership with the International Development Research Centre, invested in the development of local, digitized curriculum content in school-based subjects like mathematics in multimedia format. Organizations such as Learn things Africa specialize in the development of multimedia content in a range of subjects that have been used extensively in the NEPAD e-Schools Demo Project in a number of countries. Similarly, Mindset Network in South Africa has developed multimedia content directed by South Africa's National Curriculum Statement in

new subjects like information technology for both primary and high school. The need to develop local digital content is recognized in most of the ICT education sector policies. Several policies specify the agency to assume responsibility for this role. Typically an existing agency that previously had the responsibility for developing print-based curriculum materials assumes this function.

Successful ICT Adoption is conditional on human capital development. This includes more than a comprehensive education curriculum effort. It should involve prioritizing extension and end user involvement in policy formulation, meticulous planning of resource allocation and ultimately assessment of the results based on feedback and evaluation of results.

Involve research in prioritizing practical solutions for ICT uptake. Some research pointers for example include; how to construct sector-specific ICT architectures and cross-industry standards, how to use best practice models for specific processes integrations, how to develop sustainable program commitment to rural viability; involve research in specific programs with ICT Adoption as a major core issue.

This study therefore will also be concerned with the scope and availability of the subject content matter. As expressed by other scholars in this literature, content development is such a massive task that could easily hinder the roll out of the project. Therefore it is important to find out to what extend does the availability of the content can be a serious problem in the implementation of the project.

2.5 School management and implementation of laptops project

School leaders can be a major influence on such school-level factors as well as help buffer against the excesses of the mounting and sometimes contradictory external pressures. As the analytical framework for OECD's 'Attracting, Developing and Retaining Effective Teachers Project' (OECD, 2002, p. 8) argues, "A skilled and well-supported leadership team in schools can help foster a sense of ownership and purpose in the way that teachers approach their job. … conferring professional autonomy to teachers will enhance the attractiveness of the profession as a career choice and will improve the quality of the classroom teaching practice." (OECD, 2002, p. 14) Spencer (2001, p. 814) makes clear that the "single most powerful recruiter of teachers are schools themselves. People who have had positive experiences in school can prolong that experience by becoming teachers."

Research on decision making in Australian primary (Mulford et al, 2000) and secondary (Mulford et al, 2001) schools found that the more positively teachers viewed the decision making processes in the school the higher the degree of influence and control they perceived to be exerted by education staff groups in the school. Ongoing analysis of this data base (Mulford et al, in press) shows that where decision making is perceived by teachers in secondary schools as collegial, cooperative and consultative and providing adequate opportunities for participation it will be more likely to lead to positive student perceptions about their school and teachers as well as perceptions about relationships and their own performance than where decision making is more top-down, executive, or does not foster widespread teacher involvement.

However, the results also show that while decentralisation may have occurred from the system to school level it had not necessarily occurred within schools and where it had it tended to be about administrative rather than education matters. These results are supported by other research. Gray (2001, p. 13) points out that in England teachers "note considerably greater changes in areas to do with their schools' management and organisation than in ethos, culture or teaching … classroom-level 'changes' were far less frequent than school-wide initiatives." From case studies in nine Scottish secondary schools Adler et al (1997, Pp. 6-7) also concluded that implementation of devolved school management "has, so far, fallen short of transforming the culture and working patterns of schools but had contributed to a dramatic change in the role and status of headteacher." Schools "seemed able 'to respond more quickly to changing needs and priorities', but this was mainly in terms of repairs, maintenance and equipment."

One of the most congruent findings from studies of effective leadership in schools is that authority to lead need not be located in the person of the leader but can be dispersed within the school in between and among people. (MacBeath 1998; Day et al, 2000) There is a growing understanding that leadership is embedded in various organisational contexts within school communities, not centrally vested in a person or an office. To illustrate, a recent study in USA by McLaughlin and Talbert (2001) that examined principals' effects on teachers' community, instructional practices, and careers found no instances of leaders who created extraordinary contexts for teaching by virtue of their own unique visions; nor did the study reveal any common patterns of strong principals' characteristics. Successful principals turned out to be men and women with varied professional backgrounds who worked in collaboration with teacher leaders and showed respect for the teaching culture. They found various ways to support teachers in getting the job done. "The leadership of these principals was not superhuman; rather, it grew from a strong and simple commitment to make schools work for

their students and to build teachers' determination and capacity to pursue this collective goal." (Copland, 2001, p. 532)

Harris and Muijs (2002, p. 1) argue that, "the real challenge facing most schools is no longer how to improve but more importantly, 'how to sustain improvement?" Further, they argue that, "Sustainability will depend upon the school's internal capacity to maintain and support developmental work … [and that] sustaining improvement requires the leadership capability of the many rather than the few and that improvements in learning are more likely to be achieved when leadership is instructionally focussed and located closest to the classroom." In other words, Harris and Muijis (2002, p.2) are supporting the importance of teacher leadership, "a form of collective leadership in which teachers develop expertise by working collaboratively." Research on teacher leadership and improved student outcomes from Australia (Crowther, 2000 and Silins & Mulford, 2002a & b), Canada (Leithwood & Jantzi, 2000), USA (Louis & Marks, 1998) supports this position.

In pursuit of the Millennium Development Goals (MDGs) and Education For All (EFA) goals, coupled with the task of delivering the policies set out in the Sessional Paper No. 1 of 2005, on Policy Framework for Education, Training and Research, MOEST decided that the most effective mechanism to coordinate and successfully implement such a programme is through a Sector Wide Approach (SWAP). This approach will ensure the delivery of educational services to learners in the most effective and efficient manner. For this reason, since June 2004 the MOEST has been working closely with a wide range of stakeholders in the education sector in the development of a SWAP for the development of the education sector in Kenya for the next five years (KESSP 2005-2010).

The overall aim of MOEST's SWAP is to develop and secure funding for the Kenya Education Sector Support Programme (KESSP), which will be the basis upon which the Government, individuals, communities, the private sector, Non-Governmental Organizations (NGOs) and development partners, will jointly support the education sector during the period 2005/06 to 2009/10. Through SWAP, duplication and inefficient use of resources, which often occur when many projects and programmes are implemented without adequate co-ordination and a clear long-term and sector-wide development strategy, will be significantly reduced. This will ensure that the scarce resources are invested in programmes that will deliver equitable and quality education and training to all Kenyans (KESSP 2005-2010).

KESSP has been developed to enable the Government to provide "Quality Education and Training for Development" or 'Elimu Bora kwa Maendeleo' as translated into Kiswahili. In order to fulfill this mission, the MOEST and key stakeholders developed the Sessional Paper No 1 of 2005 that stipulates policies and strategies the Government will undertake and implement in order to address the challenges facing education and training. In order to successfully implement KESSP, the MOES&T will continue to work through strong partnerships with all stakeholders, including communities, civil society, (Community Based Organizations (CBOs), NGOs, religious organizations) other Government institutions, development partners and the private sector (KESSP 2005-2010).

The KESSP structure outlines various stakeholders that are key to its implementation. Among them is the School Management Committee whose roles are defined as; receive and account for all FPE resources, develop and implement school plans, mobilise additional resources and implement government policies and guidelines. It also recognized the Parents- Teachers Association (PTA) and assigned it the role of; monitoring implementation of school programmes, monitoring education services and mobilising additional resources.

