TEACHER PROFESSIONAL DEVELOPMENT NEEDS FOR PEDAGOGICAL ICT INTEGRATION IN KENYA: LESSONS FOR TRANSFORMATION

Minae I. Mwangi[1i],
David Khatete[2]

[1,2]Dr., Department of Educational Communication & Technology,
School of Education, Kenyatta University,
P.O. Box 43844-00100, Nairobi, Kenya

Abstract:

This paper is based on a study carried out in selected secondary schools in Kenya. The research examines teachers' professional development needs in Kenya with a specific focus on the teachers' needs towards professional development in pedagogical ICT integration. Teachers' professional development is often regarded as a key element to successful education reforms. Hence, teachers are expected to undergo continuous professional development to keep abreast with the various changes that occur in the education systems including the modes of teaching and instructional resources. In this study, a cross-sectional and descriptive survey design was used where research data was collected through triangulation. Three key instruments namely; questionnaires, interview guides and checklists were used to collect data. The study sample for the institutions was 30 secondary schools from Nairobi and Kiambu Counties. The sample comprised 278 teachers, 375 secondary school students, 30 schools and Computer for Schools Kenya (CFSK) trainers. The study revealed a variance in the use of ICTs by teachers especially between personal use and pedagogical use. The highest teacher professional development need cited by teachers for effective ICT integration was an intensive approach to ICT integration. Most teachers felt that the approaches used in professional development did not equip them adequately for independent ICT usage in schools. The paper proposes for a convergent approach to teacher professional development which supports constructivist learning among teacher trainers and

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[1] Correspondence: email minaeisaac@gmail.com

subsequently among learners in schools to enhance ICT integration in teaching and learning.

Keywords: teacher professional development, ICT integration, challenges of ICT integration

1. Introduction

The prevailing curriculum framework of the secondary school education system in Kenya emphasizes connecting knowledge to life, shifting from rote learning to constructing knowledge, providing a wide range of experiences for the overall development of the learner and introducing flexibility in the examinations (GOK, 2005). Pedagogical ICT integration holds great potential in meeting the demands of such a curriculum framework. As ICT continues to be an integral element for educational reforms and innovations at secondary schools, the need for enhancement of teachers' skills for pedagogical ICT integration is even higher. Recognizing that schools can be no better than the teachers who work within them, teacher professional development is therefore a key component in almost every improvement plan for education and constitutes a main component of educational reform programmes. Building teachers' capacity on how to effectively integrate ICT in classroom practice for the purpose of improving education quality and reforming curricula has been one of the main goals of national, regional and international education reform efforts in various countries (Kozma and Anderson, 2002; Pelgrum and Law, 2003).

Teacher professional development for successful and effective integration of ICT in classroom practice is undoubtedly complex and varies in approach. Research indicates that a variety of approaches have been adopted over the years to prepare and support teachers in integrating ICT in classroom practices, although the results have not always been positive. For example, Rodrigues (2003) states that teacher professional development with respect to ICT and science has not promoted any real change in classroom teaching.

Majumdar (2005) observes that most teachers, who received ICT training as part of their professional development, still lack the confidence needed to integrate ICT in teaching and learning. A review of the literature also indicates that for the most part, ICT professional development has focused on learning about ICT. The main focus of learning about ICT has been on skills regarding the use of various computer applications, such as word processing, spreadsheets, email, internet and graphics. The failure of teacher professional development programmes therefore to adequately

prepare teachers to integrate ICT in teaching and learning could be attributed to various factors. According to Margerum-Rays and Marx (2003), one major contributing factor is the lack of a conceptual framework to systematically guide the process of integration of ICT into teachers' pedagogy.

