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# Towards an ICT Integrated Management of School Curriculum: A Review of the Status in Secondary Schools in Uasin-Gishu and Nandi Counties, Kenya

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**Abstract**
*This paper delvesinto the status of integration of ICTs in the management of the teaching-learning process in secondary schools in two counties of UasinGishu and Nandi in Kenya. The main objective of the study was to examine the nature of ICTs in the schools, the capacity of users, and the level of integration of ICTs. The study employed the descriptive survey design. A total of 342 educators comprising of 57 head teachers and 285 teachers from 63 secondary schools at various stages of ICT integration were selected. Purposive sampling was used to select the head teachers and schools with functional ICTs while the teachers were selected using stratified random sampling. Data was collected through a questionnaire and an interview schedule. Data was analyzed descriptively by use of SPSS programme version 17 for frequencies, means and percentages. The results indicated that there was an acute shortage of computers but the few available were easily accessible to users. There was a high level of utilization of ICTs for the purpose of management of exams whereas integration into curriculum delivery and decision making was low. Most respondents were only trained on basic introductory computer programmes but few had been trained on application programmes for teaching and management. The study recommended that acquisition of computers be enhanced and the training of ICT to focus more on specialized application skills rather than basic operational skills. Head teachers should source for ICTs that enhance the performance of curriculum management practices. It is hoped that the study will benefit education policy makers and head teachers in adopting effective ICT integration strategies in secondary schools*

**Keywords**: *ICT Integration; Management of Curriculum; ICT Recourses; ICTs*

## Introduction

Aduda and Ohaga (2004) define ICTs as "all hardware, software and services that relate to information processing and handling, communication, as well as all business activities that depend substantially on the above". In the context of this study, ICTs are considered as those tools, which allow digitalized information to be accessed, stored, manipulated and exchanged in order to enhance management, teaching and learning in schools. These include computer

software and hardware, internet, landline and cellular telephones, wireless technologies, DVDs as well as older technologies such as radio, television, overhead projectors and Videotape Recorders (VCRs). Education systems around the world are under increasing pressure to use ICTs to equip students, teachers and education managers with skills they need in the 21st century. Within the past decade, ICT tools have fundamentally changed the way people communicate and do business. Omwenga (2007) states that ICTs provide an array of powerful tools that may help in transforming the present isolated, teacher-centered and text-bound classrooms into rich, student-focused interactive knowledge environments. The major challenge confronting the education system in Kenya is how to transform the curriculum and teaching process to provide students and teachers with skills to function effectively in this dynamic, information rich and continuously changing environment (USAID, 2006). To meet these challenges, schools must embrace the new technologies and appreciate ICT tools for learning. Since the 1980's, integration of ICTs in education has been compulsory in developed nations (UNESCO, 2002). This has not been so in developing countries such as Kenya, where ICT integration in education has been considerably more recent, small scale and experimental in nature. It is however generally recognized that the interest for adoption of ICT in education has progressed considerably in the recent past in most African countries, including Kenya. Oyomno (2005) observes that a growing number of governments have formulated or initiated the process of formulating national ICT policies for their countries.

**Statement of the Problem**

In Kenya various initiatives have attempted to enhance ICT integration in schools. The government through the Ministry of Education for example has launched a multi- million ICT Trust Fund. The government has initiated programmes in conjunction with development partners to install ICTs in schools. The private sector has also been incorporated in the ICT integration programme in schools. The question that guided the study was whether ICTs sourced by the government and the other stakeholders listed above are being used to enhance curriculum management in schools. Muriithi (2005) observes that in the current secondary school curriculum, Computer Studies is a separate learning subject. Learners are being taught how to be computer literate and not how to use computers to enhance learning. Likewise the ICT training for teachers is focused on learning about computers rather than how to use the machines as tools for managing curriculum. This observation shows therefore that there is need for models that serve as examples of how ICTs can be used to promote learner-centred education, and the approach used should reflect a general movement away from "teaching computers" towards using ICTs as educational tools. It's for this reason that this study set out to investigate the factors influencing ICT integration into curriculum management in secondary schools by finding out the nature of ICT resources available in the schools and the extent to which they have been incorporated in the management of teaching and learning. It's hoped that this will assist in unearthing the factors that influence the ICT integration process and the challenges being experienced by head teachers and teachers while implementing ICT integration into teaching and learning. This way, appropriate options for successful adoption of ICTs in schools can be explored. This might then go a long way in informing school practitioners and policy makers on how best to make use of ICT in tackling the challenges of education in the country.

