# Teachers' perceptions about ICT for teaching, professional development, administration and personal use

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## ABSTRACT

Tanzania has been investing in the integration of information and communications technologies (ICT) in education for several decades. However, little is known about teachers' perceptions about ICT integration in education. This study examined teachers' perceptions about the use of ICT tools for teaching, administration, professional development and personal use. Seventy four teachers were involved in the study. Data were collected through an online survey using *SurveyMonkey* and postings generated from the researcher's blog. Qualitative data were downloaded from the blog and from SurveyMonkey; read word for word; and analysed using *Weft QDA* where themes related to the research questions were coded while quantitative data from SurveyMonkey were analysed online in the form of percentages. Results indicate that while the frequency of use of ICT was influenced by access, the competence of ICT use was influenced by training; teachers used ICT in a wide range for teaching, administration, professional development and personal use. However, teachers did not use ICT to radically change their pedagogical practices, but rather to sustain their traditional practices. Future research could focus on classroom observations to ascertain the actual use of ICT as data for this study have solely depended on self-reports; and the role of school leadership for integration of ICT in the teaching-learning process needs to be examined.

*Keywords*: teachers' perceptions; ICT

## BACKNGROUND TO THE RESEARCH PROBLEM

Information and communications technologies (ICT) are being integrated in the teaching-learning process in many learning institutions of the world (Ertmer 2005; Juang *et al.* 2008; Friedman *et al.* 2009; Steel 2009; Ismail *et al.* 2010). It has been learnt that the integration of ICT in education, *inter alia*, does promote autonomous learning, curriculum differentiation (Smeets 2005), student-centred learning, higher order thinking, problem-solving, cooperative learning (Smeets & Mooij 2001; Bangert 2008), clarification of abstract concepts and transformation of the understanding of the subject matter (Leach & Moon 2000). It is due to such benefits that Tanzania too has been struggling to encourage teachers integrate ICT in education at various levels.

The Education System in Tanzania is divided into five levels, namely: 2 years of pre-primary education (for children of about 3-6 years), 7 years of primary education (7-13 years), 4 years of secondary education, ordinary level (for ages 14-17), 2 years for secondary education, advanced level (18-19 years) and 3 or more years for university level (for 19 + years old).

Successful integration of ICT in the teaching-learning process, among other things, is dependent on the preparation of teachers. In Tanzania, teachers are prepared at two major levels, the college and university levels. In the college level, graduates from ordinary level are trained as certificate teachers for pre-primary or primary schools while the advanced level leavers are trained as teachers for secondary schools. At the university level, depending on their

specializations, the trainees can be secondary school teachers or college tutors. At both levels, prospective teachers take courses related to ICT integration in education.

Research studies in Tanzania show that teachers use ICT (MoCT 2003;  Foundation 2007;  Tilya 2007;  Swarts & Wachira 2010), however, it is evident that ICT is rarely used as a teaching-learning tool (MoCT 2003;  Senzige & Sarukesi 2003;  Unwin 2005). Furthermore, research does not indicate how ICT is used for administration, professional development and personal purposes amongst teachers. The importance of ICT in these areas cannot be ignored. According to Cavas et al. (2009), personal success of using the technology can encourage teachers to use the technology in other areas such as teaching and learning. However, factors such as access and cost may be some of the factors that may limit ICT integration in schools. To that end, this study set to examine the teachers' perceptions about freely distributed ICT tools for teaching, professional development, administration and personal use.

## STATEMENT OF THE RESEARCH PROBLEM

This research examined the teachers' perceptions about ICT tools for teaching, professional development, administration and personal use. This was based on the assumption that successful personal use of ICT is likely to motivate the teachers to use ICT in other areas such as in teaching (Cavas *et al.* 2009;  Steel 2009). Therefore, *inter alia*, it is experience that makes teachers see the value of the technology they use (Mugaloglu & Bayram 2009;  Brady 2011).

## SIGNIFICANCE OF THE STUDY

The study has the following potential benefits. In the first place, it informs teachers' readiness to use ICT. Second, teachers' experiences of using ICT shade light on proper integration of ICT in teaching and learning, and, in turn, these experiences help to determine teachers' professional development needs for proper ICT integration in the classrooms. Finally, it informs teacher preparation colleges and educational technology curriculum developers on the actual use of ICT in context. It is from such contextual uses of ICT, the concerned parties can improve their programmes.

