

EFFECTS OF INFORMATION TECHNOLOGY IN LEARNING INSTITUTIONS

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Abstract

Information Technology is awesome and amazing. With public and private institutions, governments, learning institutions and even a large population of the people in this world investing heavily in information communication technology (ICT), there are just no other words to describe technology. Basically almost every sector in this world has integrated information technology and the education sector has not been left out. This study seeks to find out the impacts of ICT in enhancing the quality of education and child growth and the level of ICT application in learning institutions around Nakuru municipality. The sample size was composed of 100 respondents comprising of 20 head teachers/principles, 30 teachers/lecturers and 50 students. This sample comprised of respondents from primary schools, secondary schools and institutions of higher learning. Purposive sampling was applied in selecting the head

teachers/principles, random sampling was used in selecting the teachers/lecturers while the students were interviewed as key informants. Data was collected using a questionnaire and through observation. The collected data was then processed using statistical package for social sciences (SPSS). The analyzed data was presented by use of narrative reports as well as some quantitative techniques of data presentation. The findings will be useful to the national and county governments in policy formulation, adding the existing knowledge on provision of education and management of the education sector, help in understanding the factors affecting quality of education among learning institutions.

Keywords: Information Communication Technology, Integrate, Kenya Certificate of Secondary Education, Learning

INTRODUCTION

Almost every Kenyan living in this digital era should be aware of the good and bad side of information technology. The best place to start with such awareness is in learning institutions. The jubilee government must have projected on the need to make Kenya a digital country inline with other fast developing countries hence proposed to issue free laptops to every standard one pupil.. this being a strategic though and a noble move for the country's development and growth, it is imperative that all learning institutions in Kenya see the government's projection and embrace information technology as a subject taught as well as practiced in primary , secondary and beyond. This will definitely give the Kenyan child an edge over other African children and place him/her in a much better position to work with or develop digital ideas globally.

Our increasingly technology-rich world raises new concerns for education while also expecting schools to become the vanguard of knowledge societies. Firstly, technology can provide the necessary tools for improving the teaching and learning process, opening new opportunities and avenues. In particular, it could enhance the customisation of the educational process, adapting it to the particular needs of the student. Secondly, education has the role of preparing students for adult life, and therefore it must provide students with those skills necessary to join a society where technology-related competencies are becoming increasingly indispensable. The development of these competencies, which are part of the set of the so-called '21st century competencies', is increasingly becoming an integral part of the goals of compulsory education. Finally, in a knowledge economy driven by technology, people who do not master these competencies may suffer from a new form of digital divide that may affect their capacity to fully integrate the knowledge economy and society.

Because of these reasons, most countries have undertaken significant investments to enhance the role of technology in education recently. Many would say that the incorporation of technology in education has lost its status as policy priority number one, although for a number of political reasons investments have not been stopped. In many respects, the principle of 'build it and they will come' seems to have taken root, and education systems keep investing in technology based on the belief that, sooner or later, schools and teachers will adopt it and benefit from it. The question that arises then is whether or not these new investments are paying off; is this investment in technology within education systems managing to fulfill expectations?

Statement of the Problem

The use of information technology in marketing of communication services is a major problem experienced by learning institutions. They are still striving to invest in ICT, let alone integrating with information technology and this has influenced the outcome of school leavers in their work performance. With a few learning institutions investing in ICT, particularly the private schools, the outcome is a disparity in level of confidence and knowledge amongst school leavers. This in turn is interpreted in the economy as there is are balancing acts to bring those in the blackout to par with those with technical knowhow.

Objectives of the Study

The main objective of the study was to assess the effects of incorporating ICT in learning institutions, around Nakuru municipality. The specific objectives of the study are;

1. To establish the tools used in learning institutions to improve teaching and learning
2. To establish the IT skills acquired by school leavers before joining the society
3. To determine the digital divide between school leavers

Significance of the Study

The research study will be of great significance to the stake holders in the education sector. This is because the study report highlighted and explained the effects of ICT in the education sector which will be of importance towards the governments in Kenya to come up with measures of alleviating the imbalance of knowledge among school leavers.

Towards achieving the vision 2030 goals in Kenya, this study will provide an insight on the best way forward in investing towards enriching the Kenyan child with the necessary skills and competencies required for survival in this dynamic world.

The study will facilitate the head teachers/ principles to adopt pro active measures that enhance the effectiveness implementation of information technology equipment and use in the institutions that they head. To the teachers/lectures, this study will provide an insight of where their teaching standards fall therefore possibly work on improving where they fall short.

