

An Activity System Analysis of the Conceptualisation of ICT Interventions in the Malawi Primary Education System

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Abstract

The introduction of Information and Communication Technology (ICT) in education has greatly transformed and improved the quality of teaching and learning worldwide. In Malawi, efforts are continuously being directed towards having ICT resources in all primary schools through different ICT interventions. Though the interventions are likely to be widespread, there needs to be empirical evidence if they are contextually conceptualised before being introduced into the schools. This research examines how ICT interventions in Malawi's primary school education system are planned, introduced and guided in the primary schools. The main aim of this study is to analyse the activities and processes taking place in the contexts that the ICT interventions are being introduced. The study used a qualitative research approach to investigate the roles, processes and collaborations between government institutions and ICT providers in conceptualising ICT interventions through interviews and analysis of documents. An Activity System Analysis was used to draw relationships between and within how the interventions are conceptualised at the national level. The findings reveal gaps in national education plans and policies as formal guidelines that regulate primary school education system investments. The efforts by the various ICT intervention providers are unguided and unregulated, and the process of conceptualising and implementing the ICT interventions in primary education is still in the form of experimentation being led by the intervention providers rather than the Ministry of Education.

Keyword: Activity System, ICT interventions

Introduction

In recent years, there has been an upsurge of interest in how ICT can best be harnessed to improve the efficiency and effectiveness of education at all levels, in both formal and non-formal settings. However, the adoption and use of ICT in education require understanding how ICT can be incorporated into teaching and learning through dynamic processes and within unique situations and contexts (UNESCO, 2004). Thus, using ICT in education requires understanding and applying context-relevant concepts, materials and environments directed towards learning.

ICT interventions in education are emerging technologies that are reshaping the nature of education by increasing access to information as well as serving as a means of promoting learning by transforming classrooms into more engaging, collaborative and productive learning environments in which instruction can be customised to learners' specific needs, interests and learning styles (UNESCO, 2004). ICT interventions are also understood as technological resources that redefine how educators teach and their role in the school (Trucano, 2005). In Malawi, there have been few attempts to precisely capture the actual situation of ICT conceptualisations in the education system through empirical studies to provide a valid explanation of how the ICT interventions fit in the education system, context and structure.

According to the Ministry of Education (MoE) National Education Sector Plans of 2008-2017, primary school education harbours most of the challenges in Malawi's entire education system due to ever-increasing enrolment that is not complemented with adequate funding. This situation has led to challenges, including a shortage of qualified teachers and inadequate teaching and learning materials (MoEST, 2008; Kadzamira & Rose, 2001). In response to these challenges, from 2008 to this study, the Malawi Government has implemented a priority scheme titled the National Education Sector Investment Plans (NESIP) to strengthen primary education through policy measures, quality improvement and investments. The NESIP informs all investment decisions about funding, new approaches and new interventions for the development of the education sector by the Government of Malawi and all its development partners.

Following the NESIP, several government-led interventions have been introduced to overcome the identified challenges. The interventions include improving teaching and learning inputs such as books and ICT innovations to facilitate more effective learning and enhance learning outcomes. As one way of improving teaching and learning inputs, the Ministry of Education (MoE) has worked with several development partners for the past two decades to introduce ICT innovations in schools. Examples include *Tiphunzire Limodzi* portable multimedia players for instructional materials; *Tikwere* Interactive Radio Instruction (IRI); *TeachTab* and *LearnTab*; Euro-Talk tablet-based interactive video lessons; and the Unlocking Talent iPad-based interactive video instruction. The numerous interventions within such a short period suggests that using portable ICT interventions for classroom instruction is essential for improving educational quality in primary school classrooms in Malawi.

Research Problem

Studies elsewhere show that ICT interventions do not automatically add quality to teaching and learning or a better education system (see Baskin & Williams, 2006; Boakye & Banini, 2008; Dawson & Rakes, 2003; Smeet, 2005). In most developed countries, where nearly all schools are equipped with the infrastructure for conducting ICT-mediated teaching and learning, "ICT interventions have been thought about, invited into educational practices, and pushed down the schools and teachers without preparing nor supporting them" (Maclure, 1997; Tsitouridou & Vryzas, 2003 in Teo 2008 p. 414). This approach has proved a wasteful strategy. Although new interventions are argued to improve learning attainment and educational practice tremendously, optimal benefit from any ICT intervention may only be achieved when teachers use ICT to design and develop classroom instruction (Maclure, 1997).