According to Zhiting and Hanbing (2006), teacher education programmes in China and other parts of the world mainly train teachers in two clusters of technology courses. The first cluster falls into what he calls ICT basics, including modules such as computer basics, programming, software tools, and network applications; the second cluster is related to educational technology, including modules such as instructional media, computer-based instruction, and multimedia authoring. Zhiting and Hanbing (2006) noted that, a number of problems have been found with such an approach for training teachers to use technology. First, the ICT basics courses only focus on technical issues and therefore do not incorporate pedagogical issues in the use of technology. Second, educational technology courses are taught in a traditional manner and lack attempts at adopting modern or emerging technology to support instructional innovations. Third, teachers fail to use new technology in their classroom instruction when they begin practicing because they lack   previous practices of applying ICT into curriculum.

According to Zhiting and Hanbing (2006) this type of structure for teacher education programme diverge theories, technology and pedagogical practices (Divergent model) in other words; theories of education, technology and pedagogy are treated in isolation. To remedy this problem, they proposed a convergent model for training teachers in technology (Figure 2.2).

Figure 1.1: Convergent model of technology integration
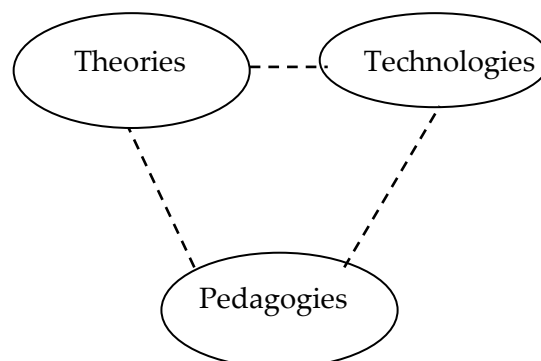
Source: Zhiting and Hanbing (2006)

Khirwadkar (2007) categorized the approaches that have are used to train teachers on pedagogical use of ICT into four (4) broad approaches:

(a) ICT skills development approach:

Where the focus is on training teachers in the use of ICT in general. In this approach, teacher trainees are expected to be skilled users of ICT for their daily activities. Knowledge about various software and hardware and their use in education is emphasized.

(b) ICT pedagogy approach:

Emphasis is on integrating ICT skills in specific subjects. Drawing on the principles of constructivism, pre-service teachers design lessons and activities that center on the use of ICT tools that will foster the attainment of learning outcomes. This approach is useful to the extent that the skills enhance ICT literacy skills and the underlying pedagogy allows students to further develop and maintain these skills in the context of designing classroom-based resources

(c) Subject-specific approach:

In this approach, ICT is embedded into one's own subject area. Teachers/subject experts not only expose students to new and innovative ways of learning but provide them with a practical understanding of what learning and teaching with ICT looks and feels like. In this way, ICT is not an 'add on' but an integral tool that is accessed by teachers and learners across the curricula.

(d) Practice driven approach:

In this approach, emphasis is on providing exposure to the use of ICT in practical aspects of teacher training. The focus usually is in developing lessons and assignments. Using ICT and implementing it in their work experience at various levels provides students an opportunity to assess the facilities available at their school and effectively use their own skills.

Khirwadkar further indicated that in majority of teacher education institutions in India, the syllabi exhibit less weight to practical than theoretical aspects in technology training.

The challenge of pedagogical ICT integration in schools including cases of low adoption and use in Kenya can be understood from the typologies of teacher training for ICT integration discussed by Zhiting and Hanbing, 2006 and Khirwadkar, 2007). PanAfrican Research Agenda on the Pedagogical Integration of ICTs, 2011) in the field of educational technology have also shown that in spite of the many efforts that researchers and educators put over the years in preparing teachers in the educational uses of technology, teachers still lack the skills and knowledge needed to be able to teach with technology successfully. Gathara (2011) observes in a study undertaken in Kenya that most of the professional development programmes that teachers engaged in mostly geared towards improvement of their academic status, with little concern in

improving teaching at the classroom level. It was necessary to ascertain in very specific terms the teachers professional development needs relating to ICT integration especially because ICT integration in instruction is significant theme in current dispensation.