One cannot therefore over-estimate the utilization of ICT in everyday activities of the school. Nwosu (2003) noted that ICT assists the school administrator to meet the task of school management in the areas of curriculum and instruction, school community relationship and school business operations. In support of this Mohammed (2006) argued that the introduction of ICT in schools enhances the daily school routine, programme, updating the evaluation of school programmes, solving individuals' or groups' as well as staff development.

Therefore, this engagement provide the school management committees in various schools with an opportunity to ensure that the preparation process for the implementation of the laptops projects is squarely on track and kind of complacency on their part would indeed affect its uptake and eventual roll out.

2.6 Theoretical framework: Theory of Domestication

Domestication is described as the process of technology adoption into everyday life. The concept of domestication was originally adapted from other disciplines such as anthropology and consumption studies, as well as from the media studies considering the context in which ICTs were experienced by the people using them (Haddon, 2006). According to Haddon (2006)

the framework looks beyond the adoption and use of ICTs (as well as gratifications or benefits) to ask what the technologies and services mean to people, how they experience them and the roles that these technologies can come to play in their lives. The processes observed in this framework are about how individuals encounter technologies and deal with them, sometimes rejecting them and at other times accepting them (Haddon, 2006).

Domestication consists of three main processes namely Commodification, Appropriation and Conversion (Frissen, 2000). Some researchers split the appropriation stage into Objectification and Incorporation stages, thus making four stages (Habib, 2004). In this study we will adopt the four stage process of domestication. Commodification (also known as imagination) refers to the way a technological product is designed and is given an image by the users as it emerges into the public space. At this stage symbolic and functional claims about the product are noted. The images could be a result of an advertising campaign. The product is evaluated on how well it would fulfil the consumers' perceived needs (Habib, 2004). In the case where the consumer has a choice of adopting, the commodification process may affect his/her decision to acquire the product.

Once purchased by an individual or an organisation, the product or object goes through a process of appropriation. At this stage the product is possessed by the owner and becomes authentic. When looking at appropriation, the objectification process is considered to examine how the product finds space and enters the geographical area of the owners. Objectification does not necessarily mean the product is accepted by the potential adopters. Products entering the school sphere may not be immediately integrated into its pedagogy. The product is then incorporated into the daily routines of its owners. Incorporation begins by first integrating the product in temporal structures both formally (in the work schedules) and informally (in the routines and habits).

In the conversion stage, the adopters of the innovation show their adoption by displaying it to the outside world physically or symbolically (Habib, 2004). In case of laptops and ICT for curriculum delivery, the display could be by individual teachers within a school environment or by the entire school as an adopter displaying to other schools. The first two stages of the domestication process are equivalent to what is normally referred to as adoption in most adoption frameworks (Pedersen & Ling, 2003). Thus, it is noted that the domestication framework allows for investigating the processes beyond the acquisition of the technology.

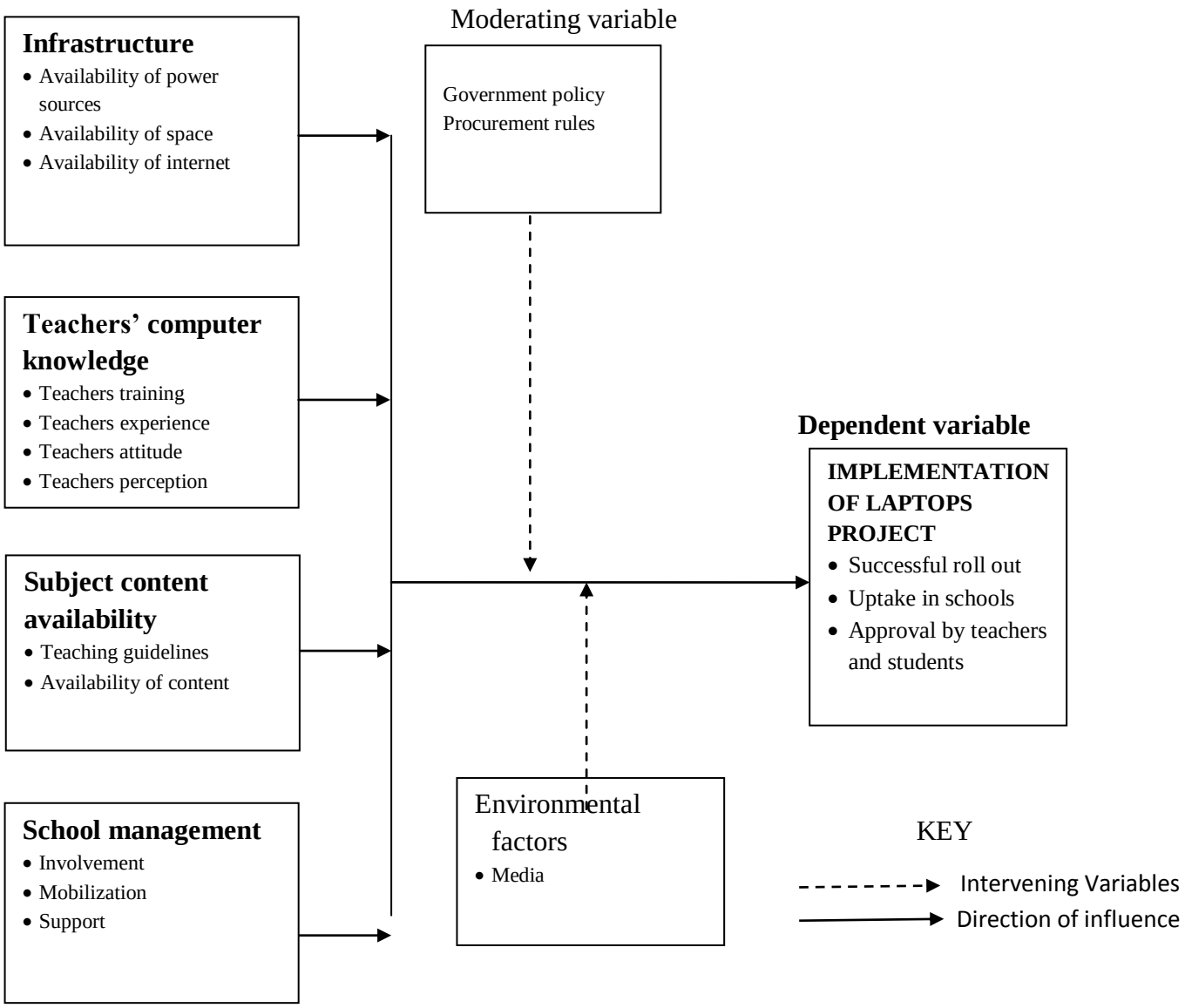
In this paper, we employed the domestication framework as the lens to understand the factors inhibiting the implementation of the laptops projects in the schools. The domestication framework has been used to study the adoption processes of a variety of technologies including personal computers, televisions and mobile phones (Perdesn & Ling, 2003). Again it should be noted that although the framework is mainly used to study person or household adoption of technology, others recommend that it can also be used to study organisational domestication of technology. For instance, Habib (2005), used domestication to study the adoption of learning management system at a university.

2.7 Conceptual Framework

The conceptual framework represents the relationship between independent variables intervening and moderator variables and dependent variables. Conceptual framework has therefore been developed from the reviewed literature and related theories.