As presented in the introduction, in the Malawian primary education context, the introduction of ICT interventions in primary education is rapid. Hence, swift subsequent decisions are made by the MoE and the involved ICT providers, schools and teachers. It has yet to be determined if the interventions are designed with parallel reforms and support systems within the education structures that could support the schools and teachers in implementing and integrating ICT for their intended purposes. Without such empirical evidence, ICT interventions will likely be introduced into the primary education system much faster than at which the schools and the teachers can use them effectively.

Purpose of the study

This study aimed to investigate how ICT interventions are planned, introduced and guided in the primary education system of Malawi.

Literature Review

Existing research findings suggest a number of factors that affect the effective adoption of ICT interventions in education. These factors include a lack of policy and regulatory frameworks to guide the roles of key stakeholders in the introduction of the ICT interventions (Kozma, 2005; Sawicki & Clark, 2015; Vanderlinde et al., 2014); lack of national planning to establish needs and goals for ICT to direct the ICT investments in the education system (Kozma, 2005; Ringstaff & Kelley, 2002; Yusuf, 2005); lack of ICT integration during pre-service teacher education to prepare teachers for ICT uptake and integrations (Blake et al., 1998; Jimoyiannis & Komis, 2007; Rakes & Casey, 2002; Tondeur et al., 2012); and lack of relevant in-service professional development in ICT for serving teachers (Romeo et al., 2012; Tezci, 2011; Unwin, 2005).

Kozma (2005) asserts that classroom innovations are less likely to add to overall national goals and have the ultimate intended effects if their interventions and desired outcomes are not developed from strategic ICT plans, policies and programs. The strategic plans for ICT investment and interventions have to harmonise and regularise efforts of different key stakeholders in the design, development and management of ICT interventions by identifying priorities, setting targets and providing a framework against which to monitor and evaluate national progress. Vanderlinde, Aesaert, and Van Braak (2014) also observe that the effective attainment of whatever goals of ICT interventions in education requires strategic planning to ensure their effective implementation. Furthermore, Ringstaff and Kelley (2002) and Jhurree (2005) highlight the need for national education ICT plans to act as blueprints for the subsequent events in the schools' implementation and teachers' integration of the ICT provisions and interventions. National ICT plans should provide schools with a broad philosophy of ICT use to explore how ICT can improve teaching and learning through school-based ICT vision, professional development, curricula strategies, planning and evaluation (van Braak & Goeman, 2003).

Apart from policy direction, Goktas, Yildirim and Yildirim (2009b) recommend that the best way to inspire teachers to adopt ICT into their teaching is to develop their ICT competency and efficacy through teacher education. Teacher preparation, through modelling by the teacher educators, has to empirically provide and engage the students in ICT-integrated training (Redmond & Albion, 2005). The lack of knowledge of the pedagogical demands of the ICT interventions in primary schools presents challenges in how teacher educators could prepare the pre-service teachers for ICT intervention's pedagogical integration. Similarly, recent research has found that the main challenge to implementing ICT interventions in schools is the need for more in-service training for teachers (Buabeng-Andoh, 2012; Chai et al., 2011; Tezci, 2011). Genc (2011) argue that teachers only value the use of ICT in their teaching if their training addresses pedagogical issues for ICT use. Inadequate and inappropriate ICT in-service training leads to teachers' insufficient preparedness and poor confidence, preventing them from adopting ICT interventions in their instructional activities (Granger et al., 2002). This argument prompts consideration of teachers' meta-cognition of ICT pedagogy integration to identify, articulate and pursue personally relevant goals for ICT use rather than specific ICT objectives being imposed on them.

Lastly, effective adoption and integration of ICT into teaching depend mainly on the availability and accessibility of ICT resources (BECTA, 2004; Bingimlas, 2009; Granger et al., 2002; So et al., 2012). Other studies established that access to ICT infrastructure and resources is essential for schools to adopt the new ICTs (see Cabanatan, 2001; Jung, 2005; Keengwe et al., 2009). Research findings by BECTA (2004) on barriers to the uptake of ICT

by teachers which is not always merely limited to the non-availability of the hardware and software or other ICT materials within the school but also a result of poor organisation of resources, poor quality hardware, inappropriate software, or lack of personal access for the teachers and learners.

