

**Teacher Competence in ICT: Implications for Computer Education  
in Zimbabwean Secondary Schools**

**Teacher Competence in ICT: Implications for Computer Education  
in Zimbabwean Secondary Schools**

**By**

*Richard Bukaliya and Augustine Kudakwashe Mubika*

**Abstract**

*This study examined the ICT competences of rural and urban day secondary school teachers in Chegutu District, Mashonaland West Region. The study looked into the training and literacy levels of computer usage by the practitioners with a view to find out the areas of strengths and weaknesses in ICT usage. Upon identifying weaknesses, the study aimed at providing recommendations for improvement. One hundred and twenty out of 320 secondary school teachers participated in the study by providing data which was sought through the use of questionnaires and a competence practical test. The instruments required information on ICT training background, competence and literacy level of the educators. Results reveal that the majority of the teachers were computer illiterate because they were not exposed to ICT training or the practical hands on experience. A significant number had no formal ICT qualifications. A few, however, had a diploma in computers while none had a degree. Results from the practical test given indicate that the majority of the respondents were not able to use the basic software in computers for lesson delivery. Further indications are that teachers lack the necessary skills and knowledge of computer. In terms of applicability of the packages teacher weak knowledge levels show that their competence in ICTs for classroom use still lags behind. Challenges to ICT competence were identified as lack of adequate computer hardware, limited knowledge on how to make full use of ICTs in the classrooms and limited understanding on how to integrate ICTs into the teaching processes. To counter the effects of challenges, schools should fundraise in order to purchase computers. Staff development in ICTs should also be undertaken. All stakeholders should take part in mobilising resources for ICT resource centres. Teacher training institutions should offer ICT training to student teachers during their residential courses.*

**Introduction**

According to Krumsvik (2008) teachers' ICT competence is a very trendy theme and in some countries' national curriculum, digital competence is one of the core competences which are mandatory to take care of in schools. Zimbabwe has also embraced the need for ICTs in schools and this has been demonstrated by the inclusion of computer education in all sectors of education from primary to tertiary education. Appendix A and B of the Secretary for Education, Arts, Sport and Culture Circular Number 3 of 2002 clearly indicates that computer Studies are part and parcel of the entire education curriculum. This therefore means it is now compulsory for schools and other learning institutions to offer computer education to students. However, despite the existence of this policy paper, not a significant number of schools are offering the subject which is conspicuous of its absence for the schools' timetables. A number

## **Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools**

of challenges do exist in third world countries that inhibit the implementation of very noble programmes such as ICT training in schools. This study therefore aimed at establishing teacher competence in ICT and its implications for computer education in Zimbabwean Secondary schools.

### **Background to the study**

In the globalised world, technology has become the in thing as countries and/or organisations devise means of gaining a competitive edge over the others. In view of this, education systems in individual countries need to be tailor-made to suit this endeavour. Information and Communication Technology (ICT) has played a major role in linking business and individuals far apart in terms of geographical distance. Transactions are being carried out in or outside offices, twenty-four hours a day. In pursuit of the objectives to ensure that the country advances its technology base, Zimbabwe, through the Ministry of Education, has introduced computer education in the school curriculum. However, the introduction of computer education has failed to take off in the majority of schools, primary and secondary, rural and urban. Given this scenario, it is necessary for this study to look into factors militating against the introduction of computers in secondary schools. In view of the fact that secondary schools are immediate sources of manpower for industry and commerce, it is hoped that ICT literacy could have been taught to students in preparing them for the world of work. This, however, has not been the case for the majority of secondary school graduates who have gone job seeking without any knowledge of computers despite the government`s policy to make the teaching/learning of the subject mandatory.

### **Statement of the problem**

According to Lakkala et al (2011) ICT skills or competence are broadly investigated phenomena, often in order to support practical policy- making and teacher training. But with a lot of hindrances in the implementation of the ICT focussed programmes, more needs searches need to be carried out, hence the current aimed at investigating the teacher competences in ICT with a view to inform decision making.

### **Purpose of the study**

This study aimed at identifying areas of ICT competence and areas of weaknesses among secondary school teachers. It also identified possible challenges confronting the effective use of ICTs in classroom instruction in the schools. On the basis of the findings, the study came up with recommendations likely to contribute towards improving teachers` ICT competences for the betterment of classroom instructional processes.