Independent variables

Figure 1 Conceptual Framework



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with the descriptions of methods that will be used to carry out the study. The subsections includes research design, target population, sampling procedures and sample size, data collection instruments and their validity and reliability, methods of data collection and data analysis. In addition, this chapter includes data quality and analytical methods employed such as frequency distributions, cross tabulations, chi-square (χ) and multiple logistic regression models, ethical considerations and summary.

3.2 Research design

The study adopted a descriptive survey research design because according to Orodho and Kombo (2002), descriptive survey can be used when collecting information about peoples' attitudes, opinions and habits on educational or social issues. The design also optimizes on the strengths of a mix of quantitative and qualitative research methodologies.

The study focused on investigating the preparedness of public primary schools for the implementation of laptops project in Kimilili Sub County. The design was based on qualitative as well as quantitative information where data interpretation was followed by explanation on responses.

3.3 Target population

According to Mugenda and Mugenda (1999) a target population is that population which the researcher wants to generalize results. The target population for this study was public primary school teachers, head teachers and the TAC tutors. According to the Kimilili District education office (see appendix G), there are 45 public primary schools distributed in three educational zones. Therefore, there are 45 head teachers, a total of 739 (head teachers inclusive) teachers and three TAC tutors. Therefore the total target population for this study was 45 public primary schools with a population of 742 (694 teachers, 45 head teachers and 3 TAC tutors).

3.4 Sample Size and Sampling Procedure

This section describes the sample size and sampling procedure employed for this study.

3.4.1 Sample Size

Gay (1992) suggests that at least 10% of the population is a good representation where the population is large and 20% where the population is small. The 20% of the target population of 742 respondents made a sample size of 149 respondents.

3.4.2 Sampling Procedure

Purposive sampling was employed to ensure that for every school selected, the head teacher participated or in the absence of the head teacher, the deputy can represent. TAC tutors were also purposely selected to participate. Simple random sampling was used to select the schools within the zones and also the teachers form the selected schools.

Stratified sampling was used to select schools where the teachers' sample size came from using the zones as strata. Stratified sampling is suitable when dealing with homogenous subgroups like schools which form several segments or stratas. Random sampling is then selected for each strata (Mugenda & Mugenda, 1999).

There were three strata made up of public primary schools from the three educational zones. Nine schools were selected out of the 45 schools. Head teachers participated from every school selected. The TAC tutors also participated in the study. The sample size therefore consisted of 149 respondents as shown in table.

Table 1 Sample Size

	Population				**Sample size**			
Zone	**Schools**	**Teachers**	**Head teachers**	**TAC tutors**	**Schools**	**Teachers**	**Head teachers**	**TAC tutors**
Central	15	265	15	1	3	53	3	1
East	19	247	19	1	4	50	4	1
West	11	182	11	1	2	37	2	1
Total	**45**	**694**	**45**	**3**	**9**	**140**	**9**	**3**

3.5 Research Instrumentation

The research instruments that were used in this study for data collection was questionnaire and interview schedule. Questionnaires were useful instrument of collecting the primary data since the respondents can read and then give responses to each item and they can reach a large number of subjects (Orodho, 2004). There were two sets of questionnaires; one for the head teachers and another teachers. The questionnaires for the head teachers and teachers of departments had five sections. Sections A sought for general background information. Section B consisted of closed and open ended questions which sought for information relating to infrastructure, section C consisted of closed and open ended questions which sought for information relating to teachers' knowledge, attitude and perception, section D consisted of closed and open ended questions which sought for information on subject content availability and lastly section E consisted of closed and open ended questions which sought for information on the suitability of the choice of standard one cohort.

The interview schedule was administered to the TAC tutors. The interview schedules made it possible to obtain data required to meet specific objectives of the study (Mugenda & Mugenda, 1999). It also helps to standardize the interview such that the interviewer can ask the same questions in the same manner.

3.5.1 Pilot testing

Piloting ensures that research instruments are clearly stated and that they have same meaning to the respondents. A pilot study was done in Webuye Sub County avoid contamination of results. This was because the schools in Webuye Sub County have a formal set up as those in Kimilili Sub County. Besides, the two Sub counties have similar social cultural set up. Two schools and a TAC tutor will participate in the pilot of the research instruments. The schools will be selected through simple random sampling procedure.

3.5.2 Validity of the instrument

Both face Validity and content validity was checked. Face validity refer to the possibility that a question would be misunderstood or misinterpreted. Pre–testing was done during piloting stage to identify those items and then the items were modified accordingly. This was to increase face validity. The researcher prepared the document in close consultation with the supervisors. Borg and Gall (1985) points out that validity of an instrument is improved through expert judgment. The examiners during proposal defence and the supervisors therefore will expert judgment

which will help improve content validity. The necessary adjustments will then be made on the instruments to enhance their validity.

3.5.3 Reliability of the instrument

Mugenda & Mugenda, (1999) defines reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated trials.

The study used Spearman Brown Prophecy Formula to calculate the reliability coefficient. The formula for this test will be as follows;

$$\text{Reliability on scores on total test} = \frac{2x \text{ reliability for } ½ \text{ test}}{1 + \text{reliability for } ½ \text{ test}}$$

Mugenda & Mugenda, (1999) suggested that a correlation of 0.6 for such studies indicate high reliability.

3.6 Data Collection Procedure

The researcher obtained an introduction letter from the University of Nairobi to obtain a research permit from the National Council for Science and Technology. After this, the researcher again obtained an introduction letter from the District Education Officer, Kimilili Sub County to operate in the area. The researcher then booked appointments with head teachers of the sampled schools and TAC tutors to visit and administer the questionnaires and interview schedules.

The researcher then visited each of the sampled schools and personally administered the questionnaires. The respondents were guided on how to respond and were assured of confidentiality after which they were given the questionnaires to fill. The data collection process took two months.

3.7 Data analysis techniques

Data was summarized, tabulated and analysed using SPSS package incorporating both quantitative and qualitative information. The quantitative data was processed and analyzed using SPSS software and presented in form of tables showing frequencies and percentages.

3.8 Ethical considerations

Consideration to comply with ethical measures in the course of conducting this research was made. To ensure their safety and rights, the participants were informed about the prevailing ethical consideration, for instance, informed consent, rights of the participants, voluntary participation, anonymity and confidentiality. The researcher obtained informed consent from each participant. The consent were obtained orally after the participant had had the opportunity to carefully consider the risks and benefits and to ask any pertinent questions about the study.

Privacy and confidentiality concerns were given the deserved consideration (Cohen & Manion, 1994). The ethical principle refers to the obligation on our part as the researchers to respect each participant as a person capable of making an informed decision regarding participation in the research study. The researcher ensured that the participants had received full disclosure of the nature of the study, benefits and alternatives, with an extended opportunity to ask questions.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATIONS, INTERPRETATIONS AND DISCUSSIONS

4.1 Introduction

This chapter covers the findings, presentations interpretations and discussions of the results for the study on "Preparedness of public primary schools in the Implementation of laptops project in Kenya; A case of Kimilili sub county, Bungoma County". The main sub headings include instrument return rate, demographic characteristics of the respondents, infrastructure and implementation of laptops project, teachers' computer knowledge and implementation of laptops project, subject content availability and implementation of laptops project and school management and implementation of laptops.

