

The challenges of using information communication technology (ICT) in school administration in Kenya

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Abstract: *This paper examines the challenges faced by Kenyan secondary schools in the use of ICT to enhance school administration. Although many secondary schools introduced computers in great numbers starting early 1990's, there is limited data on their use to facilitate school administration. Due to this glaring gap, the study on which this paper is based was designed to investigate the use of ICT in the administration of Kenyan secondary schools. The study was conducted in 12 randomly selected secondary schools that had introduced computers in, Nandi North District. The study assessed the experiences of administrators and teachers in these schools. A descriptive survey research design was used where both quantitative and qualitative methodologies were employed. Data collection methods included closed and open-ended questionnaires, open-ended interviews and observation. The teachers that participated in filling the questionnaires were selected by random sampling, while all principals and computer teachers participated in the interviews. Analysis through the use of SPSS computer programme was carried out on the responses of 128 respondents who returned the questionnaires. The findings of the study showed that ICT, as an administrative tool in secondary schools was not used effectively to address administrative issues. It was employed mainly for clerical activities and to a lesser extent on a few other administrative duties, particularly processing of examinations. Major challenges faced by the schools which have contributed to the limited use of ICT in school administration 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 ICT in support of school administration in secondary schools in Kenya; innovative strategies that include training and the formulation of an ICT policy, which in Kenya is currently approaching completion, are required.*

Introduction

Educational institutions in Kenya in the 21st century, just as in other parts of the world, are increasingly becoming complex multidimensional organizations requiring tremendous input in terms of human, financial and physical resources. Such school working environments are bound to overwhelm the abilities of today's teacher and administrator if they are not aided in the performance of their school administrative duties. These developments demand therefore that educational institutions modernize their tools of conducting business to enhance the effectiveness of management and leadership. The potential of information communications technology (ICT) to enhance human capabilities and revolutionize the management of organizations was first realized in other sectors of human society, mostly in the business world and the military, other than in education (Ray & Davis, 1991). The importance of ICT contribution is also widely recognized both in the workplace and at home (Dawes, 2001; Preston *et al.* 2000). These examples are just a few pointers which show that ICT is becoming a vital enabling tool that can no longer be ignored in the management of schools.

From early 1990s, increasing numbers of secondary schools in Kenya acquired computers for use in the institutions. The initiative was partly due to pressure from parents, communities and

politicians. Some of the computers installed in these schools came in the way of donations (Kavagi, 2001; Scott, 1987). Despite the central role occupied by administration in the schools, for a long time there has been little emphasis on the “effectiveness goals” of ICT in the Kenyan schools. However, since the turn of this century, the Kenyan Government has been working towards the realization of transforming all educational institutions in the country to be ICT compliant as attested by the interest shown on ICT in a number of government policy documents (*Republic of Kenya, 2001; Republic of Kenya 2005a*). Amidst this favourable gesture from the Government of Kenya to embrace ICT, this study therefore intended to establish the challenges facing the application of ICT in the administration of secondary schools in Kenya.

Purpose of the study

The purpose of this study was to investigate the challenges faced in the use of information communications technology (ICT) in the school administration of schools in Nandi North District in Kenya. Specifically, the study looked at the factors influencing computer use and how this translates into administrative uses of ICT and its impact in the secondary school system.

The specific objectives of the study were:

1. Investigate the challenges facing ICT use in secondary school administration.
2. Determine the type of administrative uses of ICT by teachers and administrators of the secondary schools.
3. Establish the impact of ICT use on secondary school administration.

Theoretical framework

The incorporation of ICT into the day-to-day functions of educational institutions has a marked impact on every aspect of management structure and dynamics. It means the study on ICT introduction in the schools would not have been exhaustive if the social and technical aspects were not considered in their entirety explaining the reason for the adoption of the socio-technical approach in the study based on the open systems theory as espoused by Kast and Rosenzweig(1985).

In the open systems theory, the school being a typical example of an organization is viewed as an open socio-technical system composed of five (5) major, partly overlapping and interdependent sub-systems namely: managerial, structural, psychosocial, goals and values, and technical. The school’s five sub-systems interact with the external environment in such a manner that bringing change in one would necessarily lead to changes in all the others. Therefore, when considering the introduction of innovations in schools, it is prudent to take cognizance of the inter-dependencies and interactions first between the five sub-systems and secondly with the external environment. The five sub-systems and the interactions among them provide a five-component socio-technical framework for the study of information communications technology in educational administration (ICTiEA) knowledge base. As stated earlier, this was chosen to guide this study due to its all encompassing nature to get the total picture of the factors that influence ICT implementation in schools, as this avoids an overemphasis of some elements over others.