**Purpose of the Study**

- To find out the condition of ICTs in the schools.
- To establish the capacity of educators to use ICTs to manage curriculum.

- To determine the extend to which educators utilised ICTs to manage curriculum.

**Research Methodology**

This study utilised the descriptive survey research design. Apart from describing, surveys are useful in explaining or exploring the existing status of two or more variable at a given point in time. Survey studies are conducted to collect detailed descriptions of existing phenomena with the intent of employing data to justify current conditions and practices to make more intelligent plans for improving them Koul (1997). This survey was intended to gather three types of information: data concerning the existing status of ICT integration into curriculum management, comparison of the existing status with the established status and standards and means of improving the existing status.A descriptive survey describes and interprets what it is. It is concerned with conditions or relationship that exist, opinions that are held, processes that are going on, effects that are evident or trends that are developing (Best & Kahn, 2003).The target population was 63 headteachers and 1890 teachers. The study targeted only schools which had ICTs that were being used for curriculum management. The study employed purposive sampling to select 63 secondary schools with functional ICTs that were beingused for the purposes of managing curriculum. Stratified random sampling technique was used in selecting the teachers. The strata that formed the sample unit included two heads of department two subject teachers and a class teacher. These groups constitute groups that may use computers in secondary schools in different ways for managing curriculum. The sample therefore constituted 5 teachers from 63 schools giving a total of 315 teachers. Purposive sampling was used to select 63 headteachers from all the target schools. The total sample of the study was therefore 378 respondents.Atotal of 342 questionnares were returned giving a response rate 90.45%. The study obtained data by use a questionnaireand interview schedule. Data obtained from the questionnaire was analyzed by use of descriptive statistics, that is, through frequencies, means,and percentages. Data presentation was done by use of tables. Interview data was organized by grouping answers together across respondents followed by interpretation and description of the responses which involved attaching significance to particular results, and putting patterns into an analytical framework. Qualitative data sourced through the interviews were used to complement the quantitative responses obtained in the questionnaires.

**Research Findings**

The first objective of the study was to find out the condition of ICT's in the schools under study. The condition of ICT's in schools included the adequacy of computers, accessibility of computers in schools, the suitability of the computers in schools and the suitability of the software for managing school curriculum. The respondents were asked to rate the condition of the computers in terms of their adequacy, accessibility and suitability of hardware and software available in their schools.

**Adequacy of Computers in Schools**

**Table 1: Adequacy of Computers**

| **Adequacy** | **F** | **%** |
|---|---|---|
| Not Adequate | 120 | 35.1 |
| Fairly Adequate | 165 | 48.2 |
| Adequate | 51 | 14.9 |
| More Than Adequate | 6 | 1.8 |

| | | |
|---|---|---|
| **Total** | **342** | 100 |

In order to determine the status of ICT integration in schools, it was imperative to seek information on the adequacy of ICT resources available because for successful integration of ICT in school, there ought to be enough computers available for use by teachers and head-teachers. This ensures that each user is able to access a computer for use when required. Each user should at least be able to have a functional computer on their desks or within their staffrooms in order to ensure the effective utilization of the resources in all their curriculum management practices. The study, as shown in Table 1.0, revealed that that the computers were inadequate in the schools. A large majority of users (83.3%) indicated that they had inadequate computers while a limited number (16.7%) indicated that there were adequate computers for their use in their schools. This implies that there is an acute shortage of computers, a factor that can adversely inhibit the level of ICT integration in the management of curriculum.

