

Barriers to Effective Integration of Information and Communication Technology in Harare Secondary Schools

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Abstract: *This study explored the main barriers to effective integration of Information and Communication Technology (ICT) in Harare Secondary School Education. Data were collected using close ended questionnaires. Participatory research was also carried out to familiarize with the changes happening in secondary schools with respect to integration of ICT in education and to find out the challenges being faced. Data were analyzed using the Statistical Package for Social Scientists (SPSS). The results showed that although teachers are aware of the benefits of using ICTs in education there was still limited use of this pedagogy in classrooms as teachers were facing a number of challenges which acted as barriers to the successful implementation of ICT in education. These include lack of a clear sense of direction on how to use ICT to enhance the learning of students, inadequate resources and support as well as lack of the required technological skills among the teachers. The study recommends that effective planning to counter these barriers before implementation would greatly increase the effectiveness of ICT integration in secondary schools.*

Keywords: Barrier, Information Communication Technology, Teachers, Secondary Schools.

1. Introduction

Information and Communication Technology (ICT) integration in education is the use of technology tools in teaching and learning general content subjects. The integration of technology in education originated from a constructivist philosophy of education where learners actively construct their own knowledge. Research over the years has generally supported that integrating technology in education has many benefits for both teachers and their students. These include motivating students to learn, allowing for greater differentiation among students, promoting both independent work and team work and increasing the teacher's efficiency in lesson preparation and content delivery.

However, research has also found that there are many challenges associated with integrating technology in education. These include establishing infrastructure, developing the required skills to make use of information and communication technology in education and ensuring maximum use of the technology in order to reap the desired results. Searson, Laferrie and Nikolow (2011) [1] cited resistance to change, lack of a clear implementation roadmap, absence of enabling infrastructure and environment, irrelevance of the curriculum and inadequate teacher preparation as some of the barriers to successful implementation of ICT integration in education. Miima et al (2013) [2] also stated a number of challenges that hindered integration of ICT in teaching in Kenya and these include: lack of time, lack of confidence, lack of competence/limited knowledge on how to make full use, resistance to change/lack of interest, lack of computer facilities and related software and lack of technical support. Due to the

complexity of these challenges there have been some critics to the use of technology in education.

ICT integration in education also faces more challenges in developing countries where economic hardships exacerbate resource shortages. This paper explores the main barriers to effective integration of ICT in secondary schools in Harare, Zimbabwe.

2. Importance of the Research

As a new pedagogy ICT integration in education has a lot of potential to enhance learning. It offers variety to the students and therefore can keep them motivated to learn. As with any new reform in education, ICT integration faces a number of challenges. If these are not adequately addressed they act as barriers to the effective implementation of this reform. If it is not implemented successfully it discourages those who initially had the enthusiasm to take part in adopting ICT. Hollow (2011) [3] argues that, "A new technology is introduced into a school accompanied by a lot of energy and enthusiasm, but over time it doesn't get utilized in the way the participants anticipated." Balanskat, Blamire, and Kefala (2006) [8], also argue that the impact of ICT highly depended on how it is used. They also posed that, the impact of a specific ICT application or device depends on the capacity of the teacher to exploit it efficiently for pedagogical purposes. For teachers to integrate ICT into their teaching effectively, they must have the basic skills needed to operate computers and other related ICTs and schools must have the necessary infrastructure.

3. Research Objectives

This study sought to find out the challenges being faced in integrating ICT in Harare Secondary schools. It also recommends solutions to these challenges in order to enhance the effectiveness of the reform.

4. Literature review

Heshmatpanah and Neyestanak (2011) [4], carried out a study on “E-Learning Effects on Teaching at Alborz High School (Iran)”. They found a number of challenges associated with integrating information and technology in education. Surfing on the internet required more time than that allocated to a subject and students were eager to visit other sites that were not related to their subjects. Students also failed to use the sites well because of poor proficiency in the English language. A number of practical solutions to these obstacles were proposed in the article. Proficiency in computer skills for accessing sources, computer software for designing a web page, the English language and the concept of network were essential components of effective information and communication technology in education.