Also, the study is of significance to students and future scholars since it acts as a source of knowledge about the problems facing the use of IT on marketing of communication services. This will contribute towards equipping many students with more knowledge and skills on the benefits associated with effective use of IT. Future study will find the study material useful in their studies since they will have a ready source of literature review. The study report will act as reference and stimulate interest among academicians and this will encourage further research about the problem and solutions, thereby facilitating effective application of information technology in education.

Scope of the Study

The study was carried out within Nakuru county with a total of 100 respondents sampled for analysis. This comprised of 20 headteachers/principles, 30 teachers/lecturers and 50 students.

Limitations of the Study

Cases of uncooperative respondents were experienced and this affected answering of the research questions. Some of the questions were not properly answered since respondents were not supervised when answering the questionnaires, this affected data validity and reliability. The study therefore had to involve some of the respondents in a personal interview before issuing them with the questionnaires as a strategy to reduce response rate.

LITERATURE REVIEW

What is the rationale behind the focus on ICT in education?

ICT in education has, in recent years, emerged as a policy area. Many countries have developed ICT strategies, either as separate strategies or as strands embedded in national strategies for education or for the development of the information society at large in the country. The strategies and their underlying rationales share many common features. Kozma (2008) has identified important reasons for investing in ICT for education.

- To support economic growth mainly by developing human capital and increasing the productivity of the workforce.

- To promote social development by sharing knowledge, fostering cultural creativity, increasing democratic participation, improving access to government services and enhancing social cohesion.
- To advance education reform, i.e. major curriculum revisions, shifts in pedagogy or assessment changes.
- To support educational management and accountability, with an emphasis on computer-based testing and the use of digital data and management systems.

These features relate the issue of ICT in education to its function in a broader, societal context. The role of ICT in education must also be linked to educational needs. In many countries, the role of ICT is linked to issues of educational attainment and the importance of ICT for advancing robust learning strategies on the side of the students.

A second area is ICT as a tool for the support of personalisation strategies in teaching and learning. ICT can also be used to increase visualisation and variation in many subjects. As a good proportion of our homes are linked to the Internet, the role of ICT in home/ school access is now being exploited. Many children nowadays start to use ICT at an early age, and the home and the family are, in many cases, an arena for the initial acquisition of digital skills. Thus, education has a role to play in furthering these skills, based on pedagogical principles. Our educational systems should bear in mind that ICT should be an integral part of learning, in order to provide learners from families with a low socio-economic status with necessary digital skills for learning, work and life in order to avoid digital divides.

ICT is not integrated in education for its own sake. A proper integration of ICT in key policy priorities in different countries can be a productive approach in order to secure ICT as a mainstream part of education. In Norway, ICT is not subject to a separate strategy; it is rather embedded in the national curriculum and linked to overall political priorities stated by the government: quality of learning, higher completion rates and students' well-being and mastery.

The Road Ahead?

Benchmarking can play a role in developing an open knowledge base for ICT in education. International collaboration is necessary for such a venture because of complex issues, a wide spectrum of stakeholders and the need for agreed frameworks for international comparisons. By the end of the day, the knowledge base should be there to guide us in informed choices for the benefit of current and future cohorts of learners. Because they deserve it!

In Kenya, some of the goals that the government aims to fulfill before 2030 is to have electricity in each and every homestead and also provide quality education a factor which was re-enforced by the current Jubilee government. Of course, this is a tall order but achievable none-the-less.

In order to fully understand or assess the effects of ICT in education we need to know more about how ICT operates on different levels, and what we are really measuring on which levels. It is crucial that we synthesise the research with a holistic perspective in order to lay a foundation for further development in this area (Sutherland, Robertson and John, 2009). In this article, the argument is built around the need to look at the bigger picture in order to create sustainable developments throughout our education systems, and understand ICT as a catalyst for change on different levels. This creates challenges for the development of indicators of the impact of ICT in education since several sets of indicators need to be developed and different methods must be used. The objective would be to build a model that looks at how different levels and dimensions work together to create conditions for change and the integration of ICT in educational practice.

Systemic Impact, Curriculum Developments and Future Competencies

The last decade has been associated with an upscaling of activities using ICT in educational settings. The consequences in many countries have been that whole school communities use such technologies in different activities, and that these developments have an impact on a national level through curriculum developments.