### **Research questions**

In light of the significance of the issue at hand, it becomes imperative therefore to seek answers the following research questions:

## **Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools**

1. What are the qualifications held by teachers that contribute to successful ICT programme implementation?
2. What are the ICT practical skills acquired from the training?
3. To what extent are the present knowledge and skills relevant to the secondary school teacher?
4. What challenges do teachers meet in the usage of computers in the classroom situation?
5. What possible remedies can help alleviate the problems encountered by teachers in their attempt to teach with and use computers for instruction?

### **Literature Review**

A number of factors can be attributed to the success or failure of an undertaking. The issue of ICT success or its failure has been on the spot light, however, bringing to the fore a number of contributory factors. Among the factors are issues to do with qualifications, skills, knowledge and appropriate attitudes.

#### **Qualifications held by teachers as contributing to ICT programme implementation**

The basic qualifications for ICT applications to be possessed by a teacher of computers in education should include word processing, Internet, email; file navigation, spreadsheets, presentation software and database management systems (Jegede, 2009). The International Computer Driver`s Licence and the Diploma and Certificate programmes offered by accredited institutions in Zimbabwe have been, to a large extent recognised as basic ICT qualifications. However,

#### **ICT practical skills**

Basic software and keyboard skills are the most emphasised for a classroom teacher. This is even in cases where there are enough machines for hands on experience (Jegede, 2009). However, web skills are hardly taught because most of the facilities are not Internet connected. It would seem that training deliveries that have teachers or teaching as targets hardly take place. ICT training for teachers has always focused on processes that can be translated in a more efficient learning model for students in schools. The use of Micro Soft Word, Micro Soft Excel and Power Point Presentation have taken prominence, hence the teachers need to have hands on skills in their use (Lau and Sim, 2008).

#### **ICT Knowledge and skills relevant to the secondary school teacher**

Research has found that males, younger teachers, teachers with less teaching experience and secondary school teachers are more likely to have higher levels of ICT competence (Jegede & Adelodun, 2003). According to Jegede (2009) computer aided instruction happens to be one of the most required skills for a classroom practitioner but is the least possessed by teachers. This is because it is hardly been part of the training content. Besides, the need, according to Janssens-Bevernage, Cornille, and Mwamiki (2005) is to move from “Learning to use ICT” to

## **Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools**

“Using ICT to Learn”. Other ICT packages required of a teacher are Word processing and Data processing. These are used to organise and analyse students’ tests and results and have proved to be very beneficial to teachers since they can be used to create lesson plans and other forms of documents (ICT Education, 2006).

According to Jegede (2006) and Jegede and Adelodun (2003) teachers that use computers and ICT in teaching must have observed their teachers using computers. The most critical factor in the successful integration of ICT into education is the extent to which teacher educators are able to prepare teachers with the required knowledge and skills to utilize ICT effectively (ICT in Education, 2006).

### **Challenges in the implementation of ICTs by teachers**

ICT programme implementation has been beset by several challenges. Hereunder, a few of these are discussed.

#### **Costs of ICT training**

Costs of ICT training have been identified to be high so much that some schools cannot meet the expenses of making provisions for the teaching and learning of computers. In some cases, teachers who have trained in ICT have done so at their own expense. Even where the training has been organized by schools and computer centres, payments in many of the cases have been from personal purses (Jegede, 2009).

#### **Inadequate resources**

In researches carried out elsewhere, most teachers felt that there was need for more computers and better access to the existing ones. Teachers mentioned more computers in the classrooms and access to computer labs. Some felt more money was needed for gadgets such as printers, scanners, digital projectors and screens. Quality of the computers was not reliable (<https://www.det.nsw.edu.au/proflearn/der/docs/wherenow/teachict.pdf>). They lacked modernity to the extent that Internet access and Intranet were both deterred. Preston et al. (2000) found out that lack of time to explore ICT and prepare ICT resources was a barrier in implementing ICT in schools. Teachers are sometimes unable to make full use of technology because they lack the time needed to prepare ICT resources for lessons. Time is also needed for teachers to become more familiar with hardware and software.

#### **ICT literacy**

Another set back in computer usage in schools has been identified in several studies which have shown that the learning potential of ICT is deprived as many teachers are still not fully ICT literate and do not use it in the instructional process. Studies by Ya’acob et. al. (2005) and So and Swatman (2006) on teachers’ readiness for ICT generally, suggest that there is still a long way to go before schools can embrace modern technology.