**Accessibility of Computers in Schools**

**Table 2: Accessibility of computers**

| Accessibility | F | % |
|---|---|---|
| Not difficult | 159 | 46.5 |
| Fairly difficult | 110 | 32.2 |
| Difficult | 49 | 14.3 |
| Very difficult | 24 | 7.0 |
| Total | 342 | 100 |

In order to assess the status of ICT integration in schools, the issue of accessibility of computers by users was also investigated. Access is an important aspect of ICT integration because in many schools, computers could be available but are located in computer laboratories and offices which are beyond the immediate access of users. The location of computers in schools can determine the ease with which they can be accessed by users whose utilization of ICT can be restricted when computers are confined in laboratories or special rooms. In some instances, computers could be available but are locked using passwords that restrict unlimited access by all users. In order to enhance usage, it would be more useful to place computers in staffrooms or classrooms were they are more accessible. This study found that the level of accessibility of computers in a majority of schools was high. Asked whether or not computers were difficult to access in their schools, a majority of respondents (78.7%) indicated that it was not difficult to access computers in their schools while 21.3 stated that it was difficult. This shows that despite the problem of inadequacy reported in most schools, the few computers available were easily accessed by users. Table 2 shows the status of computer accessibility in the schools under study.

**Suitability of Computers in Schools**

**Table 3: Suitability of Computers**

| Suitability | F | % |
|---|---|---|
| Not suitable | 31 | 9.1 |
| Fairly suitable | 109 | 31.9 |
| Suitable | 139 | 40.6 |
| Very Suitable | 63 | 18.4 |
| Total | 342 | 100 |

The study also sought to find out whether the computers available in the schools were suitable for use by educators in managing curriculum. A majority of the respondents (59%) indicated that the computers in their schools were suitable while (41%) said that they were unsuitable (Table 3). This was a good indication that most schools are stocked with ICT facilities that are relevant for the purpose of managing curriculum.

**Suitability of Software for the Purposes of Managing School Curriculum.**

**Table 4: Suitability of Software**

| **Suitability** | **F** | **%** |
|---|---|---|
| Not suitable | 39 | 11.4 |
| Fairly suitable | 90 | 26.3 |
| Suitable | 153 | 44.7 |
| Very Suitable | 60 | 17.5 |
| **Total** | **342** | **100** |

ICTs may be stocked adequately in schools but they could not be installed with the right software suitable for the right tasks. The study aimed at determining whether the software relevant for managing curriculum had been installed in computers. One inherent challenge associated with ICT integration is that computers do not come pre-packaged with relevant user software. Computers need to be installed with programmes modified in order to be relevant to the tasks of curriculum management such as timetabling, record keeping, exam management, planning and teacher preparation. When asked about the suitability of computer software used to manage curriculum in their schools, a majority of the respondents (62.2%) indicated that they were suitable while only (37.7%) said that they were not suitable (Table 4). This is a positive indication that there is suitable ICT infrastructure in schools.

**Capacity Development of Users**

In capacity development of users, the study sought to determine whether the users were computer literate, the mode of acquiring computer skills and the type of ICT courses attended.

**Table 5: Computer Literacy of Users**

| **Literate?** | **Users** | |
|---|---|---|
| | F | % |
| Yes | 291 | 85.1 |
| No | 51 | 14.9 |
| Total | 342 | 100 |

The training of users is another aspect of ICT integration that can significantly influence the status of use of ICTs in the management of curriculum in secondary schools. This study set out to find out the ICT literacy level of users in order to determine whether it had any link with the frequency of use of ICTs. Studies have shown that the capacity development of users influences the level of ICT integration into the management curriculum. Pelgrum and Plomp (1993) found a relationship between what was learned in ICT training and the extent of ICT use, that is, the amount of training received, correlated with the extent to which users integrated ICT into their curriculum management practices. Table 5 shows the computer literacy of the respondents.This study revealed that a large majority of users (85.1%) were computer literate while only (14.9%) indicated that they were computer illiterate. This is a positive indication that most users have undergone some training in the use of computers which points at a likelihood of a high level of ICT integration in their schools.

