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ICT and Education: Enabling Two Rural Western Kenyan Schools to Exploit Information Technology

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The study was undertaken to evaluate the implementation of ICT to support learning, teaching, school administration and use of E-communication between cooperating rural secondary schools in Western Kenya under the Rotary project, Forssa Rotary Club of Finland District 1410. The study was conducted in two selected rural schools namely: Anin secondary school (Keiyo County) and Cheplaskei secondary school (Uasin-Gishu County) under a Finnish project "Enabling rural Western Kenyan schools to exploit information technology" funded by the Suomen Rotaryn between May 2007-December 2009. A case study research design was adopted for this study where interviews, observation and open-ended questionnaires including document analysis were used to collect qualitative data. The respondents interviewed in each school were mainly head teachers, ICT instructors, ICT technicians, teachers (4), students (7), and Board of Governors (BOG) and Parents Teachers Association (PTA) members (2).The findings indicate that largely the initial objectives of the project had been realized. Teachers, students and the school administrators were now using computers to access educational resource material from the Internet, prepare and process examination results, manage, monitor and process financial reports, and communicate using email. There was also evidence that quality of teaching, learning and students' level of interaction, reasoning, recall, synthesis and evaluation had improved tremendously. School discipline and student sense of self-esteem and pride had significantly been enhanced

Keywords: e-communication, education, effect, ICT, rural schools

INTRODUCTION

The project concept to enable rural Western Kenya schools to exploit information Technology was conceived in 2006 as a result of active search of subjects for appropriate service projects, regular part of Rotarian activities and was initiated in 2007. The project was implemented as a Rotary project, Forssa Rotary Club being the responsible on behalf of Rotary Finland District 1410 in two rural schools in Western Kenya namely Cheplaskei Secondary School in Uasin Gishu County and Anin Secondary school in Keiyo Marakwet County and the implementing partner in Finland Forssa Upper Secondary school. The financial support was provided by the Government of Finland, Ministry of Foreign Affairs. The objective of the project was to support the two Kenyan schools in effective use of ICT and e-communication. The implementation of this project is in line with the government's commitment to introduce ICT in primary, secondary and tertiary education institutions contained in sessional paper No. 1 of 2005 and ICT Draft Policy of 2006. According to the Draft Policy the government will provide educational institutions with ICT resources in form of computer hardware, software and ICT teachers. It is instructive to note that from as early as 1990 an increasing number of secondary schools in Kenya acquired computers through the initiative of parents, community and politicians. Some of the computers were donations from well wishers (Kavagi 2001). It has been noted that failure by educational institutions to embrace ICT innovation has been as a result of inadequate funding by the government (Richardson 2007). Without financial support of the government and assistance from development partners introduction of computers in educational institutions will continue to remain an expensive venture in spite of the fact that the cost of hardware and software has been coming down over the years (MOEST[b] 2005). This project took cognizance of the fact that most rural Kenyan schools had limited resources and therefore fewer opportunities to benefit from development made available through new technologies. It is imperative to note that the Kenya government supports secondary school education through provision of grants for purchase of learning materials and hiring of teachers. IT training in secondary schools is recognised as exceptionally important by the Kenyan government and its population. In fact in June 2006, during computers and their associated accessories were made tax free, as a measure of this recognition. This positive aspect however still does not enable disadvantaged communities to equip their secondary schools with the most basic IT equipment due to the cost implications. As a consequence computer training, including internet is very limited to very few schools, mostly in urban areas. The Kenyan government considers investing in education as a major vehicle to enhance development in the country (MOEST[a],

2005). Taking ICT as an educational technique to the Kenyan schools is one of the major objectives in the Kenyan ICT strategy (MOEST[b], 2005). This ICT strategy of Ministry of Education of Kenya, approved in 2004, sets the following objectives for developing ICT in Kenyan education system:

GENERAL OBJECTIVE

The objective of the Project was to facilitate Public Private Partnerships (PPP) to mobilise and provide Information and Communication Technology (ICT) resources to Kenyan public schools. Some of the objectives of the project with relevance to furtherance of IT in education were: sourcing and mobilizing of resources either in cash or kind for the purchase of equipment necessary for improving the delivery of information and communications technology services with the Kenyan government and the provision of technical (including equipments), scientific and financial assistance to educational institutions for the promotion of information and communication technology studies.