An upscaling of activities has brought about a need for development of indicators that capture the more systemic developments of ICT in education, and how that transcends to the micro level of teaching and learning by teachers and students: not how we change single schools in the way they work with ICT, but rather how all schools and the school system as such experience changes by implementing and using ICT. One example is the national curriculum in Norway, from 2006, which defines 'the ability to use digital tools' and digital competence as a basic skill throughout the curriculum. In this way, the Ministry of Education and Research has placed a strong emphasis on ICT as part of learning activities in schools. ICT should be an integrated part of learning activities among all students, at all levels of primary and secondary education and in all subjects. This also challenges how schools are organised.

Indicators and Levels

Different levels and indicators imply different methods of collecting information on the possible impact of ICT on education. Monitoring of impact can be done in several ways as a combination of quantitative and qualitative methods.

National Level

Impact on a national level deals with key factors of importance for how ICT is implemented in the school system in different countries. This is most of all related to the ways countries define ICT as of importance in educational development. This is to go beyond the policy slogans about the importance of ICT in itself and a technological determinism, and focus more on the concrete steps taken by policymakers in different countries. The methods used for such indications of impact could be analysis of policy documents and monitoring through national surveys of developments within the education system. Some key indicators on this level are; curriculum development, infrastructure access, standardization, digital learning resources, and actual use of ICT

Local Level

Important on a local level is the extent to which local authorities develop strategies, expressed in different kinds of documents, to give a direction for the implementation and use of ICT in education. It varies a lot as to how well such documents and local policies are developed and used. Some are too vague and contain unrealistic intentions and visions; others have clear objectives and implementation plans.

Another important aspect concerning impact on a local level is support structures, both for implementation of technology and guidelines for use. Local authorities have been important in many countries in developing such support structures, which are important especially to secure the use of ICT among teachers.

Institutional Level

On the institutional level, the leadership at the school is important in creating the setting for ICT use. This of course relates to the implementation strategies developed by national and local authorities, but also to how the leadership gives direction to certain developments. This also concerns how the school and the leadership at the school make the strategies for school development with the use of ICT explicit. It often varies how the school leadership manages to develop strategies that have real implications on a practical level. Another indicator concerning leadership could be how schools use ICT as an administrative tool.

Each school is different from another due to differences in leadership, the teacher community, the local community of the school, the student population and so forth. School culture relates to the daily life of each school. The school culture influences the way ICT is implemented and used in the school.

Teacher Education Level

Teachers' ICT competence points to the extent teacher education has implemented courses and strategies towards the increased competence of teachers in using ICT is an important part of educational development and change. This could be seen as ICT literacy indicators for teacher education, and of how teachers are prepared to face the challenges in their practice as teachers. Teaching methods: This point relates to the training of teachers in different methods of using ICT and digital resources. This implies a change within teacher training colleges in the way the teaching profession might be performed using ICT.

Collective Level

Collaborative work: This point is an indication of how the use of ICT might stimulate more collaborative work among students, and that project work becomes more prevalent in schools.

Individual Level

Outcomes: Different indications of the outcomes of ICT use on the individual level, both in a summative and a formative way related to learning.

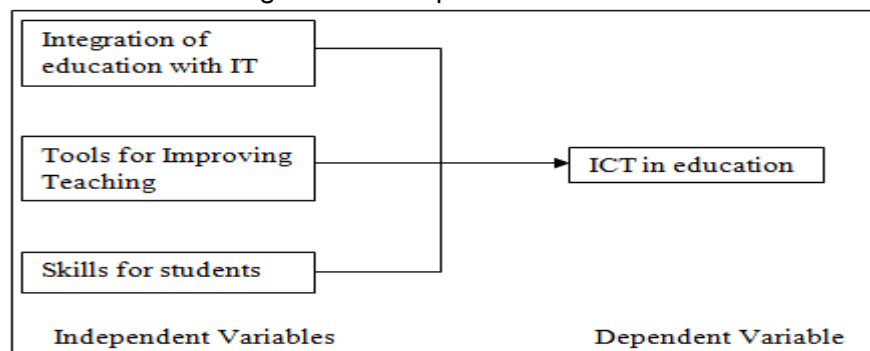
Knowledge building, problem solving: The ways in which ICT stimulates knowledge building and problem solving among students, assessed by performance assessment.

ICT competencies: The differences in ICT competencies among students, the digital divide.

CONCEPTUAL FRAMEWORK

A conceptual framework should provide an orientation for any kind of measurement required in the decision-making process and act as a reference which is flexible and adaptable to specific purposes of studies to be carried out. It should also provide a holistic view and support the setting of standard orientations when defining the evaluation methodology and selecting appropriate instruments for measurement.