As observed by (Isaacs, 2007), inequitable access to hardware, software and the ICT infrastructure within schools is often related to a lack of ICT integration where the use of ICT in education still needs to be improved.

Research Questions

The study was guided by the following research questions in order to investigate the ICT intervention environments and processes, capture the intricacies of each of these environments, and understand how the characteristics of the national conceptualisation of ICT interventions:

1. How is the introduction of ICT interventions in the Malawi Primary Education System conceptualised?
 - a. How are the ICT interventions planned, guided and regulated in the national primary school education system?
 - b. Are teachers and schools prepared for the uptake of ICT interventions?
2. How does the national conceptualisation of ICT interventions shape and influence their implementation contexts and processes in schools?

Theoretical Framework - Activity System Analysis

Activity Theory (AT) is an approach that seeks to understand subjects (individuals or institutions) in their natural settings and circumstances or environment (Yamagata-Lynch, 2003). The theory provides a set of principles that constitute a general conceptual system that accounts for the environment, history of the person or organisation, culture, role of artefact (tools), motivations, and complexity of real-life activity to bridge the gap between the individual subject and the social reality through a mediating activity (Kaptelinin & Nardi, 2006). The unit of analysis in Activity Theory is the concept of object-oriented, collective and culturally mediated human activity, or an Activity System that includes an object (or objective), subject, mediating artefact (tools), rules, community and division of labour.

Yrjo Engeström (also presented as Engestrom in this article) developed analytical methods within activity theory by introducing activity systems analysis "to map the co-evolutionary interaction between individuals or groups of individuals and the environment, and how they affect one another" (YamagataLynch, 2003, p. 22). The activity system analysis is designed to enhance understanding of human activity in a collective context with a six-element model; *Subjects, Tools, Objects, Community, Rules and Division of Labour* (Engestrom, 2000). He puts forward a matrix (See Figure 1) that conceptualises the activity system analysis, considered central in contextual studies in education.

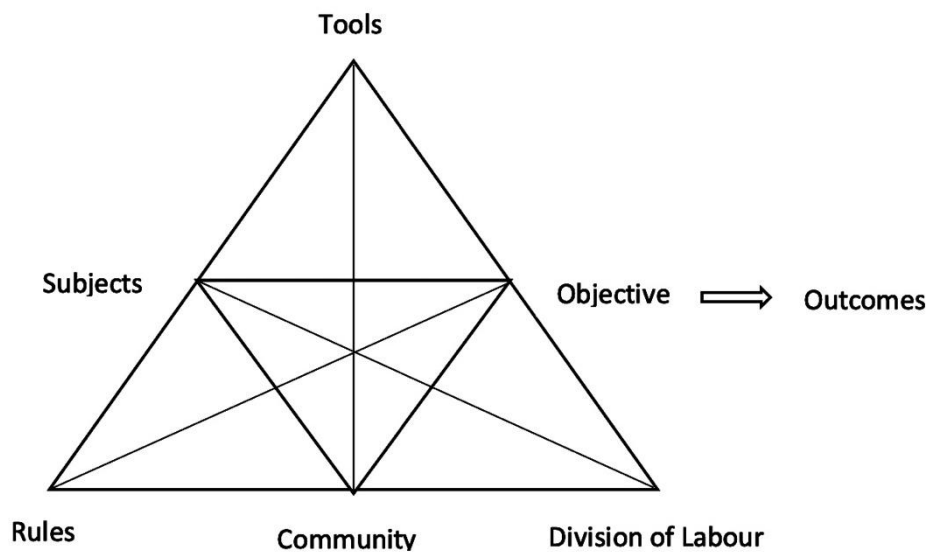


Figure 1 - Engeström's Activity System adapted from Engeström (1987)

In this activity system model, the *subject* refers to the individual or a group whose point of view is taken in the activity analysis. The *object*, also known as the objective, is the target of the activity within the system. *Tools* refer to internal or external mediating artefacts which help achieve the activity's outcomes. The *community* comprises one or more people who share the objective with the subject. *Rules* refer to the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system. In contrast, the *Division of Labour* discusses how tasks are divided horizontally between community members as well as referring to any vertical division of power and status (see Barab et al., 2002; Kaptelinin & Nardi, 2006; Stetsenko, 2005; Yamagata-Lynch, 2003).