Background Information on the Participating Schools

Anin and Cheplaskei are public schools supported by the local communities and sponsored by the African Inland Church (AIC). The two schools receive government grants in form of capitation from the government to support learning and teachers paid by the Teachers Service Commission (TSC).

Anin Secondary School

Anin secondary school which was founded in 1986 is located in Elgeyo Marakwet County, 50 km from Eldoret Town. The student population in 2006 was 325, comprising of girls and boys most of whom resided in school, taught by 12 teachers. At the time of this study the school had no permanent electricity connection to the national electricity grid and relied on a generator for power supply. The school did not also have fixed telephone wire lines and dependent on mobile phones for communication.

Cheplaskei Secondary School

Cheplaskei Secondary School is located in Uasin Gishu County, 10 km from Eldoret town along the Eldoret-Nairobi highway. It was established in 1987 and had a population of 180 students consisting of both boys and girls. The school has a dormitory capacity of 150 students with the rest of the students operating as day scholars. The school had 15 teachers and has better facilities for learning and was connected to the main electricity supply, unlike Anin secondary.

AIMS OF THE PROJECT

The aim of the project was to support Anin and Cheplaskei secondary schools to better use IT and e-communications in education.

KEY OUTPUTS OF THE PROJECT

1. **Upgrade School Facilities for IT Communication**
   - Proper electricity connection
   - Teleline connection
   - IT-classrooms in appropriate state for internet communication (local network, LAN)
2. **Equip IT-classrooms in with Computers and Internet Connection**
   - Internet connection installed and ready for use
   - Computers and printers purchased and installed
3. **Train Teachers and Students to use Computers**
   - Teachers trained to use efficiently computers in teaching
   - Students trained to use efficiently computers in their studying and communication (Office, email, internet)
   - Use of IT adapted to educational curricula of the schools
4. **Inter Cultural Activities in International Cooperation taken into Educational Curricula**
   - Ability to communicate diversely with people from different cultural backgrounds
   - Exchange of teachers and students between the two countries
   - Better understanding of own and foreign culture
5. **Provide Educational Materials to Support Environmental Education**
   - Sustainable development: game reserve development (Anin)
   - Municipal development: peri-urban planning (Cheplaskei)
   - Water and sanity (Anin and Cheplaskei)
6. **Promote Intercultural Activities and International Cooperation**
   i) Material produced in the joint projects extracting an essential content of this educational material from the projects (within reduced revised budget; reduced budget will cause very limited results in this component)

METHODOLOGY

A case study research design involving use of interviews, open and close ended questionnaires, observation and document analysis were used to collect pertinent qualitative and quantitative data. The respondents interviewed in each school were mainly head teachers, ICT instructors, ICT technicians, teachers (4), students (7), and Board and PTA members (2). Discussions were held with local project responsible persons that is, the headmasters of the two schools, board representatives, local education officer, teachers and students. They were

requested to justify how the project objectives had been met and to give their views on how full exploitation of computers is made available to the students of the two schools in terms of maximising time and optimising teaching using computers. Also to give their views on how to make teaching staff capable to apply IT better in their lessons.

The study was interested in getting to know if students were now able to use the most common software in use that is word processing, internet browser and web mail program. The study also sought to establish how IT training was integrated into the timetable in the two schools in order to make ICT learning more efficient. The discussions were also meant to assess the stakeholders understanding and views why they thought teaching information technology is important. It is instructive to note that IT plays an important part in the future of any economy and therefore it demands its own place in the curriculum of the school. Other benefits include assessing internet for facilities such as Wikipedia, the free encyclopaedia, and thus enhance the quality of education. It also makes it possible to communicate diversely with people from different cultural backgrounds through e-mails resulting in a better understanding of own and foreign culture.

EVALUATION

The success of this project is based on six broad key outputs as summarised in table 6.0 below. The table generally indicates what has so far been achieved and detailed discussion of each is presented in section 7.0 under findings and discussions.