Figure 1 Conceptual Framework



In this study, the tools used in teaching aim at integrating IT with education for the purpose of improving skills amongst students. Therefore, these three factors have been treated as independent variables which lead to the dependent variable of ICT in education. The model asserts the above literature and theories which talk of the rationale behind integrating ICT with education, systematic impact/ curriculum development, and lastly indicators and levels of ICT integration which have a direct impact on the skills acquired by students during learning.

RESEARCH METHODOLOGY

Research Design

Descriptive research design was used in the study. It is applied to obtain information concerning a circumstance with respect to variables or conditions in a situation. It involves a field survey where a study involves a population of interest to inquire certain issues concerning the planned study. The objective is to gather data without any manipulation of the research context and it is non-intrusive and involves naturally occurring phenomena, where the study has no control over the variables (Saunders, 1997).

Target Population

The target population was the heads of learning institutions, teachers/lectures and students. The study focus was the staff involved in education sector. The study's objective was to involve 200 respondents consisting of 40 headteachers, 60 teachers and 100 students. Response was received back from 127 respondents consisting of 20 head teachers/principles, 43 teachers/lecturers and 64 students. The target population was subdivided into subgroups and respondents were selected randomly from each population subgroup.

Sampling Design

Probability sampling design was applied and this gave every member of the population an opportunity of being included in the final sample. A sample of 100 was hence selected, from the 127 respondents, for the study using stratified random sampling procedures. The respondents were obtained from various subgroups using a probability of 0.79 implying that either they would respond or not (Saunders 1997).

Data Collection

Data collection technique involved the use of interviews, structured and unstructured questionnaires, and participant observation. The main data collection method used was open-ended questionnaires and closed-ended questionnaires.

Collection of secondary data was achieved through desk research, which was from internal or external sources. The external sources included journals, reports and books.

ANALYSIS AND RESULTS

This research presents the findings of the study, analysis of data and presentations of major findings. For the purpose of demonstrating the relationship among the various variables, the data is presented in the form of tables, percentages and descriptive where applicable.

Response Rate

The response rate is a comparison between planned and accrual response. 200 questionnaires were issued and 127 responses were received back therefore, a response rate of 63.5% was achieved with adequate data for analysis being collected. This is represented in table 1 below.

Table 1 Response Rate

	Planned Sample	Actual Response	Response Rate	Total Planned Sample	Aggregate Response	Non Response
Institutions Heads	Response	40	20	50%	100	10%
	Non Response	0	20	50%		N/A
Lecturers/ Teachers	Response	60	43	71.7%		21.5%
	Non Response	0	17	28.3%		N/A
Students	Response	100	64	64%		32%
	Non Response		36	36%		N/A
Aggregate total response						63.5%
						36.5%

The best response was experienced from teachers/lecturers who responded at 71.7%, followed by students at 67% while very little response was received from the institutions heads at 42.5%. The low response from headteachers/principals can be perceived to be perhaps because of their busy schedule.

Respondents Distribution

Table 2 Respondents Distribution

Institution	Head Teachers	Teachers/Lecturers	Students	Total
Primary Schools	5	5	5	15
Secondary Schools	5	10	15	30
Colleges/Universities	10	15	30	55
Total	20	30	50	100

Respondents from 15 primary schools, 30 secondary schools and 55 colleges/universities were considered respectively. 20 heads of institutions, 30 teaching staff and 50 students were sampled for the study. The study was biased towards students because they are on the receiving end of quality education therefore the most affected amongst the respondents. Teaching staff come into direct contact with the students and use of ICT in teaching therefore their number is more than the institutional heads.

More number of respondents from higher learning institutions was considered to the applicability of ICT in education. This is because in Kenya it has been common practice in the education system, for students to encounter computers after primary schools hence, the need to consider more response from higher learning institutions in this study.

ICT Tools in Teaching

In Kenya, Nakuru county in particular, integration of ICT in education and teaching is considered to be use of computers (desktops and laptops), projectors and smartboard. Therefore this study is centered around the same ICT tools used in teaching. Table 3 below displays compared tools.

Table 3: ICT Tools usage in teaching

		Computers		Projectors		Smartboard	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Valid	Primary Schools	6	40	4	27	0	0
	Secondary Schools	19	63	12	40	0	0
	Colleges/Universities	55	100	43	78	3	5
	Total	80		59		3	
Missing	System	20		41		97	
Total		100	100	100		100	

From the above analysis, the primary schools employ the least use of ICT in education. This is characterized by only 40% primary schools of those sampled use computers and 27% use projectors. There was no primary school in Nakuru county which was using an interactive smartboard. The secondary schools indicate a good improvement in ICT use as demonstrated by a 63% use of computers and 40% use of projectors. However, none of the secondary schools sampled used interactive smart boards.