## USE OF ICT IN TANZANIA

Instances of ICT use or non use in Tanzania have been documented (Senzige & Sarukesi 2003; Unwin 2005;  Tilya 2007;  Swarts & Wachira 2010). The private secondary schools are more resourced with ICT facilities than government schools (Senzige & Sarukesi 2003). Despite the presence of such ICT facilities in the schools, few teachers use them as learning and teaching tools (MoCT 2003) and Unwin (2005) points out that in some schools the facilities are not used at all.

The first computer in Tanzania was installed and used in the Ministry of Finance in 1965 (Twaakyondo *et al.* 2002). Since early 1970s, Tanzania has been using radio broadcast for teaching-learning purposes. From 1985 there has been a high influx of computers due to the country's liberalisation policies and value added tax (VAT) exemption on computers (Hesselmark 2003).

Tanzania has a national ICT policy whose vision is to enable Tanzania "become a hub of ICT infrastructure and ICT solutions that enhance sustainable socio-economic development and accelerated poverty reduction both nationally and globally" (MoCT 2003, p. 2). The Tanzania Development Vision 2025 (GovTz 1999) also puts a great emphasis on the use of ICT as "central to competitive social and economic transformation". In spite of such emphasis, Senzige and Sarukesi (2003) point out that most schools even those that have some ICT facilities do not use them as learning and teaching tools.

**ICT initiatives in Tanzania**

There have been several initiatives related to the integration of ICT in institutions ranging from primary schools, secondary schools, colleges to universities. The main aim has been to improve education in primary schools, secondary schools, teacher training colleges, vocational education colleges, higher learning institutions and other related institutions that deal with the provision of education. These initiatives are done at both the local level as well as at the national level. I will briefly describe the main ones specifically focusing on the primary and secondary schools, and teacher training colleges as the research participants worked in those institutions.

*Primary and Secondary Schools*

*TV and radio broadcast programme* is implemented by the Ministry of Education and Vocational Training (MoEVT) for primary and secondary education via Radio Tanzania in Kiswahili, while Star TV broadcasts programmes on various subjects for secondary schools in English.  A curriculum, *Teknolojia ya Habari na Mawasiliano* (information and communications technologies), for primary and pre-primary education has been developed by Tanzania Institute of Education. Currently it is implemented in few schools near district headquarters and the schools that have ICT facilities.

*Bridgeit initiative* was established by The International Youth Foundation and the Ministry of Education and Vocational Training (MoEVT) in September 2007 through a grant from the United States Agency for International Development (USAID). The project is currently operating in seven regions, namely: Lindi, Mtwara, Pwani, Dar es Salaam, Tanga, Dodoma and Kilimanjaro. Downloaded videos via Nokia N95 cellular phones are connected to TVs in the classroom for viewing. It has been reported that the technology is very useful especially for remote areas where teaching-learning resources are limited (Foundation 2007).

According to Tilya (2007), in 2002 International Institute for Communication and Development (IICD) supported seven ICT projects aimed at improving the teaching-learning process in secondary schools in Tanzania. The projects include: *Distance Education Learning Services* - to develop teaching and learning resources, *The Bright Education Trust Fund* - use ICT in the teaching-learning and for administrative purposes, *TanEdu Educational Website* -  display important information about schools, *Wanafunzi (Student) Website* - encourage and promote the exchange of knowledge and information amongst students, *The Tanzania Computer Literacy for Secondary Schools Trust Fund* (TCLSS) - to procure computers for secondary schools, help schools set up computer laboratories, teach computer literacy and computer maintenance; and *The Model School Project* - use ICT in schools in poor areas, promote active participatory learning, and demonstrate cost-effective and sustainable ways to use ICT.

*eSchool Forum* was established in 2005 with the aim of supporting the introduction and use of ICT in secondary education. The Tanzania Education Authority (TEA) is its secretariat  (MoEVT 2007).

### Teacher Training Colleges

In August 2005, *ICT Implementation in Teachers' Colleges* was established by the Government of Tanzania in collaboration with Sweden via International Development Cooperation Agency (SIDA). The aim was to introduce ICT in all government teachers' colleges in order to improve the quality of pre-service and in-service teacher education by using ICT (MoEVT 2007). According to Swarts and Wachira (2010) these colleges offer ICT courses to both instructors and student teachers.