Table 6.0 Status Summary of key factors in the implementation of the project

	KEY RESULT AREAS	**ANIN**	**CHEPLASKEI**
1.School facilities upgraded and ready for IT communications			
1.	Proper electricity connection	X	✓
2.	Teleline connections	X	X
3.	IT classrooms in appropriate state for internet communications (Local network, LAN)	✓	
			✓
2.IT Classrooms equipped with computers and internet connection for use. Hardware (availability)			
1.	Computers	12	10
2	Printers	3	-
3	Laptop	1	-
Software (availability)			
1.	Word processing	✓	✓
2.	Spread sheet	✓	✓
3.	Databases	✓	✓
4.	Internet connectivity	Yes	Yes
5.	Educational software	No	Encarta 2005
3.Teachers and students trained to use computers efficiently for: Teachers			
1.	Lesson preparation	X	X
2.	Teaching students in class	No	No
3.	Processing, keeping and assessing students records	✓	✓
4.	Processing of examination marks	✓	✓
5.	Timetabling of curricula	✓	✓
6.	Keeping Records of School Property	✓	✓
7.	Preparing budgets and keeping of school records	✓	✓
	Students		
1.	Can use email to communicate	✓	✓
2.	Can assess educational and environmental material from the internet	✓	✓
4.Intercultural activities in international co-operation taken into educational curricula			
1.	Ability by student and staff to communicate with people from different cultural background	✓	✓
2.	Exchange of teachers and students between the two countries, Kenya and Finland.	✓	✓
3.	Better understanding of own and foreign culture	✓	✓
5.	***Provide educational materials to support environmental education***	X	X
6.	***Promote intercultural activities and international cooperation***	X	X

Targeted outcomes in the project marked by X have not been achieved in the two schools and therefore require more time and re-strategizing for implementation while those marked by ✓ were achieved within the project plan period

FINDINGS AND DISCUSSIONS

ICT Adoption Characteristics of the Two Schools

The findings from the summary table above appear to indicate that the two schools Anin and cheplaskei have generally embraced the use of ICT technology and that the project is sustainable. The following are some of the indicators to support this view. It was noted that:

i) The school environment is stable to sustain the implementation of the project.
ii) The community behind the school was very supportive as evidenced by the members of the community, opinion leaders and local politicians who actively and effectively participated in the discussions during the project evaluation phase. This is an indication that the community is ready to support the planned change in the two schools.
iii) The principal, teachers and school management were receptive, friendly and supportive. They exhibited readiness and willingness to accommodate and learn new ideas and innovations. It is this adaptive culture that allows innovations to succeed. This demonstration of positive attitude among the school management and teachers is of critical importance in the adoption of new technology. According to Tearle, 2004 leadership and management are central in the implementation of any innovation or change. Implementing change requires not only management of change but also management of people. Hence introducing ICT in schools must take cognisance of this fact.
iv) There are supportive government policies for example the School IT Policy and commitment by the education officials to provide material support to the project to enable the two schools to act as accredited centres or resource centres or contact schools from which other schools could learn. Further the education officials committed themselves to recommending the two schools to their respective District Education Boards (DEB) for government and donor funding to further support the ICT project.

Challenges to the Project

However, it was noted that the implementation of the ICT project was likely to face challenges if the leadership of the schools changed at the crucial stage of the project implementation. This is true also if new school board members are appointed or if the computer teachers left. School management is the soul and heart of the project which supports student learning, infrastructure, pedagogical, monitoring, implementation and teacher training (Ramsay, 2001). To minimise the impact of such risks it is suggested that a school project team be formed to oversee the implementation of the project so as to ensure that at any one time there are teachers in possession of the necessary project knowledge in case any transfer occurred and also so that there are able to support each other and share ICT knowledge and practice. Shortage of professionals qualified in ICT, regular supply of reliable electric power and reliable internet connectivity could also pose a challenge to the project. These challenges are best handled by the government through the local education offices.

Application of Computers to Support Instruction and Learning

It was noted that currently the application of ICT to support instruction and learning was very limited. However students have been trained on basic knowledge and skills in computers and were able independently to use word processing, surf the net, use e-mail to communicate with their colleagues locally and in the North – Schools in Finland. Furthermore they were able to use the new found skills to search for new knowledge and information from the net. It was also noted that the student spend between 2 – 3 hrs per week which works out to not more than 30 minutes in computer labs because they have to attend scheduled lessons that run between 8.00 am – 4.00 p.m. every day.