Methodology

Based on Activity Systems as a theoretical framework, this study took an inductive approach by developing theory/knowledge to explain empirical observations through a qualitative methodology. The qualitative research approach supports the activity system framework. It provides a more in-depth study of a particular situation and specific methods to generate data rich in detail and embedded in a context. In order to answer the research questions for this study, it was necessary to obtain sufficient and relevant data through appropriate data collection methods. Interviews were considered one of the most appropriate data collection methods for this research as little was already known about the ICT interventions conceptualisation, where detailed insights were required from key informants and individual participants. The primary data sources for the interviews were Teacher Educators, Schools' ICT Providers, Ministry of Education officials (Education Planning; Basic Education; Teacher Education and Development; and the Malawi Institute of Education - MIE) as the education provision mandate holders.

Documents were considered an alternative source of evidence to support the understanding of the roles played by different key informants in conceptualising the ICT interventions. Apart from technical literature, other documents such as reports, plans, policies and curriculum materials were considered potential sources of empirical data for this case study research, where data on the context within which the participants operated was obtained.

The data analysis followed a grounded approach in which data sets were repeatedly compiled, examined, and organised to identify salient themes based on the Activity System Analysis and literature review. The themes were coded based on the elements of the activity system as defined by the Activity Theory as follows:

<i>Activity</i>	ICT intervention conceptualisation in primary education
<i>Subjects</i>	Ministry of Education
<i>Tools</i>	Guidelines for the Conceptualisation of ICT Interventions in primary education
<i>Objects</i>	The goal of the ICT interventions in primary education
<i>Rules</i>	Frameworks that regulate the conceptualisation of ICT interventions in primary education
<i>Community</i>	Stakeholders that are engaged in the conceptualisation of ICT interventions in primary education
<i>Division of Labour</i>	How the tasks are shared among the Ministry of Education department and partners in the conceptualisation of ICT interventions
<i>Outcome</i>	The result of the conceptualisation of ICT interventions in primary education

Knowledge of the connections and interactions of the activity system elements provided an understanding of the whole ICT intervention process. This understanding led to the analysis of the context shaped by the national conceptualisation of ICT in Malawi's primary education.

Finding and Discussion

The study found that under the MoEST, the Directorate of Basic Education (DBE) was responsible for providing Basic Education (Primary School Education) by setting, formulating and reviewing policies, rules and regulations on primary education at the national level. As such, the DBE was identified as the subject of the analysis of the introduction of ICT interventions in the primary school system activity. The study further found that other institutions within and outside the MoEST were actively involved in designing, planning and implementing ICT interventions at the national level of the primary education system. These institutions' roles were analysed and presented below based on the themes identified during the literature review; Teacher Education, Teacher Professional Development, and Provision of ICT interventions.

Roles of key stakeholders in the introduction of ICT interventions

Teacher Education

The study found that the Directorate of Teacher Education and Development was the only institution responsible for coordinating the designing and development of policies and programmes for teacher education. A key informant from DTED (KI – DTED) highlighted the objective of the Directorate regarding training and professional development of primary school teachers towards the use of ICT for instruction. The specific activities that DTED was implementing in order to achieve this goal were also highlighted by the same key informant:

DTED is mainly responsible for policy, control and maintenance of standards by designing teacher education curriculum programmes and activities. We are not involved in the implementation of teacher training activities. The Teacher Training Colleges are our implementers who contextualise the policies and plans of DTED. (KI - DTED)

It was noted that while the DTED played a central role in the formulation of plans and policies for teacher training and professional development, it did not have specific plans and policies for teacher training and development towards teachers' capacity for ICT integration:

We always encourage the Teacher Training colleges to promote the use of ICT during initial teacher training so that the teachers we produce have computer skills that are very useful in the modern world. If you visit the TTCs, you will note that they all have ICT labs and clubs as part of the co-curricular activities. So, we might not have ICT as a course under the IPTE programme, but we hope teachers can get relevant ICT skills from the exposure they get during their pre-service training. (KI - DTED)

This observation was also supported by the Tutors (Teacher Educators) from various Teacher Training Colleges (TTCs) who appreciated the significance of developing pre-service teachers' capacity in pedagogical ICT integration during the initial primary school teacher education programmes:

We have different courses under the IPTE curriculum, but ICT is not included as a course or part of any course. We must find a way to prepare our students to use ICT for themselves and their teaching. There are so many technologies coming into the schools, we see them when we supervise our students during their TP, but our students would need special training to use them. (Teacher Educator 2)