Tuncay and Uzunboylu (2010) [5], in their research entitled “Walking in two worlds: From e-learning paradise to technologically locked-in”, made an in-depth comparison of the impact of digital technologies on the educational experiences of students within two disparate schools. The results showed that the school from a developed country was systematic, disciplined and well equipped with smart boards, printers, speakers and even extra monitors on walls to make computer usage easier. The lessons and assignments were put on the LMS; exams were done on the LMS via intranet. The teachers took students assignments as emails from Blackboard. E-learning was integrated to all learning activities. Students were also confident in using e-learning technology.

In the school from a developing country, there were only 3 smart boards. Computers were limited and sometimes three students had to share the same computer. The teachers had never prepared a video conference before. 90% of the teachers took students’ assignments as paper work and did not have online e-quizzes. Generally the school from a developing country lacked e-learning technological devices, a situation referred to in this paper as being technologically locked-in. It was concluded that developing countries would have a greater chance to deliver up-to-date courses if they had more technological opportunities. Widening e-applications all over the world was encouraged to improve the quality of education received by students.

A Survey on ICT Usage and the Perceptions of Social Studies Teachers in Turkey was done by (Gulbahar and Guven, 2008) [6]. The results showed that teachers faced problems in relation to accessibility to ICT resources and lack of the basic skills of usage of computers and other technologies. Teachers’ perceptions of the compatibility of ICT with their current teaching practices were not as positive. Teachers pointed out that the class time was too limited for ICT usage. The study also showed that the main

ICTs that had been integrated were printers, overhead projectors, television/video, radio cassette recorders, and to a less extent multimedia computer and slide projectors. Instructional software and electronic references did not appear to be in use.

Lau and Sim (2008) [7] carried out a survey on “Exploring the extent of ICT adoption among Secondary school teachers in Malaysia”. The results showed that the ICTs most commonly used by teachers were word-processing, PowerPoint and the World Wide Web. Video conferencing, synchronous communications, use of databases or text reconstruction software had seldom been used. It also appeared that respondents felt least competent in statistical tools. It appeared as if these were technical areas that needed to be learned by teachers, and that current training courses had not addressed teachers’ training needs in this area. The lack of technical support was perceived by teachers as the key barrier to the further uptake of ICT in schools.

The teachers who had been using ICT extensively in their daily routines still indicated high training and support needs. Respondents also felt that among the various stakeholders, teachers as the classroom practitioners should have a greater say in deciding how ICT is used in schools.

Balanskat, Blamire, and Kefala (2006) [8] reviewed studies of ICT impact on schools in Europe. The review drew on evidence from 17 impact studies and surveys carried out at national, European and international level. The study showed some of the factors that impede the successful implementation of ICT in teaching. These included teachers’ poor ICT competence, low motivation and lack of confidence in using new technologies in teaching which proved to be significant determinants of their levels of engagement in ICT integration. Some barriers to ICT integration in education existed at the school level. These included limited access to ICT (due to a lack or poor organization of ICT resources), poor quality and inadequate maintenance of hardware as well as unsuitable educational software which were also defining elements in teachers’ levels of ICT use. Moreover, the absence of an ICT dimension in the overall schools’ strategies and their limited experience with project-oriented activities supported by ICT, also affected the levels of ICT use by teachers.

There were also system-level barriers to ICT integration in education. In some countries it was the educational system and its rigid assessment structures that impeded the integration of ICT into everyday learning activities. There were also some factors beyond the teacher’s control which influenced ICT integration in education, for example, institutional cultures, leadership, the curriculum and assessment.

Albirini (2004) [9] carried out a study entitled “Teachers attitudes toward information and communication technologies: the case of Syrian EFL teachers”. Many teachers did not think that computers fitted well in their curricular goals. They also felt that the scheduled class time was too limited for computer use. There were also insufficient computers for teachers and most of the respondents had little or no competence in handling most of

the computer functions needed by educators. The relationship between computer attitudes and competence suggested that higher computer competence may foster the already positive attitudes of teachers and increase the use of computers within the classroom.

In addition, many of the respondents stated that there were more important social issues to be addressed when implementing computers in education. This implies that balancing resource allocation among the competing areas of need is a critical issue in developing countries. Most respondents felt they needed computers that better suit the Arabic culture and identity. This conclusion points to the need for considering cultural factors in ICT integration.