2. Objectives of the Study

1. To assess the teacher professional development needs relating to ICT integration in instruction;
2. To identify the challenges and prospects for teacher effective professional development for ICT integration.

3. Research Methodology

For this study, descriptive survey design was adopted. The study was also cross-sectional in nature. Purposive sampling was used to identify respondents from the CFSK project and the schools which are supported by CFSK. Further, the schools were selected using stratified random sampling which selected three cadres of schools namely; Boys only, Girls only and Mixed Gender types of schools. The instruments for the study were developed bearing in mind the need for utilizing widely accepted indicators of ICT integration in education developed by (UNESCO Institute of Statistics, 2009). Comparable statistics on access to, and use of, information and communication technologies (ICTs), are critical to formulating policies and strategies concerning ICT-enabled growth, for social inclusion and cohesion, and for monitoring and evaluating the impact of ICTs on economic and social developments. The rationale for using global core indicators for measuring ICTs in education such as those developed by UIS (2008), is useful in formulating a framework for collecting cross-nationally comparable data on ICTs in education (Partnership on Measuring ICT for Development (2010). In the study, indicators developed by UIS like the ones on measuring access and use of ICT were referred to in developing the research instruments questions.

4. Results and Discussions

4.1 Teacher preparedness for ICT integration in schools

When teachers were asked whether they had received training on ICT integration at the teachers' training institutions where they received pre-service teacher training, 58% of the teachers indicated that they had not received ICT integration training. However, it

was re-assuring to note that 54% of the teachers indicated that they had undergone ICT training in the past five years prior to the study with some of them attending workshops and training programmes sponsored by the schools like the CFSK training programmes.

Further to understanding the training profiles for teachers participating in the study, it was found necessary to assess the adequacy of teacher's training and preparedness to integrate ICT. Teachers' responses on their preparedness for ICT integration is summarized in table 4.13.

Table 1: Preparedness to use computers for classroom instruction

| Level	Frequency	%
Not at all prepared	72	25.8
Somewhat prepared	157	56.5
Well prepared	29	10.6
Very well prepared	20	7.1

N=278
Source: Teachers' questionnaires

Table 4.13 represents statistics on teachers' level of preparedness towards the use of computers in classroom instruction. Most of the teachers accounting for 56.5% indicated that they were somewhat prepared to integrate ICT in instruction. Seventy two (25.8%) indicated that they were not at all prepared, twenty nine (10.6%) indicated they were well prepared while only twenty teachers (7.1%) indicated that they were very well prepared to integrate ICT in education. This finding is consistent with what Kiptalam and Rodrigues (2012) found out in a study on 11 secondary schools located in an urban area in Kenya that revealed that most of the young teachers who had served for few years in schools had received ICT training at college or university but that mostly the training is usually on computer applications rather than ICT integration. It is encouraging to note that the Ministry of Education has good intentions to ensure that ICT integration is mainstreamed in all teacher training programmes (Ministry of Education, 2006).

Teacher training at pre-service, in-service and in professional development courses should go beyond awareness and computer application skills. Teachers should be trained to expand their knowledge of pedagogical practices across multiple aspects of the planning, implementation and evaluation processes. According to Ertmer et al., (2004), teachers training should empower teachers to understand how to develop students' abilities to work collaboratively or to take control of their own learning in ICT – enhanced environments.

4.2 Sources of Knowledge for ICT Integration

Teachers' knowledge has been found to have significant impact on their decisions and actions (Mojgan et al., 2009). Teachers' competencies for ICT use is therefore an important factor in determining their level and manner of integration in instruction. To determine the sources of knowledge of ICT use, the teacher respondents were asked to rate the items in Figure 4.15 in order of significance (from the highest source to the lowest).