Methodology

The study focused on investigating the factors that influenced the implementation of ICT in secondary school administration in Kenya. The study was carried out in 2005 in secondary schools that had introduced and used computers in what was then the larger Nandi North District. A descriptive survey research design was adopted optimizing on the strengths of a mix of quantitative and qualitative research methodologies. Nandi North District is located in the expansive Rift Valley Province of Kenya. Fifteen (15) out of 19 district schools with computers were found to meet the criterion set by the researcher. To get the 12 study schools, purposive and random sampling techniques were used. All principals and deputy principals in the schools under study were included in the sample, while the heads of department and teachers in each of the schools were selected through simple random sampling. Teachers and administrators who responded to the questionnaire were 128.

The instruments for data collection consisted of a questionnaire and interview. The questionnaire, which contained both closed and open ended questions, formed the main instrument for data collection. Open-ended interviews were carried out to supplement the questionnaires. There was only one dependent variable in this study against a number of independent variables namely, level of use of computers shown by frequency of use scores.

Using the questionnaire as the main instrument of data collection, factors affecting ICT use in school administration were investigated following the approach of the open systems theory (Kast and Rosenzweig, 1985; Barta *et al.*, 1995) referred to above, which allowed both the schools' internal and external environment to be investigated for factors influencing ICT use in school administration. Interviews were carried out with the principals of schools and computer teachers from whom additional valuable information to supplement data obtained from the questionnaire was gathered. Data was tabulated and analysed using SPSS package incorporating both descriptive and inferential statistics.

Findings and discussions

Challenges to ICT use in school administration from the schools' external environment

The study identified a number of factors which influenced ICT use in secondary school administration, either in a facilitative or hindering way. At the external environment level of the school, it emerged that about 60% of the schools have been beneficiaries of computer donations from well wishers, either foreign or from within the country. Only four of the schools had managed to acquire a sizable number of computers using their own funds, ranging in number from 10-15. Two schools had entered into a contract with computer vendors for the supply of computer hardware, software and personnel. Whereas computers acquired by schools on their own did not present serious problems, a number of shortcomings were, however, noted with donated computers. Donated computers could not run the latest software, such as *Windows 2000*, limiting the number of school administrative tasks that could be performed by the hardware and confining them mostly to word-processing. At the same time, some of these computers lacked compatibility with the new generation computers, thus not permitting exchange of programmes between the two types of hardware, a handicap recorded in a similar study done 18 years ago by Scott (1987).

Lack of electricity connection from the Mains power supply to some of the schools posed yet another major challenge to ICT use in school administration. Due to lack of power infrastructure connection to some of the institutions, two (2) of the schools under the study had resorted to the use of diesel generators to provide electricity to power the computers. This manner of sourcing power was highly inconveniencing because it was mostly used at night. Consequently, few teachers and administrators were able to utilize the technology, leading to low frequency of ICT use with a mean score of 1.64 and 2.29 on a scale of 1-5 for the two schools. Equally, studies done in the United Kingdom, the Netherlands, Malaysia and South Africa corroborate the fact that school educators require facilitation with appropriate computer facilities and related infrastructure in order for optimize the application of ICT in their teaching and administrative engagements (see Visscher *et al.*, 2003; Mentz and Mentz, 2003 and Tearle, 2004).

Challenges to ICT implementation from the schools' internal environment

The schools' internal environment was investigated along the open systems theory's five (5) subsystem areas of managerial, psychosocial, structural, values and goals and technical. Analysis of responses of 128 respondents on the various items used to investigate these subsystem areas on a scale of 1-5 was carried out. A summary of the crucial findings relevant to this paper presentation are summarized in tables 2, 3 and 4.