4.2 Instrument Return Rate

This study targeted public primary school teachers, head teachers and TAC tutors within Kimilili Sub-county. Table 2 shows the distribution and return rates of respondents for this study.

Table 2 Questionnaire Return rate

	Targeted number				**Number responded**				
Zone	**Teachers**	**Head teachers**	**TAC tutors**	**Total**	**Teachers**	**Head teachers**	**TAC tutors**	**Total**	**%age**
Central	53	3	1	**57**	44	3	1	**48**	84.2
East	50	4	1	**55**	41	3	1	**46**	85.2
West	37	2	1	**40**	30	3	1	**33**	82.5
Total	**140**	**9**	**3**	**152**	**115**	**9**	**3**	**126**	**82.8**

Out of 151 questionnaires and interview schedules administered to the primary school teachers, head teachers and TAC tutors, 127 were responded to representing a return rate of 82.8% (126/152x100).

The return rate was high because schools are in session and the researcher secured prior appointment with the school head teachers and the TAC tutors. This return rate was sufficient for the researcher to make generalizations and conclusions about the study

4.3 Demographic Characteristics of the Respondents

This section presents the demographic characteristics of the respondent with the aim of establishing the general background of the respondents that participated in the study. The areas that to be discussed include gender, age, teaching experience, respondents teaching subjects and how long the respondent had served in the position.

4.3.1 Respondents by Gender

An item was included in the questionnaire which sought information on the gender of the primary school teachers responding to the survey. Out of the 115 interviewed, 51 which represented 44.3% were male and 64 which represented 55.7% were female as shown in table 3. From the study, it was revealed that there is a slight variation in the composition of teachers by gender.

Table 3 Gender

	Frequency	**Percentage**
Male	51	44.3
Female	64	55.7
Total	**115**	**100**

The study also observed that schools located closer to the township had more teachers than those located in the interior. Also schools located in the town had more female teachers than those in the rural areas.

4.3.2; Respondents age

This question item sought to find the age distribution of the respondents and this is shown in table 4.The age distribution across the age categories is not very varied though it was shown that teachers at the prime age are slightly more than the rest at 27.0% while those who are past

retirement age of 55 years but were given five more years by the government declaration to all the civil servants were 13.9%.

Table 4 Age

	Frequency	Percentage
30 or less	22	19.1
31-35 years	27	23.5
36-45 years	31	27.0
46-55 years	19	16.5
More than 55 years	16	13.9
Total	**115**	**100.0**

Age is considered to have an effect on the uptake of new advancements such as the implementation of ICT and e-learning among the teachers and students both at primary and secondary levels.

4.3.3; Respondents teaching experience

The study also considered the role of teaching experience and a question item to elicit this response was "for how long have you been teaching since you left college?" The responses shown in table 5 indicate that majority of the teachers have taught for between 1 year and 10 years at 77.2%. Those who have less than one year experience and more than 10 years teaching experience are the minority.

Table 5 Teaching experience

	Frequency	Percentage
Less than 1 year	10	9.0
1-3 years	30	26.2
4-7 years	39	33.7
8-10 years	20	17.3
Total	**115**	**100.0**

Teaching experience could also be assumed to have an effect on the implementation of the laptop project. Teachers have been used to be doing things in a particular way the implementation of the laptop project would present new challenges that are demanding and engaging. There are those who will appreciate technology but some would see it an unnecessary bother.

4.3.4; Respondents main teaching subjects

A question item to find out the teaching subjects of the respondents was proposed. Table 6 shows that whilst the rest of the conventional and examinable subjects were evenly taught, computer studies had the lowest number of teachers who indicated to teach it at 3.8%.

Table 6 Subjects

	Frequency	**Percentage**
English	18	15.7
Kiswahili	20	17.4
Mathematics	16	14.2
Science	21	18.6
Social studies (CRE, geography, B. Education)	27	23.9
Computer Studies	4	3.8
Other	7	6.4
Total	**115**	**100**

This finding portents that there is likely to be a problem in schools since no emphasis has been put to ensure that there are enough teachers dedicated to teach computer studies, computer studies is also not to be a priority since it is not examinable or compulsory and is seen to be a part time subject. It was also shown that most teachers teach more than one subject in primary schools in fact they are expected to teach all the subjects.

4.4 Infrastructure and implementation of laptops project

The researcher found it important to establish how schools have put the necessary infrastructure ready for the implementation of the laptop project. The question item read "when you will be using laptops and/or internet during class teaching in front of the pupils, which equipment do think will be available?" Table 7 summarizes the responses as given by the respondents. It shows

that many necessary infrastructures to back stop the laptop project is lack in majority of schools although 71.3% of the teachers believe that teaching using laptops would significantly have a positive impact on the teaching and learning of students.

Table 7 Available equipments

	YES	NO
Pupils will be equipped with laptops and/or internet	4.3	95.7
Only the teacher will use a laptop and/or internet	7.0	93.0
Both, teacher and pupils will use laptop and/or internet.	5.2	94.8
The school will provide you with a laptop for your own use this school year?	2.6	97.4
Laptop use in teaching and learning positively impacts on students;	71.3	28.7
The school has enough space for storage of laptops	9.6	90.4

Under this section the researcher posed another question item that sought to explore the conditions under which various computer-related equipments are available with their respective schools. The question was put like "under which conditions do you think you will have access to the following in lessons in your class?"

Table 8 Conditions for accessibility

Condition	No access (%)	Access on demand (%)	Permanent access (%)
a) Desktop computer without internet access	90.5	5.3	4.2
b) Desktop computer with internet access	90.5	8.4	1.1
c) Non-internet-connected laptop or note book computer	90.5	9.5	0.0
d)Internet-connected laptop or note book computer	91.6	8.4	0.0
e) E-reader(a device to read books and newspapers on screen)	100.0	0.0	0.0
f) Mobile phone provided by the school	81.1	12.6	6.3
g) Interactive whiteboard	100.0	0.0	0.0
h) Digital camera or camcorder	100.0	0.0	0.0
i) Computer laboratory	77.9	12.6	9.5

Table 8 summarizes the responses as given by the respondents. It was revealed that the essentials equipments are not yet readily available for use by both the teachers and the pupils/students. The findings of this study agree with a similar study in Thailand which found out that an inadequate number of computers in the school system remained a problem regarding student access to computers in Thai primary and secondary schools. It compared percentages of computers in primary and secondary schools with the general population. The ratio of computers to students in primary school is such that students cannot have adequate time and opportunity to use computers as part of their daily schooling. Although the computer to student ratio was significantly lower in secondary than in primary school, the ratio was still high, and students generally cannot be expected to develop a high degree of computer literacy in these environments (Stamper, 2002).

Several efforts have been put in place to promote ICT use by the government. Kenya's Education Network Trust (KENET) is a research and education network that promotes the use of ICT in teaching, learning and research in higher education institutions in Kenya (Farrell, 2007). The project was launched in 1999 and the KENET Trust was formed in October 2000 by five founders – a combination of private and public institutions. It initiated from a bilateral agreement between the Kenyan and the United States governments to implement the Leland Initiative, by which the Kenyan government committed to exploring internet pricing reforms plus the linking of Kenyan universities to the internet. KENET is currently funded by the Kenyan Ministry of Education and the ICT Trust. KENET consisted of 22 tertiary institutions countrywide by 2006. KENET's ultimate goal is the production of knowledge by fostering an information culture supported by ICT (Kyalo, 2005). While KENET's focus is on tertiary institutions, the project also envisions making the created knowledge available to the rest of the population. KENET's management model is comprised of three elements: 1) a human resource plan to manage the linkage among the participating tertiary institutions; 2) a financial plan to ensure sustainability; 3) a governance structure for the management of the system and its resources (Thairu, 2003, as cited in Nwagwu & Abanihe, 2006).