Figure 1: Sources of Knowledge for ICT Integration
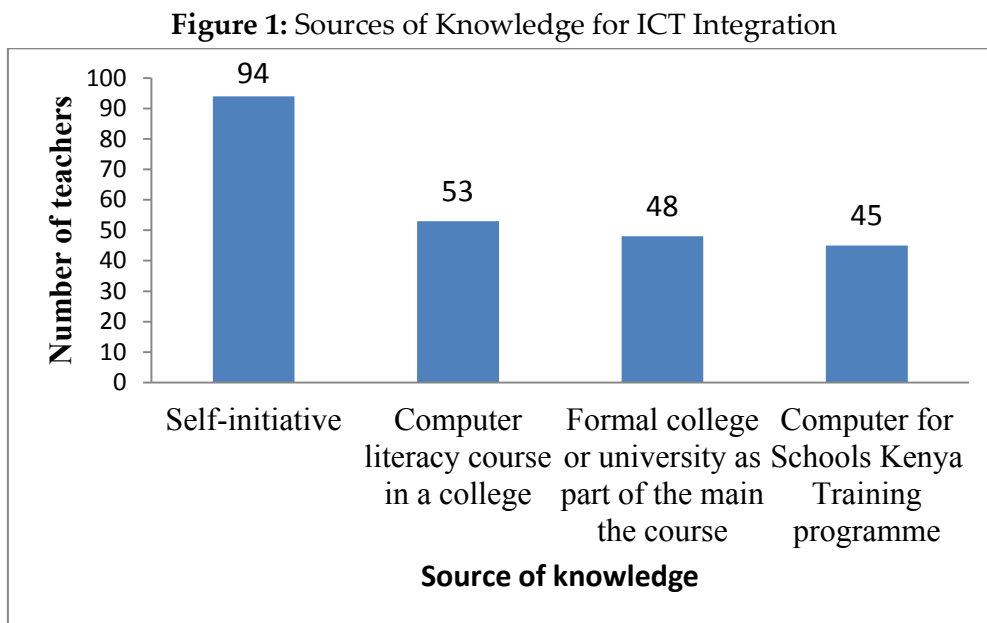
N=278
Source: Teachers' questionnaires

It is evident from figure 4.15 that most of the teachers, ninety four (94) identified self-initiative as the means by which they learnt how to use computers. The second highest source of knowledge for computer use was identified as computer literacy training in college by fifty three teachers (53). Computer for Schools Kenya was identified by forty five (45) teachers as the highest source of knowledge. Other related sources of knowledge such as workshops and seminars were selected by nineteen teachers as an important source of ICT knowledge and skills. Apparently from this data, teachers attend professional development training workshops and seminars but it appears there is little evidence to suggest that the sessions meaningfully impacted on teachers' knowledge and competencies in integrating ICT in instruction. Therefore, despite the availability of professional development opportunities, teachers had more confidence on their own self initiatives on ICT capacity development. The data seem to suggest that workshops and seminars organized for upgrading teachers' knowledge and skills may not be fully effective hence the lower rating by teachers. This therefore dispels the

assumption that teachers were not interested in pursuing their expertise in ICT. It is evident that most teachers (94) looked for their own avenues for ICT skills development, primarily utilizing their own time and seeking to add to their knowledge and skills through personal networks. There is need therefore to have a closer alignment between the amount of time given for professional development and its perceived importance.