#### **Remedies**

## **Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools**

Due to the existing constraints in ICT programme implementation, remedial action needs to be taken. Lau and Sim (2008) propose the need to put in place measures to ensure that adequate access to technical support is provided. They further suggest that a teacher with ICT competency be appointed as ICT coordinator in each school to provide technical and pedagogical support to teachers.

Lau and Sim (2008) established that teachers needed training which should be offered on a continuous, rather than a one-off, basis so that their IT knowledge is upgraded over time. It is indeed hoped that the benefits from the use of ICTs can be fully realised and optimised in teaching. Mechanisms need to be put in place to ensure that teachers utilise computer technology for further development and communication, and training needs to be designed to increase teachers' familiarity with a wider range of ICT applications.

According to STEPS (2007) the education policy should be tailor-made to increase, improve and diversify teacher education and support and attempts should be made to build ICT into general educational policies. Stakeholders should ensure access to quality equipment and learning resources and schools should develop an open knowledge-sharing school culture. Teachers' should also be given the opportunity and encouraged to reflect on, and make decisions about their own ICT development needs on ongoing basis.

### **Methodology**

The present study adopted the descriptive survey design due to the nature of the responses which were being sought for. In order to solicit data from the teachers, a questionnaire was used. The questionnaire required data on their ICT qualifications, their competence in ICT, their knowledge of ICT especially the technology that has to do with instructional processes. A practical test was given to the teachers to test their ability to use computers for basic classroom operations such as document production, internet/web operations and record keeping.

### **Population**

A total of 320 secondary school teachers made it into the sampling frame. These were all qualified teachers teaching from Form One to Six in the fifty secondary schools registered with the Ministry of Education, Arts, Sport and Culture in Chegutu District.

### **Sample and sampling procedure**

Out of the 320 teachers, a representative sample of 120 (which represents 37.5% of the population) respondents was drawn using the stratified random sampling technique. Schools were divided into two strata, one for rural and the other for urban schools. From each of the two strata, a proportional number of respondents were chosen through the simple random sampling. Names of teachers were selected through the lottery method after obtaining the lists of teachers from the monthly staff returns at the district education office.

## Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools

### Data presentation and discussion

Data were presented in tables and analysis was done to interpret the data. The data were grouped in tables according to specific themes.

**Table 1: Distribution of respondents by location of school**

Location of school	Number	Percentage
Rural	48	40
Urban	72	60
<b>Total</b>	<b>120</b>	<b>100</b>

Results from table 1 show that urban teachers were in the majority. They made up 60% of the total respondents. This was as a result of proportional representation since more schools in urban areas offered computer education than those in the rural areas.

**Table 2: Distribution of respondents by highest ICT qualification**

Type of Qualification	Rural		Urban		Total	
	Number	Percentage	Number	percentage	Number	Percentage
No formal qualification	14	11.66	32	26.67	46	38.33
Certificate of Competence	15	12.5	23	19.17	38	31.67
Diploma in computers	4	3.33	5	4.17	9	7.50
Degree in computer studies	0	0	0	0	0	0
Single subject certificates	15	12.5	12	10	27	22.5
<b>Total</b>	<b>48</b>	<b>39.99</b>	<b>72</b>	<b>60.01</b>	<b>120</b>	<b>100</b>

A total of 46 (38.33%) teachers had no formal ICT qualifications. However, 38 (31.67%) had a certificate of competence in computer usage and single subject certificate holders accounted for 27(22.5%) of the total sample. Only 9 (7.5%) had a diploma in computers while none had a degree. It appears that the qualifications of the majority of the teachers are far from being satisfactory.

**Table 3: Teachers` ICT practical skills obtained form a test**

Item tested	Passed		Failed	
	Number	Percentage	Number	Percentage

## Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools

Document processing- preparing a lesson plan	56	47	64	53
Internet- research	40	33	80	67
Email- accessing mail	50	42	70	58
Power point presentation	15	12.5	105	87.5

Results from the practical test indicate that the majority of the respondents, 64 (53%) could not be able to produce a lesson plan using the word processing software. A majority of 80 (67%) could not be able to retrieve a document from the internet while another majority of 70 (58%) failed to access mail from the email addresses. A minority of only 15 (12.5%) managed to use power point presentation to deliver a lesson but the majority of 105 (87.5%) failed to do so. Results therefore, show that the practical lesson was poorly done by the majority of the teachers who could not even use the basic software in computers for the delivery of their lessons. The results differ with the findings of Slaouti and Barton (2007) who concluded that ICTs most commonly used by teachers were word-processing, spreadsheets, Internet and presentation packages.