In Kenya, the KENET initiative is mainly focused on technical skills for supporting the infrastructure and ensuring reliable connectivity between the participating institutions; clearly, information skills are not a priority. As a consequence, both students and teachers of the tertiary institutions under this project markedly improved their abilities to use basic computer programs

(Kyalo, 2005). However, there are certain elements within this initiative that allow us to see how aspects of information literacy are being addressed (Andre, 2009).

Any initiative, be it government, NGO or private sector-based, should make lobbying for more investments in computers a priority. Most teachers, instructors and students indicated that the main obstacle blocking the effective use of ICT in educational programmes was the lack of sufficient access to computers. This is even more relevant for educational institutions in rural areas where the school or training institution is often the only access point to computers. While this requires a massive investment in infrastructure, it is essential to guarantee more equal access and to overcome the digital divide (IICD, 2004).

4.5 Teachers' computer knowledge and implementation of laptops project

This section sought to look at the how prepared the teachers are to guide the pupils during lessons when using laptops. The essential aspects under this were the subject specific computer use, training and training areas covered by the teachers and any recent professional development undertaken by the teachers. Table 9 gives a summary of responses on the question "is participation in ICT training compulsory for a teacher in your subject?"

Table 9 Compulsory ICT training

	Frequency	**Percent**
Yes	16	13.7
No	99	86.3
Total	**95**	**100.0**

It shows that an overwhelming majority of teachers at 86.3% said "NO", the ICT training was not compulsory. Another question item under this read "in the past two school years, have you undertaken professional development in the following areas?"

Table 10 provides a summary of responses to this item. From the table, very little training or professional training has been undertaken by the teachers both at basic and advanced levels of ICT training.

Table 10 Training areas covered

	YES	NO
Introductory courses on internet use and general applications (word processing, spreadsheets, presentations, databases, etc)	4.3	95.7
Advanced courses on applications(advanced word processing, complex relational databases, virtual learning environment etc)	0.0	100.0
Advanced courses on internet use(creating websites/home page, video conferencing, etc)	0.0	100.0
Equipment specific training(interactive whiteboard, laptop etc)	0.0	100.0
Courses on pedagogical use of laptops in teaching and learning	12.2	87.8
Subject-specific training on learning applications(tutorials, simulations, etc)	3.5	96.5
Course on multimedia(using digital video, audio equipment etc)	0.0	100.0
Computer training provided by school staff	23.5	76.5
Personal learning about ICT in your own time	35.7	64.3
Other professional development opportunities related to computers.	20.9	79.1

The last question item on the aspect of training sought to ascertain if the respondents have spend any time in a training on computer use. The question stated “In total, how much time have been involved during the past two school years in the above professional development opportunities?”

Table 11 Time spend in professional development

	Frequency	Percent
No time at all	72	62.6
Less than 1 day	13	11.3
1-3 days	6	5.2
4-6 days	8	7.0
More than 6 days	16	13.9
Total	**115**	**100.0**

Table 11 shows that a significant majority of respondents at 62.6% indicated that they have spend no time at all in a professional development in the last two years. This findings show that classroom teachers have only incidental knowledge of computer use. A closer look at a similar study indicated that teachers recruited to fill teacher shortages in Thailand during the 1970s were not required to have a teaching degree or to take pre-service courses in appropriate uses of new technologies. Teachers of this cohort currently hold lead instructor positions, have seniority on school teaching staffs, have little incentive to adopt new teaching methods. Acquiring ICT skills now will not affect their rank, assignments, or pay scale. Practicing teachers need to find pedagogically sound ways to apply technology in the classroom. This is difficult to do when one is not familiar with it and has no motivation to adopt its use. Unfortunately, typical new teachers have not had much formal education in pedagogies making use of ICT either. Until recently, teachers' colleges and institutions of higher education have not made the integration of ICT approaches into instruction a priority for either professional studies in education or pre-service experiences (Stamper, 2002).

The study further asserts that people's attitudes about their abilities to use the computer affect their level of performance and interest. If the computer is to be used as a teaching and learning tool, then monitoring users' attitudes toward computers should be a continuous part of the teaching and learning process, and in-service training needs to address those teachers with a low sense of self-efficacy. Some teachers are observed to have "computer anxiety," that is, an extreme resistance or aversion to working with computers. Strategies have been and can be developed to address this computer anxiety so that over time teachers will be able to produce

computer instruction that they will be able to try out and revise in their own schools and classrooms (Stamper, 2002).

4.6 Subject content availability and implementation of laptops project

The researcher sought to find out the extent to which the subject content was available in readiness to the implementation of the laptop project. The question item was "what type of support will the following provide you when you use laptops in lessons?"

Table 12 Support received within the school

Support	Response (%)			
	Rarely/ never used	Mostly technical support	Mostly technical support	Mostly pedagogical support
a) A more experienced or knowledgeable teacher	63.1	29.7	4.5	2.5
b) School ICT/technology coordinator	65.8	13.2	15.8	5.2
c) Other school staff	80.0	7.4	6.3	6.3
d) Experts from outside the school	84.2	7.4	5.3	3.2
e) An online help desk, community or website	77.9	5.3	9.5	7.4

Table 12 summarises the responses of the respondents in their pursuit to access appropriate content to deliver to the pupils or students.

The findings indicate that very little support is received or is likely to be received from the expected support sources. High percentages were scored for the rarely/never used option implying that there is no support for the teachers to use appropriate content.

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Another item sought to find out how teachers intend to share or have shared their vision on ICT integration within the school with other teachers and members of the school community. It stated like this "Do you share with your colleagues, the school head and other staff, the same vision about integrating ICT in teaching and learning at your school?"

Table 13 Share vision for ICT integration

	Frequency	Percent
Yes	29	30.5
No	66	69.5
Total	**95**	**100.0**

69.5% of the respondents responded 'No' while the rest responded 'Yes' as shown in table 13 On the delivery of content in classrooms, the study sought to find out what exactly would happen to the students/pupils during the delivery of content using laptops or computers. This was also aimed at establishing how the teachers thought computer was appropriate for the content delivery. The question was "do you consider that laptops use during lessons will have a positive impact on the following aspects?"