4.3 Teacher professional development by Computer for Schools Kenya

Teacher professional development generally affords teachers ongoing learning opportunities to improve their skills and knowledge for better practice (Zhiting and Hanbing, 2006). The CFSK trainers were interviewed in order to understand how they train teachers on ICT integration and also to find out what constitutes the curriculum offered to teachers during their training sessions. It emerged from the interviews that the CFSK training offered to secondary school teachers focuses on the following modules: Basic User Proficiency, Hardware Maintenance, Computer Network Administration, ICT Integration in Teaching and Learning, Computerized Institutional Management, Web site administration, Short courses including SPSS, AutoCad, AchiCad and Quick Books. Except from one module that is geared towards equipping teachers with ICT integration knowledge, all the other modules are computer application courses. The approach taken by CFSK followed the divergent model (Zhiting and Hanbing, 2006). As noted by Zhiting and Hanbing, this approach treats theories, technologies and pedagogies separately. Inappropriate training styles result in low levels of ICT used by teachers. Courses which lack pedagogical aspects are likely to be unsuccessful. Considering the perspective and approach used by CFSK, it is clear that in such ICT professional development courses, teachers are not often taught how to integrate ICTs into their pedagogical practices. This implies that after teachers had attended the ICT professional courses, they still found it difficult to integrate ICT in their teaching.

Professional development programmes should adopt a convergent approach in which theory and technology is focused on pedagogy. Skills taught to teachers should be within contexts of classroom practice and use. Emphasis should also be on the use of ICT in practical lessons rather than theory.

4.4 Sources of Support for ICT Integration

The presence or absence of support for the use of ICT devices determines the success of integrating these devices into various educational tasks. Teachers were asked to state their sources of support in the use of computers which is summarized in table 4.14.

Table 2: Frequency of Support for ICT Use

Source of technical support	Often	Sometimes	Never
Teacher for computers	45	76	157
Other teachers	9	48	221
Computer for Schools Kenya	7	25	246
Other out of school support	23	45	210

N=278

Source: Teachers' questionnaires

Table 4.14 presents the different sources of support for teachers in using ICT in schools. It is evident from the statistics that the most common source of support (45) is usually from teachers of computers in schools. Evident from table 4.14 is that the least source of support was that from Computer for Schools Kenya which was selected by 246 teachers. It is very clear from the data presented in table 4.14 that teachers from the sampled schools seldom get any kind of support as shown by the high number of teachers who confirmed that they never received support from any of the four sources enlisted in table 4.14.

From these data, one is likely to conclude that the Computer for Schools Kenya does not have in place an elaborate support structure for schools where they supplied computers. Secondly, the most common sources of support are predominantly from teachers of computers in schools. This is encouraging because the existence of internal mechanisms of support in schools is an economical alternative and a readily available solution to some of the teething ICT related challenges in schools. UNESCO (2002) suggests that the provision of on-site, timely technical support is critical to the success of an ICT-based educational program. In addition, Mumatz (2000) reviews literature on the use of Information and Communication Technology within an educational context. He mentions a case study in the UK that identified a number of factors that enable teachers to successfully engage in innovative practice. These were: support at senior management level for implementing new practices and addressing financial implications where appropriate; involvement of several members of staff; fostering a culture of collaboration within schools and mutual support; and lastly willingness to take risks. The role of school leadership is also central in meeting several of these preconditions. For effective ICT use and integration in schools, teachers require both technical and administrative support.

4.5 Teachers' ICT professional development needs

The continuous professional development of teachers sits at the heart of any successful educational system. Teaching is becoming one of the most challenging professions in

our society where knowledge is expanding rapidly and modern technologies are demanding teachers to learn how to use these technologies in their teaching (Carlson and Gadio in Haddad W. and Draxler, 2002). The teacher needs-based professional development programmes maximize the effects of a professional development program, and help participants sustain their learning over the long term. To determine the professional ICT development needs of teachers in the sampled schools, an open ended question was developed which elicited multiple responses that have been summarized under the following main thematic areas in table 4.15.

Table 3: Teachers' ICT Integration Professional Development Needs

Need	Frequency
Computer hardware and software skills training	167
Internet use	48
How to integrate technology into teaching	223
Use of ICT to produce assessment tools	116
Use of technology for administrative work	51
Use of ICT for research	47

N=278

Source: Teacher questionnaire

In Table 4.15, teachers' professional needs are summarized according to their frequency. Teachers responded to the open ended question "*What do you see as your current needs for professional development in computers?*" by giving different types of responses which are categorized as shown in Table 4.15. Teachers who were specific about the type of area for which they needed professional development identified integrating technology into teaching about twice as often as computer hardware and software skills. None of the teacher respondents in this study indicated that they did not require any type of training meaning that all of them felt deficient of technology related knowledge and skills. For example, one teacher pointed out that it was "*pointless to do personal development without having regular access to a computer laboratory and appropriate software*".