**Respondents' Mode of Acquiring Computer Skills**

**Table 6: Method of Training**

| **Mode of Training** | **Users** | |
|---|---|---|
| | Frequency | Percentage |
| Personal practice | 112 | 32.6 |
| 100 | 65 | 19 |
| Workshops | 10 | 2.9 |
| College | 103 | 30.1 |
| Not Trained | 52 | 15.2 |
| **TOTAL** | **342** | |

Table 6 shows how the respondents acquired their computer skills. A majority (32.26 %) of the respondents indicated that they did it through personal practice while (19%) of them acquired their ICT skills through college training as one of the units in their course work. Only a very small minority (2.9%) of acquired their skills through capacity building workshops organized in the course of their teaching career. A significant number of respondents (15.2 %) were not trained in ICT. Perhaps this is an indicator that the government, NGOs and schools have not been instrumental in the capacity building of users in ICT integration for the management of the curriculum. Educators seem to be relying on ad-hock training through personal initiative and compulsory training that they get in college. This type of training may not be very relevant for the user's specific tasks of managing curriculum.

This observation was reinforced by further discussion with the head-teachers and teachers who revealed that though most of them were computer literate, they did not possess the relevant technological skills required to enable them become confident and creative in the use of ICT for the management of teaching and learning. Most of them had never had training specifically tailored for the integration of ICT into the management of the curriculum but only on basic computer packages. This indicates that more relevant training in application programmes is required for these users.

**Type of ICT Courses Attended**

**Table: 7: ICT Courses Attended by the Respondents**

| Course attended | Teachers (n=285) | | | |
|---|---|---|---|---|
| | Yes | | No | |
| | F | % | F | % |
| Introductory course | 180 | 52.6 | 162 | 47.4 |
| ICT for teaching | 50 | 14.6 | 292 | 85.4 |
| ICT for management | 28 | 8.2 | 314 | 91.8 |
| ICT maintenance | 28 | 8.2 | 314 | 91.8 |

The study also sought to find out which type of courses the respondents trained in so as to ascertain whether they were relevant to the management of the curriculum. Table 7 gives a summary of the courses attended. The results revealed a worrying trend where a majority of the respondents (52.6%) had trained mainly on basic introductory programmes and less on application programmes that would assist them gain skills to utilize computers for managing curriculum. A small minority of the respondents (8.2%) had been trained on computer maintenance that would assist them do minor servicing of their ICTs rather than depending entirely on external support.According to Carlson and Firpo (2001), teachers need tools, techniques and training that can help them acquire ICT based curriculum management practices designed to heighten the level of teaching learning efficiency.

**Frequency of use of ICTs**

In order to achieve the third objective of this study which was to determine the extent of ICT integration into the management of curriculum in secondary schools, the frequency of use of various ICTs by educators was sought. This was meant to find out how often the users utilized the available ICTs for the purposes of management of the school curriculum. A five point likert scale ranging from 1-5, where 1 means ‘always’ and 5 means ‘never’, was used where users were asked to indicate how frequently they utilized a list of ICTs. For the purpose of discussion, those who indicated ‘always’ and ‘often’ were said to have used the ICT frequently while these who indicate ‘sometimes’, ‘rarely’ and ‘never’ were said to have used the ICT rarely. The ICTs that the users were asked to rate were those relevant for the purposes of managing curriculum. These included the printer, photocopier, computer, mobile phone, DVD, internet, radio and LCD projector. Mean responses were calculated and used to rank the ICTs in terms of frequency of use.Table 8 shows the status of the integration of the various ICTs in the management of the curriculum.

*Table 8 Frequency of use of Various ICTs to Manage Curriculum*

| Type of ICT | Level of Integration (Percentage %) | | | | | | |
|---|---|---|---|---|---|---|---|
| | ***Always*** | ***often*** | ***Sometimes*** | ***Rarely*** | ***Never*** | ***Mean*** | ***Rank*** |
| **Printer** | 63.2 | 23.4 | 6.7 | 3.2 | 3.5 | 1.61 | 1 |
| **Photocopier** | 59.4 | 24.3 | 7.3 | 2 | 7 | 1.73 | 2 |
| **Computer** | 31.6 | 25.4 | 24.6 | 12.3 | 6.1 | 2.36 | 3 |
| **Mobile phone** | 27.5 | 18.7 | 19.0 | 17.8 | 17.0 | 2.78 | 4 |
| **Internet** | 6.4 | 12.9 | 35.1 | 24 | 21.6 | 3.42 | 5 |
| **DVD** | 9.1 | 9.9 | 25.7 | 25.7 | 29.5 | 3.57 | 6 |
| **Radio** | 2 | 7.9 | 22.5 | 27.8 | 39.8 | 3.95 | 7 |
| **Projector** | 0.3 | 1.2 | 7.6 | 14.9 | 76 | 4.65 | 8 |