### Challenges for implementing ICT initiatives

The implementation of ICT faces several infrastructural and personnel challenges.  They include: limited schools with ICT facilities, costly Internet access, limited information sharing, limited skills for ICT integration (Swarts & Wachira 2010), shortage of labour force due the failure of training institutions to produce ICT technicians and professionals needed for the labour market (Mendes *et al.* 2003), limited electricity supply, fixed telephone networks and number of computers, few people have heard of or used computers (Hesselmark 2003), lack of policy framework, inadequate infrastructure and cost of bandwidth, and inadequate in-service training on ICT integration in education (Hare 2007).

Mendes, Tuijnman and Young (2003) point out that there is less emphasis on ICT training in primary and secondary schools in Tanzania due to limited resources. Senzige and Sarukesi (2003) add that most of the schools that teach computer skills are private schools.  This problem, *inter alia*, may be due to unsuccessful pre-serving training (MoCT 2003;  Senzige & Sarukesi 2003), hence, ICT for in-service staff development is *sine qua non* (Mendes *et al.* 2003;  Pelgrum & Law 2003) in stimulating ICT integration in learning and teaching in schools.

With such initiatives in place, one would expect a fully-fledged integration of ICT in schools in Tanzania. However, little is known about teachers' perceptions of ICT for teaching, professional development, administration and personal use. Such perceptions are significant as they may influence the teachers' future ICT pedagogical practices (von Konsky *et al.* 2009;  Al-Zaidiyeen *et al.* 2010). Therefore, this study set to examine teachers' perceptions about ICT tools for teaching, professional development, administration and personal use.

The reviewed literature documents the use and non-use of ICT in the teaching-learning process in Tanzania. Despite the various initiatives for promoting the use of ICT, it has been noted that the use ICT for teaching and learning is rare; it is not known how ICT is used for professional development and administration. Thus, came the need to examine teachers' perceptions of ICT for teaching, professional development, administration and personal use.

## RESEARCH QUESTIONS

The main research question that guided this study is: What are the teachers' perceptions about ICT for teaching, professional development, administration and personal use? The sub-questions are:
1. How is ICT used for teaching, administration, professional development and personal use?
2. How often do teachers use ICT for teaching, administration, professional development and personal use?

## METHODOLOGY

This study used a case study approach in order to  get in-depth analysis (Dooley 2002;  Marczyk *et al.* 2005) of teachers' perceptions, in unique and dynamic contexts where ICT were used (Cohen *et al.* 2007;  Baxter & Jack 2008).

## Sampling

The research participants were teachers enrolled in one of the pedagogy courses at one of the universities in Tanzania, hence, sampling was purposive (Onwuegbuzie *et al.* 2009). A total of 74 teachers, 33 females and 41 males participated in the study. Their age ranged from 21 to 42, thus 26.6 being their average age. 45 of them (19 females and 26 males) were in-service teachers while 29 (14 females and 15 males) were pre-service teachers (see Table 1). 27 of them had taught in colleges, 15 in secondary schools and 3 in primary schools.  Their teaching experiences ranged from 3 to 17 years. 5 teachers had 17, 15, 12, 9 and 6 years in teaching respectively, 6 teachers had 10 years, 3 had 8 years, 6 had 7 years, 1 had 6 years, 14 had 5 years, 6 had 4 years and 5 had 3 years in teaching. 53 of them had been trained in computer use for a duration ranging from two weeks to six months in either their former teacher training colleges, schools or from other computer training centres. However, 21 of them did not have computer training at all.

*Table 1*: *Gender and teacher training of the research participants*

| Gender | Teacher Training | |
| --- | --- | --- |
| | Pre-service | In-service |
| F | 14 | 19 |
| M | 15 | 26 |
| Total | 29 | 45 |

## Methods of data collection

Data were collected from two sources, namely an online survey questionnaire using SurveyMonkey and from online postings generated from the researcher's blog. The online questionnaire generated both qualitative and quantitative data while from the blog only qualitative data were generated. The online questionnaires were used because of fast turn out of responses and for maintaining anonymity of the research participants (Sue & Ritter 2007). The questions for both the survey and for blog discussion were similar.  The use of two sources of collecting similar data was for complementarity reason (Onwuegbuzie *et al.* 2007) because the survey had specific

focused questions while in the blog the questions were purposefully made more open to accommodate more views from research participants.