Out of the sampled 55 respondents from colleges/ universities, all of them acknowledged use of computers in teaching. This is probably because almost all institutions of higher learning in Kenya have introduced the study of computers as a ‘university compulsory common course’ which has to be attempted by every student joining the institute. The use of projectors in learning, at the college/university level, was a bit lower than computer use down to 78%. There were only 3 respondents who acknowledged the use of an interactive smartboard in their institutions. One such institution is The Presbyterian University of East Africa (P.U.E.A). Overall, out of the 100 institutions that were sampled, 80 have invested in computers, 59 have invested in projectors and 3 have invested in smartboards to aid in learning. The public primary and secondary schools observed had a high number of students per class and there is a definite need to invest more in projectors so as to improve the teaching effectiveness and boost the students understanding. Considering that smartboards offer a more interactive atmosphere of learning and clear display of information technology, it is important for the institutions to invest in this worthwhile tool.

Table 4: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Use of Computers in Teaching	80	2.61	.626	.070
Use of Projectors in Teaching	59	2.66	.605	.079
Use of Smartboard in Teaching	4	2.25	1.500	.750

Table 5: One-Sample Test

	Test Value = 0			95% Confidence Interval of the Difference		
	T	df	Sig. (2-tailed)	Mean difference	Lower	Upper
Use of Computers in Teaching	37.310	79	.000	2.613	2.47	2.75
Use of Projectors in Teaching	33.792	58	.000	2.661	2.50	2.82
Use of Smartboard in Teaching	3.000	3	.058	2.250	-.14	4.64

As presented in tables 4 and 5, a T- test of 37.310 indicates that use of computers in learning institutions has the best results among the two other variables. Use of projectors closely follows with 33.792 and the least applied tool in teaching is use of smartboards.

Findings on Different Levels

Use of ICT

It is clear that ICT is widely used by the institutions of higher learning as compared to the secondary and primary schools. According to international levels, this might be a little bit late but the good thing is that all colleges and universities sampled in Nakuru county employ the use of ICT in different ways i.e projectors, computers and smart board. This definitely boosts the students skills and morale of both teaching and learning. At the secondary schools level, a fair share of the sample size used computers and some projectors. None however has an interactive smartboard.

All privately owned primary schools employ the use of ICT through computers and projectors. Very few public primary schools use ICT in boosting learning.

However, according to reports from previous studies, the number of secondary and primary schools which use ICT tools has increased for the past 2 years. This is good news despite the fact that the numbers are still low.

At the School Level

From observation and review of records, findings show that those schools which worked through the use of ICT achieved the best results in terms of school development also more integrated into pedagogical practices. This finding cuts across all levels of primary and secondary schools with colleges and universities' students' performance being better as according to the regularity use of equipment at the institution.

Students and Teachers

Students, teachers/lecturers and head teachers were positive towards the use of ICT in teaching. Students and teachers/lecturers experienced an increase in their competencies in using ICT. This is cutting across all levels of learning however, an observation made in regards to public primary schools is that many teachers do not recognize the pedagogical opportunities that the technology affords. This calls for a teacher training on ICT use in education and importance as well.

CONCLUSION

Incorporating information technology will definitely give the Kenyan child an edge over other African children and place him/her in a much better position to work with or develop digital ideas globally. The Kenyan government has an ambition of achieving the incorporating information technology in the education sector fully by 2030 but the learning institutions are also taking up the challenge by self initializing this idea. According to this study, Nakuru county is doing great in making this dream a reality.

As much as information technology offers benefits, there is also a bad and dangerous side to information technology. Recently there has been more reported cases of cyber security e.g hacking, rising cases anti-social behavior being witnessed among the youth, fraudulent cases which are hard to track with some originating from correctional facilities, uncontrolled pornography over the internet...etc. it is therefore necessary to study the dangers of incorporating information technology in learning institutions.

A further area of study is how to manage ICT in education. As a country, Kenya is geared up to embrace information technology tools but managing what is already available is necessary. This is imperative to make sure that the ICT acquired is used well to optimize the skills acquired by students.

A recent wave of online teaching has hit the Kenyan education sector. This area was left out as this digital wave is only gaining footage in the country. Therefore, it will be an area worth venturing into to find out how effective it is to use information technology in online education.

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