**Frequency of use of Printer**

The printer is one of the most important ICT that can be utilized for the management of curriculum in a school since it is central in the preparation of curriculum delivery and evaluation materials. No wonder the printer was ranked as the most frequently used ICT in all schools with a mean frequency of 1.61. A large majority of users (86.6%) indicated that they always integrated the printer in the management of curriculum in their schools. Perhaps the printer was ranked as the most frequently used ICT in secondary schools because of its importance as a gadget for preparation of exams. Evaluation is a core function of curriculum management and most schools have found it imperative to invest in the printer, an ICT which makes it easier and economical to do mass production of continuous assessment tests and end term examinations in schools. It was for this reason that a functional printer was found in all the schools visited.

**Frequency of use of Photocopier**

Alongside the printer, the photocopier also emerged as a highly utilizedICT in all the schools under study. The ICT also ranked high in popularity and was the second most frequently used ICT after the printer. A large majority (83.7%) of the respondents used it frequently while only 16.3 % rarely used it. The mean was 1.73 and was ranked second in the frequency of use after the printer indicating a high level of use. This popularity of the photocopier could be attributed to its importance in the production of examination and teaching materials in schools. It's also widely used for the production of school records and correspondences.

**Frequency of use of Computer**

The computer should be the main ICT to be considered when planning and implementing any ICT integration process. In fact the first thing that comes to the mind of many when discussing the integration of ICT into the management of curriculum is the use of the computer. In many instances, it is usually erroneously widely believed that ICT integration is the same thing as the use of computers alone. It is for this importance attached to computers which perhaps can be linked to its high frequency of use in schools as revealed by the results of this study. The results revealed that a majority 57% frequently using it while 43% rarely used it. The frequencies for use of the computer registered an average mean of 2.36. Although the computer was rankedas the third most used ICT in the range of eight ICTs that were recorded the results revealed a worrying trend because it implies that almost half of the

respondents have a rare opportunity to use computers for the management of curriculum in their schools. This could perhaps be due to their lack of exposure to ICTs or their incapacity to use them.

**Frequency of use of Mobile Phone**

The mobile phone is arguably the most widespread and easily available ICT in Kenya today. This wide usage of the ICT in general life was however not translated to a high frequency of use of the mobile phone as a tool for managing curriculum. The gadget scored a mean of 2.78 showing that it had an average level of use. The majority (53.8%) used it rarely while 46.2% frequently used it. This trend is worrying given that the mobile phone is one of the most easily available ICTs. There is need to popularize its use as a tool for managing curriculum by school managers.

**Frequency of use of DVD**

The DVD machine is one of the newer technologies that is rapidly replacing the VCR. The DVD is an ICT that can be effectively be utilized for efficient delivery of curriculum. DVD shows can be used as teaching aids to stimulate interesting studying environments. The study however revealed that the gadget was used moderately among head teachers and teachers as an ICT for managing curriculum. The results indicated that a majority (81%) rarely used it and 19 % used it frequently. This indicates a level of use that was below average given that the mean score of its frequency of use was 3.57. This is a worrying scenario given that the DVD one of the technologies which if well harnessed can be very useful in reinforcing teaching and learning in schools.

**Frequency of use of Internet**

The internet is another ICT that needs to be seriously developed as a means of managing curriculum in secondary schools. It is particularly useful in the area of teacher preparation and research. It can also be utilized in information dissemination and exchange between head teachers, teachers and students. Despite its potential usefulness in the management of teaching and learning, it was worrying to observe that only a small group (19.3%) of head teachers and teachers used the internet frequently in managing curriculum in their schools while a large majority (80.7%) rarely used the internet. With a mean frequency of 3.42, the use of the internet as an ICT for managing curriculum schoolsregistered a low level of use.