The survey questions focused on four major areas. First, where the teachers accessed computers for use (computer laboratory, library, home, other - specify), their level of ICT competence (very competent, competent, not competent and don't know), and their training in the use of ICT. The second area was on the frequency of use (daily, weekly, monthly, termly and never) of the following ICT resources: Internet, e-mail, word processing, spreadsheet, digital cameras, CD-ROMs and TVs. The third area was on the reasons for non use of ICT resources for teaching, professional development, administration and personal use. The ratings ranged from not available at all, not accessible when needed, not familiar with, lack of skills, not appropriate, lack of technical support to lack of time. The final area focused on the impact of ICT for their teaching and for students' learning with the following ratings positive, negative, mixed and don't know. In this area, they were also required to rationalise their choices by stating why they thought so.

## Methods of data analysis

The survey questionnaire generated both qualitative and quantitative data while the blog generated only qualitative data. The qualitative data from SurveyMonkey software (i.e responses to open-ended questions) and from the blog were downloaded. The names and email addresses of the research participants from the blog data were removed to maintain anonymity. Thereafter these qualitative data were read verbatim and analysed via Weft QDA where themes related to the research questions were coded. Quantitative data from SurveyMonkey were analysed online in the form of percentages.

## FINDINGS AND DISCUSSION

All 74 research participants responded to the entire survey questionnaire. The findings focus on the following areas: ICT competence and training, frequency of ICT use and access of ICT resources, ICT use for teaching, administration, professional development and personal use; and the influence of ICT on students' learning.

## ICT competence and training

The level of competence of ICT was influenced by computer training whose duration ranged from two weeks to six months. Specifically, 48.4% (36) got training from former teacher training colleges and schools, 15.4% (11) from private computer centres, 3.8% (3) self-taught and 3.8% (3) taught by friends, while 28.6% (21) did not receive any training at all. The respondents who had received some form of computer training displayed more use ICT in various areas than those who did not receive any training. The lack of computer training could lead to cyber phobia, that according to Agbatogun (2010) is likely to limit their use of ICT. Dogan (2010) points out that, *inter alia*, teacher training in ICT is vital for future conception and uses of computers for teaching-learning process. However, for proper ICT integration in education, the quality of training needs to be taken into account.

**Frequency of ICT use and access to ICT resources**

The frequency of use of ICT was influenced by access of ICT resources. The most commonly used ICT resources were computers followed by TVs, while digital cameras and scanners were hardly used due to their inaccessibility when needed and cost of buying them. About 64.5% used the TVs daily, but for entertainment, not for teaching, and 42.9% did not use TVs due to lack of time. With computers, the most frequently used applications per week were word processing for teaching, administration and personal use (80%), e-mails, mainly for personal communication (78.1%), Internet for searching teaching resources (71%), and spreadsheet for administrative purposes (50%). The non use of such applications was attributed to inaccessibility when needed and not familiar with them especially for spreadsheet. This confirms previous findings that the frequency of use of ICT, among other things, is influenced by access of such resources (Wu 2008; Moore & Iida 2010; Mwalongo 2010; Teo 2010).

The non use of digital cameras was surprising because from personal observations it was seen that most of the teachers had cellular phones with digital cameras, yet a reasonable number of them attributed their non use to cost of buying (37.9%), not available at all (27.7%), not accessible when needed (17.2%) and not familiar with them (17.2%). Very likely there was a misconception of digital cameras. A digital camera, to some research participants would have been viewed only as a standalone gadget, not as a device that can be embedded in a cellular phone, laptop or a personal computer.

**Use of ICT for teaching**

The most commonly reported use of ICT for teaching included preparation for notes, teaching-learning resources and examinations as indicated by the extracts below from three different research participants:

> *I use ICT in teaching for several purposes such as; searching teaching and learning materials, preparation of lesson notes, as well as teaching it as a subject.*

> *It helps me for preparing notes, to prepare different materials for teaching and learning process, to access different information.*

> *This helps during preparation of notes, preparation of exams, searching teaching and learning materials.*

Such level of ICT use does not enable teachers to radically change their pedagogical practices. There is need to go beyond such simple use by involving students in the use of ICT in order to transform students' learning.