**Table 4: Responses on present knowledge and skills on specific ICT software**

Type of ICT	Knowledgeable		Not Knowledgeable	
	Number	Percentage	Number	Percentage
Computer aided instruction (CAI)	9	7.5	111	92.5
The use of word processing	70	58	50	42
The use of spread sheets	52	43	68	57
The use of presentation software	25	21	95	79
Internet	45	37.5	75	62.5
Email	55	46	65	54

The results above show that only 9 (7.5%) teachers were knowledgeable and skilled in computer aided instruction. Seventy (58%) teachers indicated that they had knowledge of the word processing software while a majority of 95(79%) lacked knowledge and skills of presentation software. Results of the present study contrast those by Lau and Sim (2008) who found out that teachers considered themselves to be more competent, either excellent or good in the use of presentation tools.

The use of spread sheets was a familiar operation for only 52(43%) while the Internet and Email skills and knowledge accounted for 45 (37.5%) and 55 (46%) respectively. Contrary to the situation obtaining in the district under study, in most industrialized countries, schools have for a long time had access to the Internet (Russell and Bradley, 1997). Basically, indications are that the teachers lacked the necessary skills and knowledge of computers and related technology.

**Table 5: Respondents` views on the relevance of present knowledge and skills to the secondary school teachers**

## Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools

Knowledge/skills of:	Relevant		Not relevant	
	Number	Percentage	Number	Percentage
Computer aided instruction	9	100	0	0
The use of word processing	65	93	5	7
The use of spread sheets	50	96	2	4
The use of presentation software	20	80	5	20
Internet	15	33	30	67
Email	5	9	50	91

According to the table, computer aided instruction was relevant to all the 9 respondents who had earlier on indicated they had knowledge and skills in CAI. The use of word processing appeared relevant to 65 (93%) teachers who adopted the software package for various classroom uses. The result is in agreement with those of Cuckle et al. (2000) and Jegede et. al. (2007) who found teachers to be most competent in word processing compared to other applications. Presentation software was relevant to 20 teachers whereas Internet and Email were useful to a handful, 15 and 5 teachers respectively.

To the contrary, according to Lakkala, Ilomäki and Kantosalo (2011), most teachers use computers for the Internet and in few cases use computers for word processing. Overall, the results are consistent with the findings of Slaouti and Barton (2007) who concluded that ICT most commonly used by teachers was word-processing, spreadsheets and to a limited extent, the Internet. It is surprising for the majority of teachers to be less competent in spreadsheets and word processing since these are normally used by teachers to manage student grades and results on frequent basis. The relevance, in terms of applicability of the packages demonstrates further that teacher competence in ICTs for classroom use still lags behind.

**Table 6: Challenges faced by teachers in the usage of computers in the classroom Situation.**

Challenges	Number	Percentage
Lack of adequate computer hardware	75	63
Limited knowledge on how to make full use of ICTs	80	67
Limited understanding on how to integrate ICTs into teaching	56	47
Lack of software and hardware knowledge	70	58
Inadequate trained ICT teachers	98	82
No electricity in most rural schools	86	72
Fear of technological equipment	62	52

## Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools

No appropriate infrastructure for computer laboratories	102	85
---	-----	----

A number of challenges were identified as impeding the teachers' competence in ICTs. As depicted in table 6 above, 75(63%) indicated that lack of adequate computer hardware was a challenge. Eighty (67%) stated they had limited knowledge on how to make full use of ICTs in the classrooms while according to 56 (47%) limited understanding on how to integrate ICTs into teaching was a serious setback. Lau and Sim (2008) established that the main obstacles hindering ICT use in education were lack of technical support, lack of time, and limited knowledge on how to make full use of ICTs, limited understanding on how to integrate ICTs into teaching and lack of software or websites that support state standards.