Most of the teachers emphasized the need to receive training in order to satisfactorily confront the challenges caused by the implementation of ICT in teaching and learning processes. Almost all the teachers stated the need to acquire pedagogical training rather than technical skills; although sometimes they considered that they have to be aware of the potentialities of the tools in order to be able to use them properly. Most teachers felt that teacher training institutions were not doing enough to equip them with pedagogical ICT integration skills.

Some teachers expressed the need for better exposure to ICT use experiences. One teacher for example argued that it would be enriching for him to interact with his peers from private schools where ICT is regularly used in teaching and learning.

It was nonetheless interesting to note that some teachers were a step ahead because they were already interacting online with peers through blogs such as *"iLearn Technology, Emerging EdTec and Educational Technology Debate (ETD.* A further observation of these three blogs revealed that ETD seeks to promote a substantive discussion of how low-cost information and communication technology (ICT) device initiatives for educational systems in developing countries are relevant to the very groups they purport to serve – the students, teachers, and their surrounding communities. This is advanced through the conversation in weekly posts on a monthly topic of discussion. Participants are encouraged to augment each post with comments, related information, and relevant news items. Participants are also encouraged to be moderators or discussants at any time. The activities embedded in the debate are categorized into four mutually supportive and inter-related focus areas, each building on the other namely; sharing information, sharing experience, discussing new innovations and solving problems to create a true industry- and continent-spanning community of practice (www. edutechdebate.org). The only challenge with such blogs is that that most of them are hosted abroad and therefore the content shared on them is foreign. Due to the foreign nature of the content, teachers feel distanced and out of tune with it.

From this example, it was realized that there are now many examples of Internet and Web-based communication technologies, being used to support teachers' on-going professional development and networking. Such types of websites provide online resources for teachers and facilitate teachers' networking based on the assumption that professional development should be an integral part of daily practice for all teachers and the use of the Internet would enhance continuous professional development activities of teachers, connecting teachers to larger teaching communities and allowing for interaction with expert groups. Teachers therefore need to be given incentives and facilitated to develop their ICT integration skills through a variety of strategies including online professional development courses whose costs are often cheaper than face-to-face and even less interruptive of their daily schedules.

5. Conclusion

It was evident from the study that most of the professional development programmes administered to teachers focused on generic or ICT application skills. The model used

in teacher professional development programmes was largely divergent rather than convergent. The teacher professional development needs analysis clearly showed that teachers require training pedagogical on ICT integration for them to meaningfully integrate ICT in their instructional activities. It is also imperative in this study that most teacher professional development programmes lack a well-organized conceptual framework that embraces technology learning, pedagogical approaches and subject content learning.

6. Recommendations

Teacher professional development providers should expose teachers to practical examples of integrating ICT for constructivist teaching. By seeing teacher educators as successful role models and mentors, teachers will build the confidence and capacity that is necessary for pedagogical ICT integration. This implies that teacher professional development in the use of technology should embody and model the forms of pedagogy that teachers can use in their classrooms.

Additionally, it is vital for teacher professional development programmes to empower teachers to develop their knowledge and skills actively and experientially, in a variety of learning environments, both individually and collaboratively. As much as possible provide various opportunities for different learning strategies that have direct instruction, discussion, drill and practice and other meaningful strategies that make ICT integration a tool for successful learning experiences. Teachers should also be provided with opportunities to create professional learning networks. Such networks are useful in facilitating sustainable professional development opportunities.

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