Table 2: Experiences of administrators and teachers on the use of ICT in secondary schools in Nandi North District at the managerial, psycho-social and structural sub-systems

<i>Managerial level</i>	<i>Statement</i>	<i>Mean</i>	<i>% with Negative Responses</i>	<i>% of those undecided</i>	<i>% With Positive Responses</i>
	School planned for computers	3.90	12.8	7.2	80
	My participation has been significant	2.90	42.9	15	42.1
	Mechanism in place for managing, monitoring and evaluating of computer resources	2.97	36.5	15.9	47.6
	Written policy on use of computers	2.85	42.1	15.9	42
<i>Psycho-social level</i>	Time set aside on the timetable for staff to use computers	2.05	71.7	13.3	15
	Priority given to purchase of computers	2.65	48.8	18.1	33.1
<i>Structural level</i>	Increase in roles of the principal and teachers	2.80	40.8	12.8	46.4

Fairly favourable perceptions were registered at the managerial and psychosocial levels, with overall means of 3.16 and 3.04 respectively. Although the question on whether planning for introduction and use of computers was undertaken by schools was answered favourably by 80 % of the respondents, interviews carried out with the principals and school computer experts indicated that most of the schools had not planned for the introduction of computers thus posing one of the biggest challenges in over 90% of the schools under the study. Besides this, more challenges abound at the managerial level. Responses for the level of participation was 42.1 %, while those for whether there was a mechanism for managing and evaluating ICT implementation, including whether there was a written policy in place was 47.6% and 42% respectively. Lack of ICT policy then both at the Ministry of Education and school levels, led to ad hoc acquisition of computers by the schools, dominated to a high degree by donated computers, whose handicaps have been mentioned earlier.

Facilitation of ICT implementation through support from administration, motivation of users, for instance, in the provision of adequate facilities and offering encouragement is of utmost importance to its success and in enhancing the level of use for school administrative tasks (Fullan, 1982; Dale and Habib, 1992; Pelgrum and Plomp, 1993 and Tearle, 2004). The school

administration and computer experts were viewed by 71.7% and 69.1% of the respondents respectively, as having shown interest, support and involvement in ICT implementation in the schools. This in turn has satisfied potential users of ICT, a factor that should help in catalysing the computerisation process in these schools. However, support through prioritising of computer purchases and allocation of time on the curriculum to facilitate teachers and administrators to use computers more were rated unfavourably or respondents were undecided at 66.9% and 85% respectively, an indication that these aspects require greater attention from schools during ICT implementation.

On the structural subsystem level, 60% of the respondents did not agree that the roles of teachers and administrators had changed since the introduction of computers in their schools, whereas 40% thought otherwise. Bennet and Lancaster (1986) and Visscher (1988) stress that in addition to training, users ought to be equipped to do the job through provision of adequate resources, chief among them, personnel to manage and maintain the equipment. From interviews it was found that in 80% of the schools under the study had been boosted through hire of computer expert(s) by the Board of Governors of the respective schools.

In this study attitudes were investigated under the values and goals sub-system and the outcome was that attitudes of administrators and teachers to ICT implementation in the secondary schools were generally positive, with an overall mean of 4.06 on a scale of 1-5. Olson and Lucas (1992) posit that “people problems”, in addition to technical and financial problems, have to be tackled together for any ICT implementation programme to succeed. Personal characteristics investigated using the Chi square test included gender, responsibility, experience and teaching area. The outcome of the results indicated variance for the first one, while the last three did not show any variance in ICT use. That is, the relationship between ICT use and each of the independent variables was significant at $p < 0.002$ for gender and not significant for responsibility, experience and teaching area. Male teachers tended to use the computer more than their female counterparts. This finding is of importance and should be taken into account during ICT implementation in Kenya’s secondary schools by laying more emphasis on the training and encouragement of more female teachers to use ICT in school administrative work.

Towards the lowest end of the respondents’ perceptions was the technical subsystem, where variables representing this subsystem were scored unfavourably by respondents, with an overall mean of 2.39. This was a sign of real danger of this subsystem dragging behind the use of ICT in the schools and some intervention is necessary to avert such a situation from happening. From the data collected and the interviews with the computer expert, it was apparent that the technical subsystem suffered from shortage of computer hardware, with an average ratio of computers dedicated to administrative use vis-à-vis the number of users being on average 1 computer: 15 users. Constraints imposed on ICT use due to limited computers for administrative work were also reported during the Computer Assisted School Administration (CASA) studies (Visscher and Spuck, 1991). In the schools under study, computers were either located in the principal’s office or computer laboratories making access by teachers difficult, although about 76% of the respondents thought this was not a serious handicap; perhaps arising from their non use of computers they did not consider it a problem.