Lack of software and hardware knowledge was a challenge to 70(58%) teachers. A majority of 98(82%) cited inadequate trained ICT teachers within their vicinity as a challenge whereas 86(72%) said that there was no electricity in most rural schools for them to have computer lessons and studies. Some 62(52%) stated that fear of technological equipment was a setback and an overwhelming majority of 102(85%) stated that there was no appropriate infrastructure for computer laboratories in the schools. The findings replicate those by Hakkarainen et al., (2000) who established that in 1999 in some least developed countries only one in five teachers used ICT in teaching to a significant degree. As far as student use of the computer in the classroom, there was of the order of one computer for every ten students in lower secondary schools (Pelgrum and Anderson, 1999).

**Table 7: Possible remedies for the problems encountered by teachers in ICT**

Remedy	Number	Percentage
Fundraise to purchase computers and accessories	109	91
Staff development in ICTs	110	92
Conscientise community on the need for ICTs in schools	75	63
Involve all stakeholders in mobilising resources for ICT resource centres	100	83
Teacher training institutions to offer ICT training to students	86	72
Making it compulsory for ICT literacy for all teachers	55	46

Asked to propose remedies for the challenges faced in the quest for computer competence, 109(91%) suggested that schools should fundraise in order to purchase computers and other related accessories. Staff development in ICTs was proposed by 110(92%) of the teachers. Seventy-five (63%) suggested that the community should be conscientised on the need for ICTs in schools so as to create awareness. Some 100 (83%) were in favour of the involvement of all stakeholders in mobilising resources for ICT resource centres. Teacher training institutions, according to 86(72%) respondents should offer ICT training to student teachers during their residential courses and the Ministry of Education, Arts, Sport and Culture should make it compulsory for all teachers to be ICT literate, according to 55(46%) teachers. In support of the view to make computer education compulsory, Krumsvik (2008) states that

## **Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools**

since teachers' competence is a very trendy theme national curriculum, digital competence needs to be mandatory for school teachers.

### **Conclusions**

The current study aimed at providing an assessment of the levels of ICT knowledge, competences and skills among secondary school teachers in Chegutu district. The study drew the following conclusions:

1. the qualifications of the majority of the teachers are far from being satisfactory due to lack of exposure to college curriculum that does not cater for ICT training.
2. the teachers have poor practical skills in ICT usage since the majority of them could not even use the basic software in computers for the delivery of their lessons.
3. indications are that the teachers lack the necessary skills and knowledge of computers in basic software usage.
4. computer aided instruction and other packages among the majority of the teachers are irrelevant ICT packages due to lack of knowledge and skill on how to use them.
5. lack of software and hardware knowledge and unavailability of infrastructure are some of the inhibiting factors to teachers' ICT competences.
6. making ICT competence mandatory for school teachers can be an effective measure to improving teachers' ICT knowledge and skills.

### **Recommendations**

After unearthing the challenges that bedevil ICT programme implementation in schools, the following recommendations are made:

1. Teacher education institutions should spearhead ICT initiatives through training teachers to equip them with the requisite skills and knowledge to prepare them for classroom instruction.
2. ICT competency standards for teachers should be set up which provide guidelines for planning teacher staff development programmes and training needs to be analysed so that teachers are prepared to play an essential role in producing ICT capable students.
3. A clear and compulsory national ICT education policy should be drafted to drive ICT development among teachers so that they are able to be conversant with the necessary skills and knowledge of computers in basic software usage.
4. computer aided instruction and other packages need to be taught to teachers so that they realise the relevance of these ICT packages in classroom instruction.
5. Government and the non-governmental organisations should mobilise resources for the establishment of ICT centres in schools and other community centres.
6. making ICT competence mandatory for school teachers can be an effective measure to improving teachers' ICT knowledge and skills.
7. The responsibility for ICT programme development for teachers should extend to all stakeholders and should not be limited to the Ministry of Education, Arts, Sport and Culture.

## Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools

### References

- Bevernage, A., Cornille B., and Mwaniki, N. (2005). Integrating ICT in teacher training: Reflection on practice and policy implications- A case study of the Learning Resource Centre at the Kenya Technical Teachers College. Available at [http://www.1drc.ca/en/ev-93060-201-1-DO\\_TOPIC.html](http://www.1drc.ca/en/ev-93060-201-1-DO_TOPIC.html)
- Cox, M., Preston, C. and Cox, K. (1999). What factors support or prevent teachers from using ICT in their classrooms? British Educational Research Association Annual Conference, University of Sussex at Brighton, September 2–5. Retrieved from <http://www.leeds.ac.uk/educol/documents/00001304.htm> on 04/08/11
- Cuban, L. (1999). The technology puzzle. *Education Week*, 18 (43). Retrieved from <http://www.edweek.org/ew/vol-18/43cuban.h18> on 02/08/11
- Cuckle, P., Clarke, S., AND Jenkins, I. (2000). Students' information and communications technology skills and their use during teacher training. *Journal of Information Technology for Teacher Education*, 9(1), 9-22.
- Hakkarainen, K., Ilomäki, L., Lipponen, L., Muukkonen, H., Rahikainen, M., Tuominen, T., Lakkala, M. and Lehtinen, E. (2000). Students' skills and practices of using ICT: results of a national assessment in Finland. *Computers & Education* 34, 103-117.  
[http://linked.eun.org/c/document\\_library/get\\_file?p\\_1\\_id=22507&folderId=23774&name=DLFE-743.pdf](http://linked.eun.org/c/document_library/get_file?p_1_id=22507&folderId=23774&name=DLFE-743.pdf) on 08/08/11
- ICT in Education (2006). Information and communication technologies in teacher education: A planning guide. Retrieved from <http://www.unescobkk.org/index.php?ld=3806> on 06/08/11
- Jegede, P. O. and Adelodun, O. A. (2003). The status of computer education in Nigeria secondary schools. The African symposium. An online African Educational Research Journal, 3(3). Available at <http://www.Nesu.edu/ncsu/aero/sept03.htm>
- Jegede, P. O. (2006). A study of predicting factors of teacher educators towards ICT in south western, Nigeria. An unpublished PhD Thesis submitted to Obafemi Awolowo University, Ile-Ife, Nigeria.
- Jegede, P.O. (2009). Issues in Informing Science and Information Technology Volume 6, 2009 Assessment of Nigerian Teacher Educators' ICT Training Obafemi Awolowo University
- Krumsvik, R. (2008). Situated learning and teachers' digital competence. *Education & Information Technologies*, 13, 279- 290.
- Kwache, P. Z. (2007). The imperatives of ICT for teachers in Nigeria higher education. *MERLOT Journal of Online Learning and Teaching*. 3(4), 395-399.
- Lakkala, M., Ilomäki, L and Kantosalu, A. (2011) Which areas of digital competence are important for a teacher? Retrieved from

## **Teacher Competence in ICT: Implications for Computer Education in Zimbabwean Secondary Schools**

- Lau, B.T and Sim, C.H. (2008). Exploring the extent of ICT adoption among secondary school teachers in Malaysia International Journal of Computing and ICT Research, Vol. 2, No. 2, December 2008 Retrieved from <http://www.ijcir.org/volume2-number2/article3%2019-36.pdf>. on 8/8/11.
- Pelgrum, J.W. and Anderson, (Eds.) (1999). ICT and the Emerging Paradigm for Life Long Learning: A worldwide educational assessment of infrastructure, goals, and practices. Amsterdam: IEA.
- Preston, C., Cox, M., and Cox, K. (2000). Teachers as Innovators in learning: what motivates teachers to use ICT, MirandaNet. Retrieved from [http://www.mirandanet.ac.uk/pubs/tes\\_art.htm](http://www.mirandanet.ac.uk/pubs/tes_art.htm). on 08/08/11
- Russell, G. and Bradley, G. (1997). Teachers computer anxiety: implications for professional development. Education and Information Technologies, 2, 17-30.
- Slaouti, D., Barton, A. (2007). Opportunities for practice and development: newly qualified teachers and the use of information and communication technologies in teaching foreign languages in English secondary school contexts. Journal of In-service Education, 33(4), 19.
- So, T. and Swatman, P. M.C. (2006). e-Learning Readiness of Hong Kong Teachers. University of South Australia.
- STEPS (2007). Study of the impact of technology in primary schools Retrieved from: [http://eacea.ec.europa.eu/llp/studies/documents/study\\_impact\\_technology\\_primary\\_school/brochure291009\\_en.pdf](http://eacea.ec.europa.eu/llp/studies/documents/study_impact_technology_primary_school/brochure291009_en.pdf) on 05/08/11.
- Ya'acob, A., Nor, N., and Azman, H. (2005). Implementation of the Malaysian Smart School: An Investigation of Teaching-Learning Practices and Teacher-Student Readiness. Internet Journal of e-Language Learning & Teaching, 2(2), pp. 16-25.
- Zimbabwe Government (2002). Secretary's Circular Number 3 of 2002. Harare: Government Printers.