Some teachers used ICT to solve immediate problems related to teaching and learning they had encountered during the course of teaching as the following extract illustrates:

> *I am a temporary [part-time] teacher at a certain school; when I get difficult questions from students I do simply visit Wikipedia and get good, enough and satisfactory answers, my students praise me by calling me a competent teacher.*

This kind of approach of looking for further information seems to be desirable as it encourages teachers' lifelong learning that is inbuilt on the needs of the time. Thus, the desire to learn more is prompted by the existing situations, forcing teachers to move out of their comfort zone. Ecclestone ( 2004) points out that unchallenged teachers tend to remain in their comfort zone.

However, it has to be noted that the Wikipedia is not the only source of information and that such information has to be taken cautiously, among other things, focusing on authority and accuracy of information.

The use of ICT helped teachers simplify their teaching work, manage their time and enrich teaching-learning tasks as indicated in the following excerpts from two different teachers:

> *Help to simplify my teaching activities and help in time management.*

> *It helps to access information related in[to] teaching, to provide different activities.*

However, to some teachers it was a problem as one of them illustrates:
> *It led the students to concentrate much on computers without listening. It is time consuming.*

Such an experience indicates teachers' lack of pedagogical skills in handling issues related to the use of ICT in the classroom. Essentially, it is a matter of capturing students' attention. The best part is that students seem to be motivated to use the technology, thus, it is the teacher's role to ensure that concentration is either focused on the technology or on the teacher at a given time in the classroom.

**Use of ICT for administration**

Administratively ICT were used for preparing school announcements, reports, letters and student registration.
> *I use ICT in preparing different announcements, preparing reports and letters to teachers, parents and other administrators, registration of students and employees and keeping various records.*

Such uses of ICT are encouraging, contrary to what has been reported in some schools where such resources are available, but not used at all (Hesselmark 2003; Senzige & Sarukesi 2003). It seems, in some schools, there is culture of looking at ICT resources as *sacred* objects. It is beyond human comprehension to learn that in some schools ICT resources are not used at all despite their presence, the availability of users and the need to use them. It is expected that visionary leadership would have promoted the use of such resources. Mitchell and Geva-May (2009) also confirm that many innovations are not implemented for the fear of changing the *status quo*.

In some cases computers were used as depositories of various documents of the teachers and those related to the school.
> *I store different information about school such as to store teachers' report, school meeting, children registration and different documents concerning school.*

> *I prepare promotion letters and sometimes demotion letters to workers, keeping workers and students records, for registration purpose.*

> *It help[s] easy handling of data and information due to the fact that a teacher can store a lot of information and access a specific information easily.*

These extracts seem to come from heads of school as deduced by the loaded administrative tasks. Such uses are likely to make the work of the heads of school easy and manageable. This type of document storage saves a lot of space as physical files are replaced with electronic files.

The saved space can be used for other purposes. However, this entails some cost as computers with higher storage capacity will be needed.

Finally, many respondents indicated that ICT were used to prepare timetables, schemes of work and school reports.

> *It is used in creating school timetable or subject timetable, preparation of scheme of work, preparation of students reports, letters for school meeting, parents, head of school, head of department and administration purposes such as students enrolment, teachers and workers employment, also to save students project work and examination results.*

These are common administrative ways of using ICT, but the worry is whether the schools have the right computer applications for the right tasks.

**Use of ICT for personal purposes**

ICT were used for communication, personal development and entertainment as indicated below by four different research participants:

> *I use ICT for communication, self study, entertainment through games, music and movies, updating myself through various information and advertisements from internet.*

> *I communicate with my friends through Email. Knowing different issues about the world.*

> *I chart[chat] with other people and also refresh myself.*

> *Entertainment e.g listening to music when I fill[feel] tired.*

Entertainment at workplace during work hours is likely to compromise work. In a study by Young and Case (2009), some form of entertainment such as viewing pornography, downloading music, visiting chat rooms and cybersex at work were seen as forms of misuse of ICT amongst men and women.

They also used ICT to search for and store information, and sometimes for online application.

> *OK I use this ICT personally for searching materials, for saving my different documents, for Email use.*

> *I used ICT to make online applications through the internet, example on TCU's central admission system, to apply for Higher learning institutions.*

The current use of central application system by Tanzania Commission for Universities (TCU) has given the opportunity for many students to at least experience the use computers.

