Challenges Faced by Schools when Introducing ICT in Developing Countries

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ABSTRACT: *Although ICT has the potential to improve the education system of every country to a great extent but this is not the case in some of the developing countries because of certain challenges. Technologies allow students to work more productively than in the past, but the teacher's role in technology is more demanding than before. ICT has the potential to transform the nature of education but most developing countries face a number of challenges. The aim of the study is to present a review of the state of ICT in the school system in a developing country, by evaluating the current use of ICT as well as the challenges encountered when introducing ICT in the classrooms. A qualitative and quantitative research was used to collect data. Systematic sampling was done on the schools in terms of region, location (urban/rural) and type of school (government, mission/church, or community).*

I. INTRODUCTION

In order to compete in the global competitive economic environment, a highly skilled and educated workforce with aptitude and skill in the application of Information and Communication Technology (ICT) is essential [1]. It is important that all sectors of the education understand the benefits of investing in ICT and the infrastructure that is required for introducing ICT. There is a need for government to partner with private sector for resource mobilisation to fund the use of ICT in education [2]. This calls for policies that promote broad access to skills and competencies to learn ICT [2], which can be achieved by providing broad based formal education, establishing incentives for firms and individuals to engage in continuous training.

The Network Readiness Index (NRI) index has four sub-indices namely environment, readiness, usage and impact. Currently Swaziland ranks no 136 out of 142 countries measured in NRI [3]. In the SADC sub region the only country ranking lower than Swaziland is Angola and countries like Lesotho, Zambia and Zimbabwe have outranked Swaziland by creating an enabling environment for ICT to thrive and implement strategies that catalyse the industry. Swaziland's lowest scoring in sub-indexeswas readiness and impact. ICT readiness is the first process on the ICT development value chain. Thus the ICT ministry has come up with the implementation plan so as to improve the access, usage, economic and social impact [4].The aim of the study is to present a review of the state of ICT in the school system in Swaziland as well as the challenges encountered when introducing ICT in the classrooms.

In Africa, the introduction of computers into primary and secondary education is a recent phenomenon [5]. High subscription and ICT infrastructure costs coupled with the poor quality of service providers and the lack of basic infrastructure such as electricity can act as barriers to the use of ICT in education.

What have helped the schools to have computers are foreign donors and the companies that donate as a social responsibility project**.** Table 1 shows the total number of secondary/high schools and Table 2 shows the schools that had computers in 2012. 39% of the schools were in the rural areas and 19 % in the urban [6]. It is in the MoE ICT policy that the emphasis on ICT be in the rural schools. The computers range between 3 and 200 per primary school [6]. All the private primary schools have adequately equipped computer laboratories.

Table 1: Distribution of Schools

Secondary/High Schools		
Type	No	%
Community	172	68.0
Government	9	3.0
Private	21	8.3
Mission	51	20.2
Total	253	100
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MoE March School list 2012		

Source: Report MoE/Jica October 2012

Table 2: Schools offering computer studies and curriculum

Region	Rural schools	Urban schools	curriculum
Hhohho	21	17	IGCSE
Lubombo	23	8	
Manzini	27	17	
Shiselweni	26	6	
Total	98	48	

Source: MoE 2012

Of the 142 schools with computers only 38 schools wrote the International General Certificate of Secondary Education (IGCSE which is the UK grade 12 exam) exam in 2011 and 2012. Government has no set curriculum to be followed by secondary schools on ICT subjects. A probable reason why the other schools are not writing the IGCSE is the shortage of qualified ICT teachers in the schools. A study was done in 2012 with a sample of 42 schools that have ICT both in urban and rural. The study revealed that 34 % of the teachers teaching ICT are bachelor holders who are employed for other subjects such as mathematics, science, business, accounting, geography and agriculture etc. Most of the 32% of the teachers who are employed on permanent basis to teach ICT are on transit, they are looking for jobs in the industry.

Whilst there are calls for a new kind of learning in which students deal with knowledge in an active and self-directed way through use of computers and internet, it must be noted that the older technologies such as television play a significant role in education especially in least developing countries. Swaziland has just passed a bill on the ICT regulation and among the components in the bill is that there is going to be a channel on Swazi TV for teaching purposes.

II. METHODOLOGY

The study was descriptive and consisted of phase 1 and phase 2. Phase 1 was a close ended questionnaire and phase 2 was interviews with all the education instituions in the country. The schools that were used in phase 1 were drawn from the database of the MOE. The target population was schools that have computers. The schools were selected in terms of region, location(urban or rural) and type of school (government owned, mission owned or community school).Systematic sampling was used on the schools in each of the four regions so as to have schools represented in all the regions. A close ended questionnaire was administers to 42 high schools that teach ICT.

In phase 2 of the study, an interview as done with the institutions that offers education. Phase two of the study was to find out the challenges faced by the institution in teaching ICT. Whiles phase 1 of the study was to get the challenges faced in the classroom. This was because the purpose of the study was to find out the challenges faced by the schools when introducing ICT in the classroom.