**Frequency of use of Radio**

Radio broadcasts is one of the older ICTs that are still relevant in the dissemination of teaching and learning in schools. The Kenya Institute of Education transmits radio broadcasts which can be used in schools to supplement classroom lessons. The study however revealed a majority of the head-teachers and teachers (90.1%) rarely used the radio while only 9.9% used it frequently. The level of use of the radio among the respondents was low with a mean of 3.42.

**Frequency of use of Projector**

The projector is one of the latest ICT which is used in combination with the computer as a tool of curriculum delivery. It can be a very effective mode of lesson delivery and can be used in place of the chalkboard. The level of use of this ICT was low(M=4.65) making it the least used ICT in the schools with only 1.5% using it frequently and a large majority 98.8% rarely using it.

## Conclusion

This study was done with the main aim of establishing the status of the integration of ICT into the management of curriculum in secondary schools with the intention of establishing how the challenges facing the integration of ICTs may be curbed. The study revealed that whereas there were great strides towards a heightened level of ICT integration into secondary schools curriculum, many weaknesses still existed that needed to be addressed. The results indicated that there was an acute shortage of computers in the schools under study. This is in line with USAID (2006) which reports that inadequacy of computers is a challenge that affects most sub-saharan countries, Kenya included. For the successful integration of ICT into the management of school curriculum, there ought to be enough computers available for use by teachers and head-teachers. This ensures that each user is able to access a computer for use when required. School managers should be able to have computers at the ratio of 1:1 in order to ensure the effective utilization of the resource in all their curriculum management practice. Despite the problem of inadequacy reported in most schools, the few computers available were easily available to the users. Access is an important aspect of ICT integration because in many schools, computers could be available but are located in computer laboratories and offices which are beyond the immediate access of users. The location of computers in schools can determine the ease with which they can be accessed by users whose utilization of ICT can be restricted when computers are confined in laboratories or special

These results revealed that a large majority of head teachers (87.7%) and teachers (84.5%) were computer literate indicating that most users have undergone some training in the use of computers. Training was however done through personal practice while a majority of teachers acquired their ICT skills through college training as one of the units in their course work. This observation was reinforced through the interview with the head teachers who revealed that though most of them were computer literate, they did not possess the relevant technological skills required to enable them become confident and creative in the use of ICT for the management of teaching and learning. Although a large majority of head teachers and teachers were computer literate, the study revealed that most of them were only trained on skills that dealt with the operation of basic introductory computer programmes such as Microsoft Word and Excel. Only a few of them had been trained on application programmes for teaching and management. Consequently, teachers and head teachers should receive application training in ICT integration into the management of classroom teaching

The study also found out that most respondents had acquired their computer skills either through personal practice or by being taught by colleagues. A minority of the respondents had undergone formal training on the use of ICTs to manage secondary school curriculum. Research by Rogers (1995) indicates that trainability and operability are the two attributes of an innovation that might increase the rate of use of ICT in teaching and learning. If users are aware of computer techniques, their capability of integrating technology into their practices may increase. The conclusion drawn from this is that if teachers acquire ICT techniques, they will be able to use ICT to effectively manage curriculum since they will be able to fix minor technical problems rather than wait for external support. Luck of technical competence impedes the effective utilization of ICT since a lot of time and funds are lost as schools seek technical assistance that could easily de availed by trained users.The three most frequently used ICTs in schools were found to be the printer, the photocopier, and the computer whose levels of use were above average with mean frequencies below 2.5. Other ICTs such as the

mobile phone, DVD, internet, radio and LCD projector were rarely used with frequencies above 2.5.

**Recommendations**

1) Schools should provide more computers for the teachers so that they can easily interact with them for ICT intergration in management of curriculum
2) Since majority of the head teachers and teachers had acquired their skills through personal practice or colleagues, it is recommended that the training on the use of ICTs in secondary school curriculum management should be formalized
3) Although majority of the respondents were computer literate, they did not have adequate skills to enable them confident and creative in the use of ICT for the management of teaching and learning hence it is recommended that the training should be aligned towards acquiring the relevant skills for ICT intergration
4) Teachers should be encouraged to increase the frequency of use of various ICTs such as the Internet, radio and a projector.

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