**Use of ICT for professional development**

Several incidences of ICT uses for professional development have been indicated. Such uses include searching for information for self study and communication. These uses ultimately helped teachers increase their confidence in their respective areas of specialisation as indicated below:

> *I use ICT for searching various information that will strengthen my profession, self studies, communication as well as updating myself through information from [the] internet.*

> *Searching for materials through internet so as to keep myself update and increase my confidence and competence in my subject of specialization.*

Research indicates that when teachers value the benefits of ICT, their attitudes towards the use of ICT tend to be more positive (Teo 2008; Al-Zaidiyeen *et al.* 2010).

Some teachers used ICT to further their then teaching career and were consequently able to motivate other people to use ICT as illustrated by the excerpts below:
> *I search different materials about what I learn from school [University].*

> *Communicate with other professionals, self studies and motivate others to use ICT.*

However, the extent to which ICT are useful for their career development is unknown. It is evident that motivated teachers about the use of ICT are likely to encourage their students to use ICT.


**The impact of ICT on students' learning**

Many teachers (64.6%) acknowledged that ICT had positive impact on their students' learning, while only 3.2% had negative, 29% mixed feelings and 3.2% did not know the impact of ICT on their students' learning. It is possible that the student teachers who did not know the impact of ICT on their students' learning are those who did not use ICT for teaching.

The search of information from the cyberspace promoted some innovation to students as illustrated below:
> *Many [students] search materials via internet hence it encourage[s] the spirit of innovation.*

However, ICT were also a source of distraction as the following extract illustrates:

> *Sometimes they [students] can be carried away by non-related issues eg searching issues about musicians.*

It is to born in mind that ICT *per se* cannot make learning happen; it is how ICT are used that makes the difference. Thus, such problems, among other things, can be solved if the lessons are properly planned and guided.

The use of ICT also broadened students' understanding of the subject matter as indicated below:
> *Help the students to understand better about the subject by having many [variety] materials.*

> *It helps pupils to search different materials*.

The use of variety of teaching-learning resources has the potential of making students understand the subject matter easier as they get different perspectives; however, proper use of such resources is what brings the impact. Such tasks tend to be more fruitful when they are clear, teacher guided and students have the necessary technical skills, otherwise students tend to immerse themselves in searching for unnecessary information. On technical issues, one of the teachers clarifies the point, thus:

> *Microsoft word is still the problem, because most of the learners do not manage the speed on the keyboard, mouse use.*

Technical skills are important for full utilisation of ICT. Such skills, research indicates that emanate from experience and constant use of ICT (Cavas *et al.* 2009; Steel 2009; Mwalongo 2010). However, some studies indicate that experience alone is not a precursor for ICT use in the

teaching-learning process (Alexander *et al.* 2010), but attitudes towards the use of ICT (Cavas *et al.* 2009) and the value of ICT (von Konsky *et al.* 2009;  Dogan 2010;  Moore & Iida 2010; Ottenbreit-Leftwich *et al.* 2010).

ICT simplified students' understanding of different abstract concepts and made them more active as illustrated below.

> *Through using teaching media it help[s] clarification of the concepts, and activeness of the pupil[s] in learning.*

Absence of ICT in some schools limited their use in the school context, though some students had expressed interests of using such tools as indicated below:

> *No computer in my school although students are interested in knowing computers, but do not have opportunity to use them. School leaders don't care about it.*

School leadership defeats the very purpose of ICT integration in schools because computers are the tools of the trade.  The use of ICT does not necessarily involve possession of many ICT facilities such as computers, though many computers would be an added advantage. School leaders need to be encouraged to use even the few ICT facilities they have. They will make a difference.

## CONCLUSION AND FUTURE RESEARCH

This research examined teachers' perceptions about ICT for teaching, administration, professional development and personal use. It was found that; first, the level of ICT competence was influenced by training. Second, the frequency of certain ICT resources was influenced by access. Third, ICT use for teaching included preparation of notes, teaching-learning materials, examinations and searching materials with students. Such uses helped to clarify difficult concepts, save time, make learners active, and simplify teachers' work. Fourth, administratively ICT was used for preparing reports, letters, timetables and schemes of work, and for students' registration. Fifth, personal use included communication with friends, entertainment, storage of resources and online application. Finally, professional development included self study and accessing materials for their assignments; this ultimately increased their confidence in their areas of specialisation. In general, teachers did not use ICT to radically change their pedagogical practices, instead, ICT in some cases were used to maintain teachers' traditional pedagogical practices.