In a study on ICT use for school administrative and instructional use, Pelgrum and Plomp (1993) found out that there was a relationship between what was learnt in ICT during training and the extent of use of ICT for instructional and administrative purposes by teachers and administrators, thus making training a crucial component in ICT use in schools. Table 3 shows the kind of ICT training undertaken by school administrators and teachers in the schools under study, while table 4 shows the confidence levels on the application of different aspects of ICT skills.

Table 3: ICT courses attended/not attended by teachers and school Administrators in Nandi North District secondary schools

<i>Type of computer course attended</i>	<i>N</i>	<i>Yes%</i>	<i>No%</i>
A. Introductory course on computers	128	53.9	46.1
B. Application programs	126	33.3	66.7
C. Programmes for teaching school subjects	125	17.6	82.4
D. Programmes for performing administrative tasks	124	21.8	78.2

Table 4: Confidence levels for application of ICT skills by school administrators and teachers in Nandi North District secondary schools

<i>Type of skill</i>	<i>N</i>	<i>mean</i>	<i>% Low Level Confidence use</i>	<i>% High Level Confidence use</i>
Switching on the computer	127	4.09	15.7	74
Creating new document	127	3.39	33.9	53.5
Printing document	126	3.37	32.5	52.4
Using word processing package	126	3.17	38.1	49.2
Using Spreadsheet package	126	2.75	48.8	35.4
Using a database	126	2.39	57.1	25.4

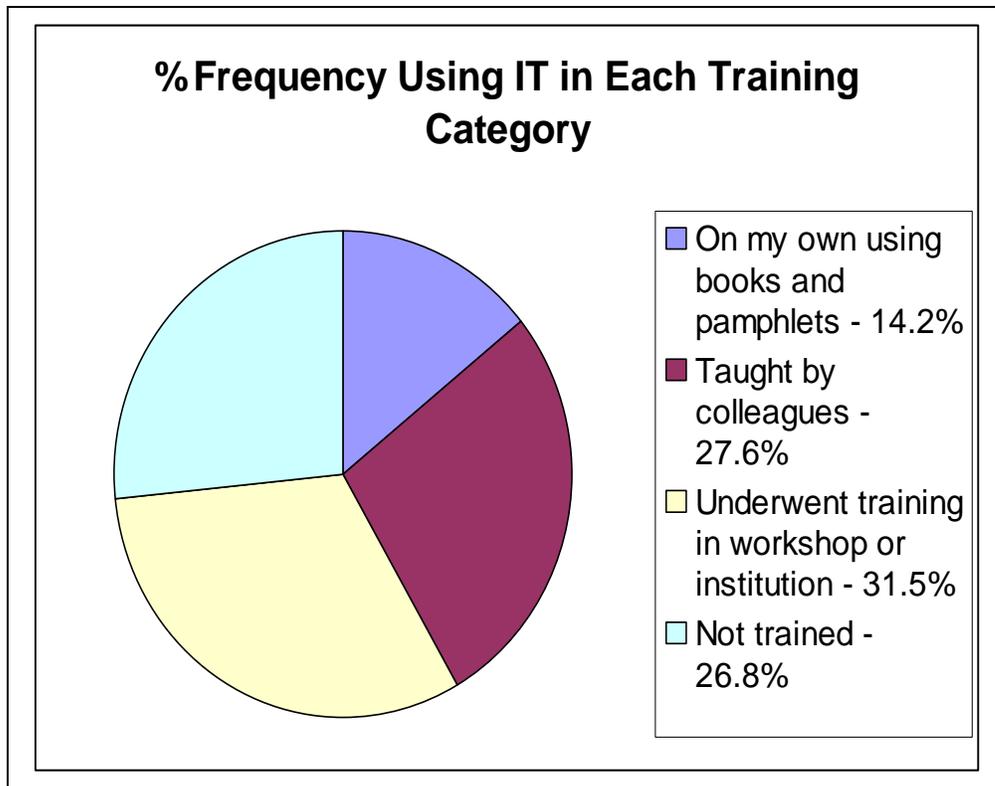


Chart 1: Training of administrators and teachers in ICT skills in Nandi North District secondary schools

In this study, lack of computer training for teachers and administrators in the schools proved to be a major drawback, with only 31% of the respondents having undergone some formal computer training in school or through a workshop. Moreover, 60% of the staff who had not used computers cited training as the biggest obstacle to their inability to utilise the technology. Regarding the computer courses attended by teachers and administrators in the secondary schools under the study, only 54% of the respondents had done introductory courses on computers as compared to between 18%-33% who had done high level ICT skill courses such as application programmes and programmes for teaching and handling administrative tasks. Lack of appropriate training among respondents led to the low use of ICT for administrative purposes, save only for word-processing.