5. Materials and Methods

A quantitative survey was carried out in secondary schools during the period 2012-2013. It was carried out in Harare province in Zimbabwe. The results of the pilot study have been used in this paper.

The ICT Integration questionnaire consisted of 199 closed ended items distributed under seven subsections: School ICT Capacity, Access to Professional Development, School Planning and Leadership, Applications of ICT in the Classroom, Assessing Student Outcomes using ICT, Personal / Professional Use of ICT and ICT Knowledge and Skills. It was adopted from an instrument used to research and evaluate ICT knowledge and skill levels of Western Australian government school teachers. The results gave useful insights on the challenges being faced in ICT integration in Harare secondary schools. The results were analyzed using the Statistical Package for Social Scientists (SPSS).

The research also included participatory research in order to establish Zimbabwean teachers' current position with respect to ICT integration in education and to practically experience the challenges faced in implementing this reform. Participatory research involved attending a national headmasters' conference on ICT in education and attending an "Intel getting Started Course" which is currently being offered to teachers in Zimbabwe to enhance their ability to integrate ICT in education.

6. Results and Discussion

6.1 Results

Results of the study showed that ICT integration in education was still a new pedagogy in Harare secondary schools and various schools were still at different stages of implementing this reform. There was a general appreciation of the benefits of using ICT in teaching and learning but various challenges had slowed the adoption of this reform. Teachers lacked the required skills. Government schools had started training teachers in the basic use of word processing and presentation software in teaching. However, a number of ICT applications, for example databases and curriculum management software had never been used and professional development courses in these areas had not been done.

Frequencies of never using some ICT resources ranged from 22%-61%.

There was still very limited use of ICT applications in the lessons with a number of teachers never using ICT, most of teachers only using ICT once a term, a number used it weekly and a very small percentage used it on a daily basis. This is illustrated by the following graph on students' assignments that incorporate a learning experience involving the use of an ICT application:

Table 1: Frequency of ICT Use by Teachers

Objective	Daily %	Weekly %	Once per term %	Never %
Achieving learning outcomes				
Mastering skills just taught	6.9	34.5	31.0	27.6
Remediation of skills	0.0	34.5	27.6	37.9
Expressing yourself clearly	17.9	14.2	25.0	42.9
Communicating with others	28.6	21.4	28.6	21.4
Finding out information	33.3	46.7	16.7	3.3
Analyzing information	13.8	48.3	24.1	13.8
Presenting information	13.3	23.3	33.4	30.0
Improving computer skills	6.9	27.6	27.6	37.9
Learning to work collaboratively	3.3	40.0	36.7	20.0
Assessing students				
Student assignments that incorporate ICT	3.3	23.3	46.7	26.7
Digital artifacts, from student assignments	3.3	10.0	46.7	40.0
Customizing assessment	6.9	17.2	20.7	55.2
SIS Curriculum Manager to monitor, evaluate and report on student achievement	3.4	17.2	24.2	55.2
Other ICT applications to monitor, evaluate and report on student achievement	0.0	29.0	54.8	16.2
Professional use of ICT				
Create materials for students use (e.g. handouts, tests)	32.3	54.7	6.5	6.5
Access research and best practices for teaching	22.6	48.4	22.5	6.5
Curriculum administration	23.3	46.7	23.3	6.7
Communicate with student(s) and/or parent(s)	9.6	19.4	35.5	35.5
Post information to a website for students	3.2	6.5	12.9	77.4
Online professional learning	3.3	16.7	26.7	53.3

There were also barriers emanating from planning and management of this reform. Many teachers felt that there was not adequate support and encouragement from their schools in supporting the use of ICT in the classroom. Generally teachers did not feel that as a school they had a clear sense of direction on how to use ICT to enhance the learning of students:

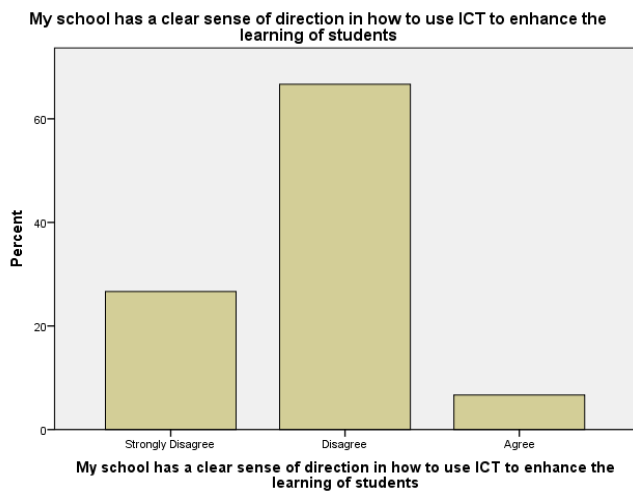


Figure 1: School Sense of Direction in how to use ICT

Many of the schools did not have the infrastructure required. Resource shortage seemed to be worse in government schools and hence private schools were ahead in using ICT in the classroom. Many Teachers did not feel that they had adequate support and ICT resources for them to use ICT in their classrooms:

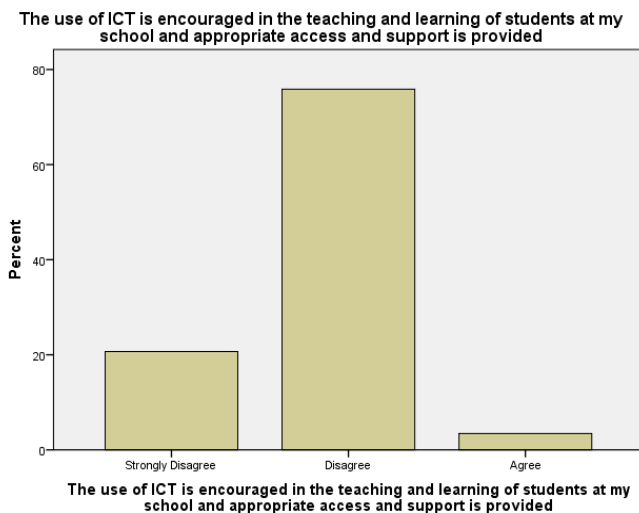


Figure 2: Use of ICT is encouraged and Access & support

In addition to that, surfing on the internet and lesson preparation took more time than the teachers were prepared to invest considering that they had other targets such as syllabus coverage and preparation for examinations. Frequent power cuts also made it impossible to use ICT in the classroom at times particularly in schools where they had not acquired generators. Most respondents stated that they frequently encountered factors outside their control that restricted their use of ICT.

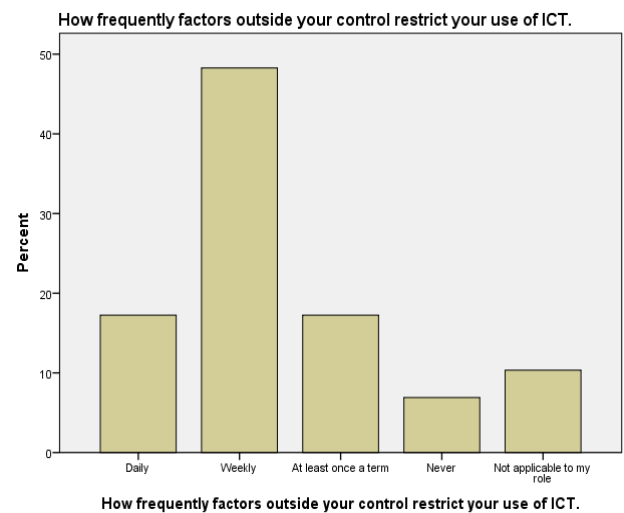


Figure 3: How frequently ICT is restricted

6.2 Discussion and Conclusions

The results show that the schools in Harare are at different stages of adopting ICT in education as a pedagogical tool. This agreed with the results of a Harvard University-guided e-readiness survey, which suggested the country was not uniformly e-ready (Isaacs, 2007:4) [10].

The results show that there is still limited use of ICT in Harare secondary schools with most teachers just using word processing, presentation software and spread sheets for adding up pupils' marks. This agrees with Lau and Sim (2008) [7], whose results showed that the ICTs most commonly used by secondary school teachers in Malaysia' were word-processing, PowerPoint and the World Wide Web and that Video conferencing, synchronous communications, use of databases or text reconstruction software had seldom been used.