Table 14 Impact of ICT during lessons

	Strongly disagree		Disagree		Agree		Strongly agree	
	Freq	%age	Freq	%age	Freq	%age	Freq	%age
a) Students concentrate more on their learning	14	11.3	19	15.3	49	39.5	42	33.9
b) Students feel more autonomous in their learning	7	5.6	23	18.5	53	42.7	41	33.1
c) Students understand more easily what they learn	13	10.5	38	30.6	44	35.5	29	23.4
d) Students remember more easily what they've learnt	15	12.1	26	21.0	47	37.9	36	29.0
e) ICT facilitates collaborative work between students	11	8.9	21	16.9	48	38.7	44	35.5
f) ICT improves the class climate (students more engaged)	16	12.9	19	15.3	51	41.1	38	30.6

Most of the respondents strongly agreed or agreed on the most of the aspects listed as shown in table 14. These findings suggest that educational organisations need to make well-considered and discerning choices about the courses that are most relevant for their own specific needs and

where laptops can really add value. This will help to manage expectations and channel efforts in the right direction. In many projects, partners began by setting up an ambitious plan to completely digitise all the content in every teaching and training area. Yet, developing materials is a highly complex and time-consuming activity in practice. In the case of specific ICT training, it is important to examine the requirements and needs of the government or the private sector. It is only then that graduates will be able to increase their job opportunities. Matching offer and demand is crucial: this is true not only for the requirements needed today but also for the skills that will be required in the near future (IICD, 2004).

Elementary schools in America face special problems in identifying an appropriate role for technology. Even though there are a variety of software packages and applications available for elementary levels, this level typically reports the least number of available resources and technology applications in place (Technology counts, 1998, October 1). The reason for this de-emphasis on technology is not difficult to discover. Both educators and parents view elementary schools as the place for children to acquire the basic skills in reading, mathematics, study, and organization that will help them be successful students and life-long learners. Technology skills usually are not seen as an essential part of this basic preparation.

Other pedagogical reasons influence technology integration at PreK-5 levels in America. In the first place, computers still rely primarily on keyboard input; and children, especially at Grades PreK-2 lack the fine motor skills to become fast typists. Some schools pair small children with older students to help speed up input, but most teachers who use computers with young children must do most of the typing themselves or use volunteers or aides to assist. Also, it is more difficult to locate software designed for elementary levels whose benefits for developing reading, writing, and mathematics skills clearly offset the time required to implement them. Some of the most powerful instructional software available, e.g., simulations and problem solving software, provide an abstract environment for learning concepts which many educators feel young children should encounter first in a real-life, hands-on way. Science and social studies simulations, for example, sometimes are viewed as less helpful to young students than to older ones (Roblyer, 2000).

Similar observations were identified by KESSP programme where the first sub-component of the investment programme supports ICT for administration with a view to using existing and future systems to strengthen management of education. The second sub-component supports ICT in education (e-learning) with a view to providing guidelines, standards and controls to support implementation of ICT in educational institutions. The components for the investment programme included; Ministerial ICT capacity development, ICT advisory services to education institutions, digital content development and delivery, ICT teacher development, research and development on ICT in education and capacity building (KESSP, 2005-2010).

Self-efficacy is the belief in one's capabilities to organize and implement a course of action that will bring about expected results. Several researchers have determined that self-efficacy is essential in learning to use and in using computers (Delcourt & Kinzie, 1993; Hill et al., 1987; Jorde-Bloom, 1988; Kinzie et al., 1994; Miura, 1987; Schunk, 1981, 1985). It is distinct from computer literacy and the attainment of specific skills, but it is important to skill improvement. The greater people perceive their self-efficacy to be, the more active they are and the longer they persist in their efforts (Bandura, 1977, 1981, 1982; Bandura & Adams, 1977). Woodrow (1991) specifically claimed that students' attitudes toward computers were a critical issue to consider in developing computer courses and computer-based curricula.

Setting standards for school, teacher, and student use of technology is a recent phenomenon. In the United States, North Carolina and other states have set specific standards for what students at each grade level should know and be able to do with technology (Atkins & Vasu, 1998). In 1998, the National Educational Technology Standards (NETS) project in the United States published standards for student use of technology. Unlike content areas such as mathematics, no US professional organizations had published national standards until that time. Besides standards for student ICT achievement, other organizations have established standards for teachers and for schools. For example, the School Technology Assessment of Readiness (STAR) is a series of questions that helps a school to evaluate if it has the requisites in place to support technology-based approaches to teaching and learning. The readiness questions includes such items as, “Do you have the capability to maintain your hardware?” (For many Thai schools, the answer to that particular answer would be “no.”). This assessment tool helps schools understand where they are

and where they need to be in order to successfully implement ICT approaches in classroom instruction (Stamper, 2002).

Since software is the key to effective computer use in Thai schools, software programs in the Thai language should be enhanced and adequately funded. ICT materials development centers should be instituted through an ICT Consortium of the MOE, universities, and private businesses. The MOE and the Institute for Promotion of Educational Technologies should coordinate and supervise efforts. Lead development centers are proposed for Sukhothai Thammathirat Open University and Ramkhamhaeng University. Other universities and organizations (e.g., Kasetsart University and SchoolNet) would eventually be part of consortium efforts.

Several projects already are developing new Thai language software. One large project represents a new role for the SchoolNet project, which managed a network for the school system of 2,200 secondary schools during the year 2000 with projections of a target of 5,000 schools by the end of 2002. As SchoolNet ismerged into EdNET, project staff increasingly will undertake strategic projects in Thai software development (Stamper, 2002). For instance, educational software supplied by the various consortia was enthusiastically received by the teachers. They claim that it allows them to produce their own learning materials and are keen to explore similar software tools. This outcome of the project provides positive indications for developing skills to recognise information needs. In order to produce learning content, the teachers have to understand students' information needs and the types of content that will improve their learning process. And producing content also entails the creation of learning material to be transferred to students, which helps cultivate the skills to apply information to create and communicate knowledge (Andre 2009).

4.7 School management and implementation of laptops project

The study sought to find out how the school management was preparing the schools for the roll out of the laptop project. The respondents were asked to respond on the questions about the school management committees where the principals are included.

Table 15 School management support

	YES	NO
Pupils will be equipped with laptops and/or internet	4.3	95.7
Only the teacher will use a laptop and/or internet	7.0	93.0
Both, teacher and pupils will use laptop and/or internet.	5.2	94.8
The school will provide you with a laptop for your own use this school year?	2.6	97.4
Laptop use in teaching and learning positively impacts on students;	71.3	28.7
The school has enough space for storage of laptops	9.6	90.4

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Table 16 School management statements

	Strongly disagree		Disagree		Agree		Strongly agree	
	Freq	%age	Freq	%age	Freq	%age	Freq	%age
a) The committee ensures that infrastructure is in place	18	11.3	13	15.3	41	39.5	52	33.9
b) The committee provides for ICT in its budgeting	17	5.6	20	18.5	63	42.7	46	33.1
c) The principal uses computer in the day to day management	13	10.5	28	30.6	41	35.5	39	23.4
d) Students remember more easily what they've learnt	16	12.1	26	21.0	47	37.9	26	29.0
e) ICT facilitates collaborative work between students	19	8.9	31	16.9	48	38.7	41	35.5
f) ICT improves the class climate (students more engaged)	9	12.9	29	15.3	51	41.1	25	30.6

Institutional capacity in the education sector needs to be strengthened in order to manage and plan activities more effectively. Information is mostly in hardcopy format and is not easily accessible. Data about teachers, salaries, student grades, the number of pupils per class, and statistical information in general are scattered and are not readily available. The scant amount

of information that is available tends to be unstructured and dispersed, which makes analysis for management purposes difficult (IICD, 2004).