It was found that teacher educators felt that they were just implementers of decisions by the curriculum designers and that the pressure of national examinations that the student-teachers have to sit for at the end of their training affected the teacher educators' decision on whether to help the student teachers develop ICT skills through co-curricular activities or not:

I wish ICT were offered as a foundational course. However, we accept because we are called implementers, so we are so much influenced by what our students will be examined on, so all the time that we are teaching, we are looking at the coverage of the curriculum, how it is to be covered, so that our students in the end pass in examinations. (Teacher Educator 1)

It was also noted that all the Primary Teachers Training Colleges (TTCs) that provided pre-service teacher training had no role in promoting ICT methods and competencies:

We always request the intervention programmes to assist by training TTC tutors and to help them incorporate ICT methodologies into pre-service teacher education. However, for budgetary reasons, this is always deferred... (KI - DTED)

From this crucial information, it can be concluded that there are no set guidelines for ICT training within the teacher education programme structure which the teacher educators could follow.

Teacher Professional Development

The study found that the MoE, through the 2013-2018 National Education Sector Investment Plan (NESIP), prioritised the institutionalisation of In-Service Training (IN-SET) and Continuous Professional Development for Teachers (CPDT) for primary school teachers under Teacher Education Priority Number Two, Objective Five (page 25). As such, In-service teacher training and continuous professional development on using ICT for teaching and learning were expected to receive similar priority as part of the national ICT integration activity system for serving teachers. According to the Report of the Functional Review of the Ministry of Education, Science and Technology by the Directorate of Human Resource Management and Development of Malawi Government (DHRMD, 2005), the Malawi Institute of Education was responsible for providing in-service training for education personnel at national level (DHRMD, 2005).

Further data analysis revealed that while the Malawi Institute of Education (MIE) recognised its role in training in-service primary school teachers, head teachers and education advisors, it did not provide training for the use and integration of ICT interventions that are introduced in the schools:

We have not been able to provide training on ICT with primary school teachers because most of the ICT interventions in the primary schools start as projects, and the agency responsible for that project trains and monitors the teachers and provides CPD when required... (KI - MIE)

It was also found that the ICT intervention providers took the responsibility of designing and coordinating the in-service training that was required for the teachers to implement and use specific interventions that they provided effectively:

For example, 'Tikwere' was a USAID project for several years before it became a government programme, and USAID was responsible for 'Tikwere' CPD programmes. They also established 'Tikwere' Coordinators at TDCs who organised CPD activities within their respective zones. So, that responsibility was left with those coordinators even after the 'Tikwere' became a government programme... (KI - MIE)

Similarly, considering that the process of adoption and use of ICT is associated with rapid and swift changes, the MIE had not yet developed a national framework to support the interventions:

Now there have been, of late, several ICT interventions in different Education Zones and Districts. From my understanding, these are run as projects by different organisations, so it is not easy to have a coordinated ICT in-service training programme through the Institute....the project implementers take responsibility for the training so that teachers can effectively use the technologies they provide to the schools.... (KI - MIE)

This assertion confirmed the need to consider specific conditions of the ICT intervention programmes for the MIE to manage to provide in-service teacher training as an ongoing process.

Provision of ICT interventions

The study found that since 2006, the MoE had worked with different development partners to introduce and provide ICT interventions in primary schools at different scales (small, medium and large scale). The ICT interventions introduced at a large scale (in more than one education

district) and still in the schools during the study period were the Tikwere Interactive Radio which started in 2007, and the Unlocking Talent through Technology, which was introduced in schools in 2011.

The study found that these two ICT intervention programmes had the same learner target groups in the primary schools (Standards 1 and 2) regarding the priorities set in NESIP on basic education. According to the Tikwere Learner Assessment Report of 2010, on the one hand, the main objective of the Interactive Radio Instruction intervention was to improve the learning outcomes in basic subjects in early primary school classes 1-3 and to support and reinforce the introduction of the new Primary Curriculum and Assessment Reform (PCAR) in Malawi with reference to NESIP. On the other hand, a project document of Unlocking Talent through Technology (2014) states that the intervention aligned its objectives to the aims of NESIP in order to improve the quality of the available instructional materials and resources for Standards 1 and 2 in literacy and numeracy through the use of an innovative methodology of mobile tablet technology in the classroom.