Teachers lacked some of the skills particularly in the use of data bases. This is supported by Lau and Sim (2008) [7], who reported that their respondents felt least competent in statistical tools. This also concurs with Bukaily and Mubika (2011:420) [11] who carried out a study on Teacher Competence in ICT in Zimbabwean Secondary Schools. They found that (7.5%) teachers were knowledgeable and skilled in computer aided instruction, (58%) teachers indicated that they had knowledge of the word processing software while a majority (79%) lacked knowledge and skills of presentation software. The use of spread sheets was a familiar operation for only (43%) while the Internet and Email skills and knowledge accounted for (37.5%) and (46%) respectively. Their results showed a lower ICT literacy than that obtained in this study and this was probably because their sample included teachers from rural schools as well, where access to ICTs is definitely less than in Harare the capital city.

The results show that access to ICTs has restricted teachers' use of ICT in the classroom especially in the government schools in Harare. This finding agreed with Gulbahar and Guven, (2008) [6] who said that the teachers faced problems

in relation to accessibility to ICT resources and lack of the basic skills of usage of computers and other technologies

Although internet facilities were available in most of the schools, there was restricted access and in some cases the speed was too slow to download movies and other resources for use in teaching. This slow speed resulted in teachers feeling that they did not have time to use ICT in the classrooms or that lesson preparation for use of ICT was wasting valuable time for other activities which facilitated syllabus coverage and preparation for examinations. The respondents also felt that integration of ICT in teaching and learning is time consuming and may delay syllabus coverage.

Schools lacked a clear sense of direction on how to use ICT to enhance the learning of students. This finding concurred with Searson, Laferrie and Nikolow (2011) [1] who sited lack of a policy framework and a shared vision as some of the barriers to successful implementation of ICT in education. This area is very important to address considering Hinostroza and Brun (2010) [12] whose results showed that one of the most important factors in facilitating ICT integration in schools was the principal's vision for ICT-use to support learning. This might have resulted from the lack of a clearly formulated policy on ICT in secondary school education within the Ministry of Education (Isaacs, 2007) [9].

7. Recommendations

For successful integration of ICT in secondary schools there is need for a specific national policy on use of ICT in secondary schools. This policy has to be clearly communicated to school heads so that schools have a clear sense of direction on how to integrate ICT in classrooms. Searson, Laferrie and Nikolow (2011) [1] also argue that a shared vision and empowered leaders are key to the success of ICT integration in education. Teachers would also use ICT more if it becomes national policy. A national policy could also result in subsidization of ITC equipment or the removal of duty on importation of ICTs. This would help schools a lot as lack of ICT infrastructure is a huge barrier to implementation of this reform.

This study recommends that educational leaders have to plan for ICT integration. They have to budget for ICTs and find ways of getting extra funding for putting in place the infrastructure required. They might have to sell the idea to the parent body first so that they can get support in fundraising for ICTs.

It also recommends that there is need to train teachers on technological skills, particularly the use of databases so that they become ICT proficient and have confidence to use ICT without embarrassing themselves in front of students. Teachers from different schools need to share ideas on how to successfully use ICT in the classroom. Gulbahar and Guven, (2008) [6] state that the introduction of ICT innovations into education requires promoting structural, pedagogical and curricular approaches. Albirini (2004) [9] also says that "the introduction of ICT innovations into

education requires equal innovativeness in structural, pedagogical and curriculum approaches".

The study also recommends that technical support is necessary to assist teachers where they have problems. Help should also be given in finding useful websites. The study also emphasizes the need for development of materials which are suited to the current syllabus in use and posting them on an easily accessible website so that teachers do not waste a lot of time searching all over the internet. Curriculum developers can be involved in this and they can also develop software for assessment.

8. Conclusion

The integration of ICT in education has a lot of potential to enhance teaching and learning in Harare secondary schools if it is carefully planned for and adequate support is given to teachers. The barriers which have been faced in integration of ICT are key aspects which educational institutions should address before implementation of the reform, to increase its effectiveness.

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