Future research could focus on two areas, namely classroom observations to ascertain the actual use of ICT in teaching and learning as this study solely depended on self-reported data; and the role of school leadership in the integration of ICT in schools.

## REFERENCES

Agbatogun, A. 2010, 'Self-concept, computer anxiety, gender and attitude towards interactive computer technologies: A predictive study among Nigerian teachers', *International Journal of Education and Development Using Information and Communication Technology*, vol. 6, no. 2, pp. 1-14.

Al-Zaidiyeen, N*., et al.* 2010, 'Teachers' Attitudes and Levels of Technology Use in Classrooms: The Case of Jordan Schools', *International Education Studies*, vol. 3, no. 2, pp. 211-218.

Alexander, M. E.*, et al.* 2010, 'Using the four-questions technique to enhance critical thinking in online discussions', *Journal of Online Learning and Teaching*, vol. 6, no. 2, pp. 409-415.

Bangert, A. 2008, 'The influence of social presence and teaching presence on the quality of Online critical inquiry', *Journal of Computing in Higher Education*, vol. 20, no. 1, pp. 34-61.

Baxter, P. & Jack, S. 2008, 'Qualitative case study methodology: Study design and implementation for novice researchers', *The Qualitative Report* vol. 13, no. 4, pp. 544-559.

Brady, L. 2011, 'Teacher values and relationship: Factors in values education ', *Australian Journal of Teacher Education*, vol. 36, no. 2, pp. 56-66.

Cavas, B.*, et al.* 2009, 'A study on science teachers' attitudes toward information and communication technologies in education', *The Turkish Online Journal of Educational Technology* vol. 8, no. 2, pp. 20-32.

Cohen, L.*, et al.* 2007, *Research Methods in Education (6th ed)*, Routledge, London.

Dogan, M. 2010, 'Primary trainee teachers' attitudes to and use of computer and technology in mathematics: The case of Turkey', *Educational Research and Review* vol. 5, no. 11, pp. 690-702.

Dooley, L. M. 2002, 'Case study research and theory building', *Advances in Developing Human Resources* vol. 4, no. 3, pp. 335-354.

Ecclestone, K. 2004, 'Learning in a comfort zone: cultural and social capital inside an outcome-based assessment regime', *Assessment in Education*, vol. 11, no. 1, pp. 29 - 47.

Ertmer, P. 2005, 'Teacher pedagogical beliefs: The final frontier in our quest for technology integration?', *Educational Technology Research and Development* vol. 53, no. 4, pp. 25-39.

Foundation, T. I. Y. 2007, *Bridgeit initiative*, Ministry of Education and Vocational Training, Dar es Salaam.

Friedman, A.*, et al.* 2009, 'National educational technology standards and technology beliefs and practices of social studies faculty: Results from a seven-year longitudinal study', *Contemporary Issues in Technology and Teacher Education*, vol. 9, no. 4, pp. 476-487.

GovTz 1999, *The Tanzania Development Vision 2025* Government of the United Republic of Tanzania Dar es Salaam.

Hare, H. 2007, 'ICT in education in Tanzania', in G. Farrell, S. Isaacs & M. Trucano (ed.), *Survey of ICT and Education in Africa: 53 Country Reports*, DC: infoDev / World Bank, Washington.

Ismail, S. A.*, et al.* 2010, 'Teachers' perceptions of the use of technology in teaching languages in United Arab Emirates' schools', *International Journal for Research in Education* vol. 27, no. 1, pp. 37-56.

Juang, Y. R*., et al.* 2008, 'Computer-supported teacher development of pedagogical content knowledge through developing school-based curriculum', *Educational Technology & Society*, vol. 11, no. 2, pp. 149-170.

Leach, J. & Moon, B. 2000, 'Pedagogy, information and technology and teachers' professional knowledge', *The Curriculum Journal*, vol. 11, no. 3, pp. 385-404.

Marczyk, G*., et al.* 2005, *Essentials of research design and methodology*, Wiley & Sons, New Jersey.

Mendes, S*., et al.* 2003, *Education and training for ICT development in Sri Lanka and Tanzania* Institute of International Education, Stockholm University, Stockholm.