The study also found that besides providing ICT resources and infrastructure, both interventions provided technical and administrative support and project management. Tikwere Interactive Radio Instruction Evaluation Report by USAID (2011) indicates that, through Education Development Centre (EDC), USAID provided Freeplay Lifeline Radios to schools, upgraded MoE recording studios and provided staff support for monitoring, evaluation and coordination functions. Similarly, the Unlocking Talent through Technology intervention report indicates that the project was responsible for building learning centres and providing iPad mini tablets to the schools, providing technical support, project management and administrative support.

It was, however, observed that such inputs depended on other activities managed by the MoE directorates and in close coordination with the Malawi Institute of Education, which is responsible for developing other curriculum materials. In support of this observation, the Malawi Institute of Education indicated that it provided expertise to the ICT intervention implementers by synchronising the content and activities that were provided through the ICTs with the curriculum and knowledge levels of learners they were meant for:

So far, we have only been responsible for assuring that the technologies are directly supportive and aligned to the curriculum and other instructional materials like textbooks and teachers' guides... only as subject experts...for curriculum content to be used along with the technologies, for example in the level of vocabulary and the density of activities... (KI - MIE)

Framework for the introduction of the ICT interventions

An analysis of the national policies and all other relevant documents which provide formal regulations on the deployment and use of ICT in education revealed that the Nation ICT Policy (2013) was the only policy that provided a direct institutional, regulatory and legal framework to support the successful deployment and utilisation of ICT in education. The policy highlights that Government has a lot of pressure on its social expenditure for education to provide adequate and quality ICT services, intending to improve access to education and the teaching and learning materials at all levels of education in Malawi. With this assertion, Policy Priority Area Number Two (Human Capital Development), Policy Statement One (page 8) states that Government shall integrate ICTs in the education systems at all levels to improve access to and quality of education; and improve management of education systems. However, the policy does not specify how Government, through different agencies and stakeholders, can facilitate the deployment, implementation and integration of ICT within the education system to meet the

policy objectives, namely to improve access, quality, relevance and delivery of education at all levels.

This observation is also supported by the key informant from the Directorate of Basic Education who, as subjects of the ICT Integration Activity System at the national level, acknowledged the gap that existed between the Nation ICT Policy and the ICT implementation frameworks in the primary schools:

The coordination and collaboration on ICT aspects are less harmonised and somehow irregular. We have attempted to address such differences in approach and implementation by establishing task forces and working groups that include the Development Partners. However, due to the exigencies of work, it takes a long time for these groups to meet; hence it takes a long time before decisions are made, and in the meantime, ad-hoc decisions and informal guidance are used without formal policy directives. (KI -DBE)

Other policies and documents that were analysed are: the Early Childhood Development Policy, which provides a framework for child development from age zero to eight that includes learners in the first two classes of primary education; the National Language Policy, which regulates language of instruction in public schools; the documents and legislation that incorporate issues relevant to children with disabilities in schools; the NESIP as an ICT integration tool of this Activity System; and the project documents of the ICT intervention programmes in primary schools. It was found that none of these made any reference to regulations or a framework for the deployment and use of ICT in education, hence their lack of any relationship with the ICT conceptualisation system under this study.

The study noted that a Tikwere Interactive Radio Instruction Evaluation Report by USAID (2011) indicated that National Language Policy required Infant (Standards 1 and 2) and Junior (Standards 3 and 4) Mathematics classes to be taught in local languages. This finding implied that some teachers were officially required to teach mathematics in the local languages of the school area (e.g. Tumbuka and Yao). However, it was observed that Tikwere IRI presented all the mathematics lessons in Chichewa only. This finding implied that teachers were required to translate instructions for the children from Chichewa to the local language of the school area, which signalled for a particular focus on the Classroom ICT Integration Activity System where the implications of the national language policy could be identified.