The institutional management also plays a significant role in the adoption of ICT in schools. In environments where there is a top-down management style with little consultation between levels, staff members feel coerced into using ICT and therefore do not use it effectively (Czerniewicz & Brown, 2009). Staff members feel constrained by a lack of institutional support and vision and many feel unsure of the direction they should take and the purpose that the use of ICT is meant to serve. Furthermore, research has shown that the vision, leadership and management provided in well-managed institutions enable the staff members to use ICTs more productively than their counterparts in institutions which are not well-managed (Czerniewicz & Brown, 2009).

This study identified the extent to which Iranian secondary school principals used computers and explored the relationship between a number of variables related to ICT use. Findings from this study showed that principals spent a few times a week working on their computers. It seems that principals should be aware of the role of ICT in their work life and get appropriate skills to use and integrate technology into the schools. To increase principal use of computer technologies for instructional and administrative purposes, the following themes need to be addressed which are support, training, change in administrative methods and strategies, improvement of school infrastructure, management of workload, and attitudes toward computer use (Casmar, 2001).

Moreover, findings of this study indicated that to create a significant impact on the level of computer use, high level of computer access is needed. In fact, principals should have access to computer technologies in their offices, schools, or any location in which access to information and productivity tools is necessary. Also, funds need to be made available to purchase hardware and software. School districts are expecting principals to model the use of technology in their schools. For principals to do this, they must have access to updated hardware and software. School budgets must include funds for training and for hardware and software upgrades (TOJET, 2010).

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter covers summary of the findings, discussion of results and conclusions drawn from the study as well as recommendations based on the study findings and suggestions for further studies.

5.2 Summary of the findings

Infrastructure is another contextual factor affecting adoption of laptop project in schools. The infrastructure required for the use of laptops in teaching includes physical space, furniture, electricity and internet connectivity. While the availability of such infrastructure may not be a challenge in developing countries or in schools in affluent areas, their availability (or ease of acquisition) in disadvantaged schools is not guaranteed). Without a constant and reliable electricity supply, it is difficult for the regular running of computers facilities in schools.

This should be carefully considered during teacher-training planning because before pedagogical use in the classroom, many teachers may prefer to become familiarized first with the technology outside the classroom. This can often be facilitated greatly by starting out with software applications or simple devices such as portable keyboards or handhelds that can be of immediate use. It is relatively easy to learn how to use these machines to store text in a portable keyboard, to construct spreadsheets, or to make use of word processing to record students' marks and records.

Although, some research studies have shown that ICT has a huge impact on the ways in which principals work (Yuen, Law & Wong, 2003; Schiller, 2003), the ICT research literature has largely ignored the role of principals as technology leaders (Schiller, 2003; Michael, 1998). This gap in the research literature is rather strange because many research studies related to school improvement, school effectiveness, and change showed that school principals play an important role in creating successful changes in schools (Schiller, 2003). According to Schiller (2003), school leaders are key factors in ICT implementation in schools. They have to shoulder the heavy responsibility for creating changes in schools through the use of ICT and facilitating the process of making complicated decisions to integrate it in schools (Schiller, 2003).

Although the role of the principal in supporting technology integration is very important, there are a few researches conducted on the role of the principal in ICT implementation. Also, little is known about the use of ICT by principals and the factors that are related to their level of computer use.

5.3 Conclusions

There are many aspects that have to be in place before a project has established an optimal mix of human skills, content and infrastructure. It therefore takes time before a project's impact in primary schools can be implemented effectively. This underscores the need to continue with evaluation activities throughout the course of a project in order to adequately measure how its impact develops over time.

A UN body goes on to note that, "ICT policies of necessity have also to take into account other policy areas, such as education policies, information policies, trade and investment policies, and cultural and linguistic policies. However, the mere establishment of a written national ICT policy has value in itself. At a minimum, it conveys the message that the government is forward-looking and intends to pursue the utilization of ICT in society. Governments should, of course, aspire to do more by putting the policy content into actual practice and becoming a role model in applying ICT in their own administration and services." (UN Economic and Social Commission for Asia and the Pacific).

5.4 Recommendations

Teachers and instructors need to be trained in basic ICT skills and ICT-based teaching methods to feel comfortable about using the materials. It is equally important to train them to integrate ICT in their teaching methods. Unfolding an information-based economy will therefore require the participation, contribution and partnership of a broad range of stakeholders including Government departments, regulatory authorities, broadcasters, telecom operators, private network operators, service providers, content providers, software developers, vendors, education providers and end-users. In this context, many cross-sectoral issues will also need to be addressed, notably to rapidly equip a whole generation of knowledge-workers with new skills that empower them to be productive in the changing ICT infrastructure. Clearly, this is not a challenge for the public sector alone, because it is evident that the private and non-profit sectors will also have a significant stake and can also make very distinct contributions to

progress. And at the same time, there are regional and global implications that need to be considered, because national infrastructures can no longer afford to grow in isolation from the surrounding world.

If governments do not make it legal for wireless internet services to operate, development and community workers in 'unconnected' parts of the world will not be able to benefit from the power of online communication and information access. The internet makes it possible for local voices to be heard throughout the world but, if policy and regulation limit their access, they will also limit their reach. On institutions, the policy still quotes the CCK and KEBS as the regulatory bodies. It talks of strengthening the mandates of the two bodies to " .. ensure quality and compatibility of IT products and services"

Strategically involving headmasters and parents is necessary for the institutionalisation and longer-term sustainability management of the laptop project. Setting up administrative committees to manage ICT facilities has proven to be very effective in ensuring the sustainability of ICT initiatives. While in many cases access to ICT is limited to a small group of interested teachers and students, participation of a larger group of administrative staff, teachers and students in projects is crucial to ensure the widespread institutionalisation and integration of laptops in educational institutions.

Beyond the institution, it is important to seek political support from local authorities and district or national education authorities to prepare for longer-term opportunities related to funding and recognizing the laptop project as part of the curriculum.

5.5 Suggested areas for further study

- ICT policies may encourage or discourage the application of ICTs. If ICTs are to be part of a sustainable activity there will need to be a suitable policy environment.
- The role of e-learning in preparation of adequate skilled manpower to spearhead the country towards the realization of vision 2030.
- ICT adoption in educational institutions has brought gains and losses. A critical analysis of both the gains and losses arising from ICT adoption in institutions.

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APPENDICES

APPENDIX A: INTRODUCTION LETTER

STEPHEN WAFULA
P.O. BOX 57,
KIMILILI.

Dear Sir/Madam,

RE: RESEARCH QUESTIONNAIRE

I am a Master of Arts student at the University of Nairobi specializing in Project Planning and Management. My research project title is ***"Preparedness of public primary schools in the implementation of laptops project in Kenya; A case of Kimilili Sub-county , Bungoma County".***

In order to gather data for the research, I have prepared a questionnaire to be filled by the teachers in primary schools within Kimilili Sub-county. I kindly request your assistance in this academic endeavour by filling this questionnaire. I would like to emphasize that your responses are extremely valuable to me and I would greatly appreciate you answering all the questions.

I assure you that the information provided here will be held in confidence.

Thank you in advance for your cooperation.

Regards.

STEPHEN WAFULA

APPENDIX B: QUESTIONNAIRE FOR TEACHERS HEAD TEACHERS

SECTION A: PERSONAL INFORMATION

In this section, you are kindly requested to provide your personal information by ticking(√) where appropriate.

A1. Name of school.....