It is also instructive to note that the amount of hours in accessing the internet is important (Cairncross and Poysti, 2006). Accessibility is also a function of the number of computers available in the school. As noted in this study the two schools had 12 and 10 computers each to be accessed by 325 students in Anin and 180 students in Cheplaskei respectively. These numbers of computers are not adequate to enable the two schools to produce students to function effectively in a technologically changing society who can fully participate and function adequately as professional workers in an technological society (Williams *et al.*, 1999). Also to improve instructional and learning outcomes in the two schools in addition to transforming learning from traditional teaching and learning to E-learning that is based on technology.

In Cheplaskei for example the performance of students has been phenomenal since the implementation of ICT project in 2007. According to the Principal, the school has moved up the ladder of academic performance in the District from number 15 in 2008 to among the top 5 in the District in 2009.

There has also been an improvement in Physics, Biology and Geography. Students were enhancing their knowledge in their respective subject areas by accessing the internet. In 2009 for example, the school reached provincial level in the science congress competition contrary to earlier years prior to the implementation of ICT project where science projects ended at the zonal level. This is attributed to the installation of the educational software called 'Encarta'. Other noticeable effects of the project include increased student entry marks due to competition for admission, improved reasoning capacity, recall and synthesis. Information accessed through the internet was said to leave a permanent impression on the minds of the students hence it improves students' capacity to retain of learnt material. The school has also witnessed increased levels of student interaction, students holding intelligent discussions, student sense of self-worth, improved levels of student discipline inside and outside school. The students reported that they now spent most of school holidays time surfing the net and little time is left them to be naughty or hung out in the shopping centres with their friends. Further that introduction of ICT in their schools means that they would not require to undertake costly ICT training in commercial colleges after they completed their secondary school education.

Another remarkable phenomenon reported by students is that they no longer coalesce in small discussion groups around a student(s) who was considered to have a mastery of knowledge of a particular subject area since there are now able as individual to seek for information and knowledge from the internet. Up to 50% of the teachers in the two schools said that they had the confidence in applying ICT to instruction and management of class activities. However it was noted that for the two schools to effectively use ICT for teaching and learning a number of challenges need to be addressed and these are:

1. Acquiring educational software to improve instructional process and learning outcomes
2. Increasing the number of computers to increase frequency of computer usage of students
3. Purchasing of LCD projectors to enable power point presentation to be undertaken
4. Training teachers in using ICT and in pedagogy and sensitising them on the full benefits of ICT. Familiarity with the use of ICT helps to build teachers confidence which is a key factor in the effective use of the computers in schools (Menjo, 2007). In this way teachers get motivated to embrace the new technology for teaching.

Application of Computers to School Management Functions

It was noted that the two schools had installed an academic programme which was being used to prepare class time tables, school master time tables, teachers' personal time tables and daily programmes for each class. The idea was brought from the partner Forssa School in Finland during the visit by the headmasters and two students each from Anin and Cheplaskei secondary schools respectively. Implementation of the ICT project had made it possible for examinations to be set locally, type-set and printed at minimum cost. Also, analysis of examination results is done electronically by the computer teachers together with the academic committee who prepare report forms for individual students, timely produce analysed results and maintain records for future reference. It was further established that school inventory was now kept and managed electronically. The two schools had installed a financial system to manage school accounts and prepare financial reports. It was noted that the installation of the financial system had led to accurate and efficient book keeping.

CONCLUSION

It can be concluded that the project objectives and plans appear largely to have been achieved in accordance with the Project timelines. The application of ICT to teaching, learning and management of education has been clearly demonstrated. The success of this ICT project is attributed to a number of factors which include the support and attitude of teachers, students, Government officials, the community and donors. The availability of suitable software and hard ware and the potential of ICT as a tool for teaching and learning are critical and cannot be underscored. It is important to note for this project just like in others that, "leadership is often the most important factor in the successful integration of ICTs into the school's instructional practices and curriculum". Without effective and supportive leadership, changes are not likely to occur (Khvilon and Patru, 2002).

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