Implications on Context for the Implementation of ICT Interventions

The unguided and unregulated efforts of the individual ICT intervention providers are not integrated into a harmonised national process; they remain as individual ICT Provider's initiatives. This finding implies a lack of visionary support for the schools and a need for more collaboration among the ICT intervention providers. The introduction of ICT interventions needs a guiding framework for designing and planning for the primary school education system interventions, which could harmonise the ICT implementation and integration processes. This finding reveals a general need for more rationale, goals, and a vision of how the Malawi education system can incorporate the ICT interventions and guide specific roles for relevant stakeholders in designing and developing specific ICT interventions. Contrary to most study findings that suggest the need for specific national ICT policies in education to converge with the roles of the public and private stakeholders and communities (see Haddad & Demsky, 1995; Vanderlinde et al., 2014; Yusuf, 2005); and to address barriers associated with cost, access, capacity and technical infrastructure (Kozma, 2005; Vanderlinde et al., 2012; Wagner et al., 2005; Yusuf, 2005), the findings on the conceptualisation of ICT interventions reveals that the Directorate of Basic Education under the Ministry of Education, Science and Technology, does

not actively set the agenda for creating and promoting the national vision for ICT in education across sectors to create an enabling and efficient environment through efficient regulatory policy frameworks.

Given these findings, an Activity System theoretical framework was developed to conceptualise the introduction of ICT interventions into the primary school education system in Malawi. Mapping theory from the literature discussed above and the findings from this study on the conceptualisation of the ICT interventions, the Activity System Analysis reveals the following things. Firstly, the Directorate of Basic Education (DBE) should be responsible for formulating, managing and evaluating plans and policies in primary school education. Secondly, the National Education Sector Plans should serve as tools for primary education ICT investments by the Government of Malawi and all its development partners. Thirdly, the National ICT Policy should be used as a regulatory framework for deploying and utilising ICT in education. Fourthly, the Directorate of Teacher Education and Development (DTED), the Teacher Training Colleges (TTCs) and the Malawi Institute of Education (MIE) should be responsible for the development, coordination, facilitation and reviewing of Initial Teacher Education and Continuous Professional Development in ICT. Furthermore, finally, the ICT Providers should be responsible for providing ICT Technical and Material Support. Figure 2 below illustrates how the activity system analysis has been used to theorise the conceptualisation of ICT interventions in the education system:

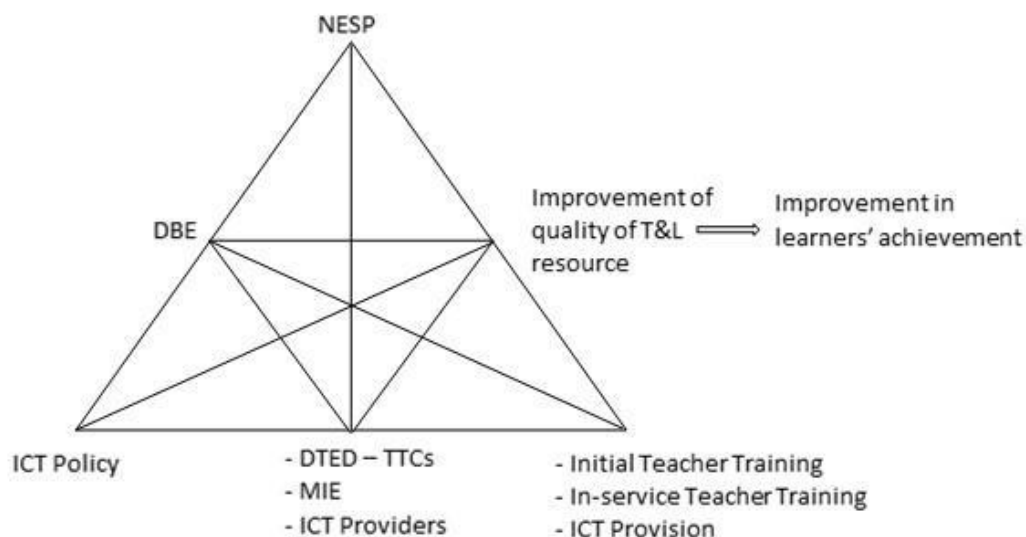


Figure 2: Proposed Activity System Framework for the Conceptualisation of ICT Interventions in Malawi Primary Education

Conclusion

The ICT interventions, as provided by the different development partners, seek to improve the quality of the teaching and learning inputs in the schools. However, their implementation needs to be guided and regulated. The unguided and unregulated efforts of the individual ICT intervention providers do not integrate into a coordinated national process but remain as initiatives by the individual ICT providers that are greatly affected by the contextual tensions identified by this study. The present study, therefore, concludes that the process of conceptualising and implementing ICT in primary education is in the form of experimentation, being led by nongovernmental organisations (the ICT providers) instead of the Directorate of

Basic Education of MoEST, who are mandated by law to formulate and review plans, policies, rules and regulations on Basic Education nationwide.

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