III. CHALLENGES FACED BY THE SCHOOLS WHEN INTRODUCING ICT

The government of Swaziland is committed in implementing ICT in the schools however, the process in hindered by a number of barriers. [1] categorised the barriers into two sections; external and internal barriers. The first order barriers according to [8] include lack of equipment, unreliability of equipment, lack of technical support and other resource related issues. Second order barriers include both school level factors, such as

organisational culture and teacher level factors. The following challenges show that Swaziland has the external and internal barriers, which are also common in other developing countries.

3.1 Lack of knowledge and skills
Teacher's lack of knowledge and skills is one of the main hindrances in the use of ICT in education [9] and [5]. A study of 42 schools surveyed showed that 66% of the teachers that teach ICT in Swaziland have not been taught how to teach the ICT [6]. The teachers were hired to teach the subjects in their areas of expertise and are expected teach ICT as well. Of the 38 schools that wrote IGCSE (UK grade 12 exam which is set and marked in UK) in 2012 only 12 teachers were degreed teachers in ICT. Therefore, lack of knowledge regarding the use of ICT and a lack of skill on ICT tools and software have also limited the use of ICT tools in teaching and learning. [9]and[5] state that if there is lack of appropriate staff training and quality training for teachers the results will be very poor
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3.2 Lack of time
Teachers have been found to be the major predictors of the use of new technologies in instructional settings. The teachers teach more than one subject and then they have to teach ICT which means they have a heavy load. These teachers do not have time to design, develop and incorporate technology into teaching and learning [6]. The teacher needs time to collaborate with other teachers as well as learn how to use hardware and software.

3.3 Lack of equipment
The development of ICT infrastructure in a country is dependent on availability of resources. Swaziland has electricity in a number of schools in the rural areas but there is more than electricity that is needed to teach ICT. There are other resources that are needed such as computers, printers, multimedia projectors, scanners, etc. which are not available in the institutions. The school may have the computer and one printer but the other resources are not available. Using up-to-date hardware and software resources is a key feature in the diffusion of technology [10] but a rare experience in educational institutions. The computers are also not enough for the schools, some classes are very large and therefore, it becomes a problem when teaching the students when you do not have enough computers. However, the private schools have up to date resources.

3.4 Maintenance
There have been several initiatives from the Ministry, the private sector and international partners to introduce ICTs in schools in the country. Government initiatives have been limited by budgetary constraints. Schools that had computers donated by the private sector or bought by government have had challenges in the maintenance and upgrading of the computing equipment. In the case of a project, at the inception of the project the computer laboratories have all the resources needed as well as networking the computers and Internet connectivity facilities. When the project phases out, the maintenance of the computer has to be borne by the students.

3.5 Internet
What has to be noted is that the changing paradigms of education delivery demand extensive use of ICT and libraries are no longer the only source of information. The internet is now an information highway and needs to be complemented with traditional libraries [11]. It is therefore expected that schools use the internet, but unfortunately the internet is only available in the urban schools. There is no internet in most of the rural schools. The rural schools have electricity but there is still no internet and where there is Internet access it is very poor [6].

Most of the schools (rural and urban) would no longer be connected to the Internet because they cannot afford the high fees charged by Internet service providers such as the Swaziland Post and Telecommunications Corporation (SPTC). The fees that are paid by the students have been able to maintain the computers and have internet in the schools. It is clear that schools do not have enough funds for the maintenance and support of the computing facilities

3.6 Insufficient funds
Effective and efficient use of technology depends on availability of hardware, software and having access to resources by teachers and students and administrative staff [12]. Most of the computers in the schools are as a result of donations or projects from private companies or foreign donors. When the project is still funded by the donor, the maintenance of the computers as well as funding for the teachers is included. Immediately the project comes to an end, then the government has to take over and that is the beginning of the

problems. The schools realising that there is no funding coming from government, and they want to maintain the computers and the subject be taught in the school then the parents have to pay for the computer classes which is the maintenance of the computers and the teacher's salary.

In most developing countries it is very hard when it comes to implementing technology into education systems because it involves substantial funding by the government. The teaching aids for ICT demands a lot of funds and setting up the infrastructure, maintenance and support of ICT facilities are some of the problems that the schools are having.

The New Partnership for Africa Development (NEPAD) initiative had two packages: These systems provided real time management data including teacher and student profiles. These packages would enable schools to report to the Regional Education Offices on any activity (in real time) who could in turn report to the headquarters. After piloting the project in ten schools the project could not continue due to lack of funding [13].

IV. CONCLUSION

Lack of resources within the educational sector educational is a hindrance in the implementation of ICT in developing countries. Because of limited resources then there will be lack of sufficient computer experience for the students and teachers [14]. The school needs to be provided with adequate facilities and resources for effective implementation of ICT. Effective implementation of ICT largely depends on the teachers and the school administration. The government can help by providing in-service training to the ICT teachers.

[15]states that it is crucial to involve those who have stake in the outcomes, including teachers, parents and students so as to assist in the creation of the vision by contributing their knowledge and skills. The parents are already paying for the ICT fee which is included in the fees of the students. Had it not been for the commitment shown by the parents most of the computers in the schools would have long stopped functioning as a result of poor maintenance by government. In a number of cases the teachers that are employed by the schools are also paid by the parents through school fees. Responsible authorities have to try and overcome these barriers so that the students can benefit.

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