A2. Please indicate the Zone that your School is in:.....

A3. What is your gender?

1) ☐ Female 2) ☐ Male

A4. How old are you?

1) ☐ 30 years or less
2) ☐ 31-35
3) ☐ 36-45
4) ☐ 46-55
5) ☐ More than 55

A5. For how long have been teaching since you left college (teaching experience)?

1. ☐ Less than 1 year
2. ☐ 1-3 years
3. ☐ 4-7 years
4. ☐ 8-10 years
5. ☐ More than 10

A6. Which subject(s) do you teach the target class (standard one)? (Tick where applicable)

1. ☐ Languages (English or Kiswahili)
2. ☐ Mathematics
3. ☐ Sciences (Biology, Physics or Chemistry)
4. ☐ Technical subjects (woodwork, metalwork etc)
5. ☐ Computer Studies
6. ☐ Other, specify.....

SECTION B: INFRASTRUCTURE

In this section, you are kindly requested to give your response concerning the infrastructure for the laptop project by both teachers and standard one pupils (Tick (√) where appropriate).

B1. When you will be using laptops and/or internet during class teaching in front of the pupils, which equipment do think will be available? *Tick yes or no for each*

Statements	Please tick (√) appropriately	
	YES	NO
Pupils will be equipped with laptops and/or internet	☐	☐
Only the teacher will use a laptop and/or internet	☐	☐
Both, teacher and pupils, will use laptop and/or internet.	☐	☐
The school will provide you with a laptop for your own use this school year?	☐	☐
Laptop use in teaching and learning positively impacts on students;	☐	☐
The school has enough space for storage of laptops	☐	☐

B2. Under which conditions do you think you will have access to the following in lessons in your class?

Statements	Please tick (√) appropriately			
	No access	Access on demand	Permanent access	Other
A laptop computer without internet access	☐	☐	☐	☐
A laptop computer with internet access	☐	☐	☐	☐
Non-internet-connected laptop,	☐	☐	☐	☐
Internet-connected laptop	☐	☐	☐	☐
E-reader(a device to read books and newspapers on screen)	☐	☐	☐	☐
Mobile phone provided by the school	☐	☐	☐	☐
Interactive whiteboard	☐	☐	☐	☐
Digital camera or camcorder	☐	☐	☐	☐
Computer laboratory	☐	☐	☐	☐

SECTION C: LEVEL OF THE TEACHERS' COMPUTER KNOWLEDGE

In this section, you are kindly requested to give your response concerning the level of preparedness, skills, experience and professional development in laptop use(Tick (√) where appropriate).

C1. Is participation in ICT training compulsory for a teacher in your subject? *Tick yes or no*

1. ☐ YES
2. ☐ NO

C2. In the past two school years, have you undertaken professional development in the following areas? *Tick yes or no for each*

Statements	Please tick (√) appropriately	
	YES	NO
Introductory courses on internet use and general applications (word processing, spreadsheets, presentations, databases, etc)	☐	☐
Advanced courses on applications(advanced word processing, complex relational databases, virtual learning environment etc)	☐	☐
Advanced courses on internet use(creating websites/home page, video conferencing, etc)	☐	☐
Equipment specific training(interactive whiteboard, laptop etc)	☐	☐
Courses on pedagogical use of laptops in teaching and learning	☐	☐
Subject-specific training on learning applications(tutorials, simulations, etc)	☐	☐
Course on multimedia(using digital video, audio equipment etc)	☐	☐
Computer training provided by school staff	☐	☐
Personal learning about ICT in your own time	☐	☐
Other professional development opportunities related to computers.	☐	☐

C3. In total, how much time have been involved during the past two school years in the above professional development opportunities? *Tick one box only*

1. ☐ No time at all
2. ☐ Less than 1 day
3. ☐ 1-3 days
4. ☐ 4-6 days
5. ☐ More than 6 days

C4. What type of support will the following provide you when you use laptops in lessons?

Statements	Please tick (√) appropriately			
	Rarely/ never used	Mostly technical support	Mostly pedagogical support	Both technical and pedagogical support
A more experienced/knowledgeable teacher	☐	☐	☐	☐
School ICT/technology coordinator	☐	☐	☐	☐
Other school staff	☐	☐	☐	☐
Experts from outside the school	☐	☐	☐	☐
An online help desk, community or website	☐	☐	☐	☐

C5. Do you share with your colleagues, the school head and other staff, the same vision about integrating ICT in teaching and learning at your school? *Tick yes or no*

1. ☐ YES
2. ☐ NO

C6. Do you consider that laptops use during lessons will have a positive impact on the following aspects?

Aspect	Please tick (√) appropriately			
	Not at all	A little	Somewhat	A lot
a) Students will concentrate more on their learning	☐	☐	☐	☐
b) Students will feel more autonomous in their learning	☐	☐	☐	☐
c) Students understand more easily what they learn	☐	☐	☐	☐
d) Students remember more easily what they've learnt	☐	☐	☐	☐
e) laptops will facilitates collaborative work between students	☐	☐	☐	☐
f) laptops will improve the class climate (students more engaged, less disturbing)	☐	☐	☐	☐

C7. To what extend do you disagree or agree with each of the following statements about the use of laptops at school? (Tick where applicable)

SECTION D: SUBJECT CONTENT AVAILABILTY

In this section, you are kindly requested to give your response concerning subject content availability (Tick (√) where appropriate).

D1. What is your opinion on the following aspects of the subject content?

Statements	Please tick (√) appropriately			
	No access	Access on demand	Permanent access	Other
Laptops without subject content will be available	☐	☐	☐	☐
How should the subject content be accessed?	☐	☐	☐	☐
Subject content will be ready before implementation	☐	☐	☐	☐
The content will be relevant	☐	☐	☐	☐
Interactive subject content	☐	☐	☐	☐
Information retrieved on the Internet for schoolwork	☐	☐	☐	☐
Information accessed on CD/DVD	☐	☐	☐	☐
Information created by you from research or other available data	☐	☐	☐	☐
Online Communication with other students on homework/school work	☐	☐	☐	☐

E2. Please indicate whether each of the following will affect you during your lessons? Please tick as many as apply

5 =Very often, 4=Often, 3=Undecided, 2= Rarely,1=Never

Aspect	Please tick (√) appropriately				
	5	4	3	2	1
a) Content distortion	☐	☐	☐	☐	☐
b) Content update to cover new discoveries	☐	☐	☐	☐	☐
c) Free hang ups and corrupted content access	☐	☐	☐	☐	☐

Thank you. Your participation in this survey is much appreciated!

APPENDIX C: INTERVIEW SCHEDULE FOR TAC TUTORS

1. Which zone is under your supervision?

2. What is your comment on the status of the laptop project implementation. Are we on track?

3. Does your zone has adequate structures for the roll out of the laptop project? If not what is lacking?

4. Teachers preparedness plays a pivotal role in the implementation of such a massive undertaking. What is your comment about in relation to your zone?

5. One of your duties is to ensure subject content is relevant and delivered in the right manner. Have you already accessed the subject content to be used with the laptops for standard one pupils? If NO how far is it?

6. Working with laptops requires a number of cognitive and psychomotor skills. Do you think the standard one pupils are up to the task?

7. Comment about the choice of standard one as a target for this project.

8. Are there other hiccups you foresee in the implementation of this project in your zone