Mitchell, B. & Geva-May, I. 2009, 'Attitudes affecting online learning implementation in higher education institutions ', *Journal of Distance Education* vol. 23, no. 1, pp. 71-88.

MoCT 2003, *National information and communications technologies policy*, Ministry of Communication and Transport, The United Republic of Tanzania, Dar es Salaam.

MoEVT 2007, *Information and communication technology (ICT) policy for basic education*, Ministry of Education and Vocational Training, United Republic of Tanzania, Dar es Salaam.

Moore, K. & Iida, S. 2010, 'Students' perception of supplementary, online activities for Japanese language learning: Groupwork, quiz and discussion tools', *Australasian Journal of Educational Technology*, vol. 26, no. 7, pp. 966-979.

Mugaloglu, E. Z. & Bayram, H. 2009, 'How are prospective science teachers' values and their attitudes toward science associated?: Implications for science teacher training programs', *Procedia Social and Behavioral Sciences*, vol. 1, no. 1, pp. 749-752.

Mwalongo, A. 2010, 'Teachers' knowledge, beliefs and pedagogical practices in integrating ICTs in different curriculum areas in secondary schools: A case study of Pakistan', *Educational Research Journal*, vol. 13, no. 1, pp. 69-79.

Onwuegbuzie, A. J*., et al.* 2007, 'Conducting mixed analysis: A general typology', *Interdisciplinary Journal of Multiple Research Approaches*, vol. 1, no. 1, pp. 4-17.

Onwuegbuzie, A. J*., et al.* 2009, 'Mixed data analysis: Advanced integration techniques', *International Journal of Multiple Research Approaches*, vol. 3, no. 1, pp. 13-33.

Ottenbreit-Leftwich, A. T*., et al.* 2010, 'Teacher value beliefs associated with using technology: Addressing professional and student needs', *Computers & Education*, vol. 55, no. 3, pp. 1321-1335.

Pelgrum, W. & Law, N. 2003, *ICT in education around the world: Trends, problems and prospects*, International Institute for Educational Planning, Paris.

Senzige, J. & Sarukesi, K. 2003, 'An approach to ICT based school education in Tanzania', *African Studies Association of Australasia and the Pacific - African on a Global Stage*, pp.

Smeets, E. 2005, 'Does ICT contribute to powerful learning environments in primary education?', *Computers & Education*  vol. 44, no. 4, pp. 343-355.

Smeets, E. & Mooij, T. 2001, 'Pupil-centred learning, ICT, and teacher behaviour: Observations in educational practice', *British Journal of Educational Technology*, vol. 321, no. 4, pp. 403-417.

Steel, C. 2009, 'Reconciling university teacher beliefs to create learning designs for LMS environments', *Australasian Journal of Educational Technology*, vol. 25, no. 3, pp. 399-420.

Sue, V. & Ritter, L. 2007, *Conducting online surveys*, Sage, London.

Swarts, P. & Wachira, E. M. 2010, *Tanzania: ICT in education situtional analsysis*, Global e-School and Communities Initiative,

Teo, T. 2008, 'Pre-service teachers' attitudes towards computer use: A Singapore survey', *Australasian Journal of Educational Technology*, vol. 24, no. 4, pp. 413-424.

Teo, T. 2010, 'Measuring the effect of gender on computer attitudes among pre-service teachers: A multiple indicators, multiple causes (MIMIC) modeling', *Campus-Wide Information Systems*, vol. 27, no. 4, pp. 227-239.

Tilya, F. 2007, *ICT in education in Tanzania: Lessons and experiences from IICD-supported projects*, International Institute for Communication Development, The Hague.

Unwin, T. 2005, 'Towards a framework for the use of ICT in teacher training in Africa', *Open Learning*, vol. 20, no. 2, pp. 113 - 129.

von Konsky, B.*, et al.* 2009, 'Lecture attendance and web based lecture technologies: A comparison of student perceptions and usage patterns', *Australasian Journal of Educational Technology*, vol. 25, no. 4, pp. 581-595.

Wu, W. 2008, 'The application of Moodle on an EFL collegiate writing environment', *Journal of Education and Foreign Languages and Literature*, vol. 7, no. 1, pp. 45-56.

Young, K. & Case, C. 2009, 'Computer ethics: Gender effects and employee internet misuse', *Issues in Information Systems*, vol. x, no. 2, pp. 598-603.