Application of ICT and impact on secondary school administration

In the schools under study, it was found that ICT use was most pronounced for word-processing with a mean of 3.70 out of a scale of 1-5. Teachers and administrators used computers for this task on average, at least twice in a month. Preparation of class lists, keeping and accessing student records and processing of examinations was performed using the computer at least once a month. ICT was used very rarely (once a term) in the preparation of timetables and of report cards, keeping inventory records and undertaking of financial transactions. This suggests that these are tasks that were performed by teachers and administrators using ICT on average at least once a term (see table 5).

Table 5: Administrative uses of ICT by teachers and administrators in Nandi North District secondary schools

Administrative Task	N	mean	Frequency of use
1.Wordprocessing	124	3.70	At least twice in a month
2.Preparation of class lists	124	3.34	At least once in a month
3.Keeping and accessing student records	124	3.00	At least once in a month
4.Examination processing	124	3.12	At least once in a month
5.Preparation of timetable	123	2.08	Rarely Used(once a term)
6.Preparation of report cards	121	2.13	Rarely Used(once a term)
7.Keeping of inventory records	121	2.12	Rarely Used(once a term)
8.Budgeting and processing of finance records	121	2.33	Rarely Used(once a term)

Despite the leadership, administrative, training and resource challenges facing ICT integration in school administration, respondents' view on ICT impact in the schools was in fact very positive. For instance, on time taken to accomplish task, 92.6% think it shortens it, while 95.7% are in agreement that the quality of work is better than before. On the effect of using ICT to perform administrative tasks, about 70% of the respondents were of the opinion that it had increased free time available to them to perform other worthwhile school duties.

Conclusions and recommendations

A number of conclusions were arrived at with regard to the challenges facing the use of ICT in school management. At the policy level, the Ministry of Education had not come up with ICT policy, nor encouraged secondary schools to come up with the same in support of ICT use in school management, a shortcoming that for sometime led to ad hoc acquisition of computers by the schools for lack of a proper strategy. However, an overall ICT policy from the Ministry of Education, Science and Technology is nearing completion (*Republic of Kenya, 2005b*). Lack of permanent electricity supply from the mains in some of the schools with computers limited the use of ICT in school administration.

Computer purchases were not given priority in the annual school budgets and teachers and administrators were not allocated time on the curriculum to use computers. At the same time, scarcity of computer hardware and software for school administrative purposes and access to computers were some of the greatest obstacles to the use of computers in the schools. Furthermore, the study revealed that a high proportion of the teachers and administrators lacked training in essential ICT skills in database applications and administrative software needed for the effective application of ICT to school administration thus leading to limited use of computers

for administrative purposes. Personal factors such as gender did appear to play a role in influencing the use of computers in school administration, with male teachers showing the highest tendency to use computers than their female counterparts.

On the extent of ICT use, the study showed that it was mainly for the facilitation of clerical activities and to a limited extent, other administrative duties, particularly processing of examinations. The power of ICT in timetabling, student records and other record keeping, financial management and decision making was minimal and yet to be tapped to the full by the schools covered in the study. However, there was positive attitude towards the use of ICT and a realization by some of the staff that ICT could lead to enhancing administrative work performance, in particular contributing to more free time available for the teachers and administrators to do other worthwhile school duties.

From the challenges identified in the study on the use of ICT in school administration, a number of recommendations were made which in the first place involve the Government through the Ministry of Education and schools developing policies to guide the application of ICT in school management, including ensuring electricity is supplied to all secondary schools. Secondly, purchase of computers and administrative software should be budgeted for and acquired by the schools to avoid undue reliance on donated computers and software. Thirdly, training of teachers and administrators in application and administrative software programmes for school administration needs to be undertaken by the schools and universities training teachers. And lastly, schools ought to ensure that computers for administrative use are increased in number and are accessible to teachers and administrators, in particular the female teachers who need more encouragement and support from the school management to use computers.

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