Promoting Digital Literacy in African Education:

ICT Innovations in a Ugandan Primary Teachers’ College

by

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Abstract

This research entitled “Promoting digital literacy in African education: ICT innovations in a Ugandan primary teachers’ college” was guided by two research questions: (1) What role can digital technology and digital literacy play in improving teacher education in a rural Ugandan primary teacher’s college? (2) How has ICT policy impacted curriculum development in Ugandan education and classroom practice in two rural Ugandan primary schools? It took the form of a qualitative case study in which data were collected using classroom observations, individual interviews, focus group discussions, semi-structured questionnaires, artefacts and document analyses. Findings of the study suggest that technology has a major role to play in improving teacher education in a rural Ugandan primary teachers’ college. These included: enhancing the tutors’ identities; increasing the tutors’ resourcefulness; promoting team work among the tutors; promoting the integration of the local with the global to facilitate teaching and learning; and promoting teamwork and team spirit among the tutors. Further, the study found that the ICT policy had positively impacted curriculum development and classroom practices in the two rural Ugandan primary schools. However, the study revealed that the positive impact of ICT policy on curriculum development and classroom practices were being undermined by multiple factors, including: fragile ICT infrastructure in the villages; inadequate supply of electricity; lack of access to the Internet; and inadequate digital literacy skills among teachers. It therefore concludes that government should take appropriate measures to address these challenges for digital literacy to sustainably take root in Ugandan education. Further studies will need to be carried out to identify appropriate strategies through which these challenges can be addressed in order to achieve meaningful educational change in Uganda.
Preface

This dissertation is an original intellectual product of the author, S. Andema. The fieldwork reported in Chapters 4 and 5 was covered by UBC Ethics Certificate number H11-01099.
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<tr>
<td>AIM</td>
<td>African Inland Mission</td>
</tr>
<tr>
<td>CCT</td>
<td>coordinating center tutor</td>
</tr>
<tr>
<td>CPU</td>
<td>central processing unit</td>
</tr>
<tr>
<td>PTC</td>
<td>primary teachers’ college</td>
</tr>
<tr>
<td>CPTC</td>
<td>core primary teachers’ college</td>
</tr>
<tr>
<td>DEO</td>
<td>District Educational Officer</td>
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<tr>
<td>EFA</td>
<td>Education for All</td>
</tr>
<tr>
<td>HSC</td>
<td>High School Certificate</td>
</tr>
<tr>
<td>ICT</td>
<td>information and communication technology</td>
</tr>
<tr>
<td>IT</td>
<td>information technology</td>
</tr>
<tr>
<td>MoES</td>
<td>Ministry of Education and Sports</td>
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<td>MoICT</td>
<td>Ministry of Information and Communications Technology</td>
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<tr>
<td>NAPE</td>
<td>National Assessment of Progress in Education</td>
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<td>NCDC</td>
<td>National Curriculum Development Centre</td>
</tr>
<tr>
<td>NGO</td>
<td>nongovernmental organization</td>
</tr>
<tr>
<td>NLS</td>
<td>new literacy studies</td>
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<tr>
<td>UNEB</td>
<td>Ugandan National Examinations Board</td>
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<tr>
<td>UPE</td>
<td>universal primary education</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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Dedication

I dedicate this study to my wife Doris Abiria Maandebo who shouldered the burden of managing the family single-handedly during in my absence and to my children, particularly Shalom Joel Awania and Paul Shepherd Leta who had to endure my absence during my studies at the University of British Columbia, Canada. Thank you for all the sacrifice, encouragement and support! Without them I would not have accomplished this.
Chapter 1: Introduction

1.1 Background to the Study

In 2005 the Government of Uganda developed an information and communication technology (ICT) policy to provide a national framework for ICT integration in education. The ICT policy underscores the need for curriculum revision to cater for ICT integration and the need for teachers to be ICT literate in order to impart ICT skills to their learners (Republic of Uganda, 2005). In view of the fact that the Government does not have all the resources needed to provide ICT equipment to all the schools and colleges in the country, the policy encourages them to enter into partnership with the different stakeholders to establish ICT facilities in schools and communities across the country. In that regard, in 2006 the Ministry of Education and Sports (MoES) initiated a partnership with Wati (pseudonym) Core Primary Teachers’ College (CPTC) and the parents there to establish an ICT lab at the college. In that partnership the Ministry took the responsibility of providing the policy guidelines and donating 20 second-hand Pentium® III computers to the college in order to kick-start the project. The college administration offered to provide a secure room to host the ICT lab, hire an ICT instructor, provide security, and maintain the ICT equipment. Students and parents were asked to contribute the equivalent of approximately 15 Canadian dollars per person per term towards operational costs. In 2007 the computer lab was launched amidst high expectations that its establishment would accelerate digital literacy among the staff and students. This was expected to lead to an improvement in the quality of teaching and learning, and a better performance of the college in national examinations.

However, during a workshop that I was invited to attend at the college in June 2010, the college administrators expressed serious concerns over the reluctance of the vast majority of the tutors at the college to take advantage of the ICT lab to become digitally literate. This was contrary to the findings of a study that I did for my Master’s degree on the teacher educators’ digital literacy practices and the challenges they faced while using digital technologies in an urban primary teachers’ college in Uganda.
(Andema, 2009). According to the findings of that study the teacher educators at that college, unlike the ones at Wati CPTC, were very enthusiastic about the use of digital technologies as pedagogical tools although they were challenged by a range of factors, including lack of access to the internet, inadequate infrastructure, frequent power outages, and irrelevant materials from the internet (Andema, 2009). When I was asked to share the findings of my study with participants during the workshop at Wati CPTC, the participants listened attentively. During tea break many of them came to me to thank me for my presentation and to explain their reasons for not making use of the ICT lab. Some of the reasons that the tutors gave for their apparent indifference towards the ICT initiative were:

- the ICT instructor (who was not a trained teacher), being very rude and disrespectful to the staff during training, shouting at them when they make mistakes during training as if they were small children, when they were actually professional teacher trainers;
- their having busy schedules throughout the week, which could not give them the time to attend ICT training;
- the ICT training timetable not being convenient for the majority of the tutors;
- some participants being close to their retirement age and therefore not being able to see the usefulness of ICT for them after retirement;
- some participants thinking that the ICT lab was for students and not tutors;
- some participants not wanting their students to watch them struggling to learn ICT because they felt it would be very humiliating and embarrassing;
- others thinking it was a waste of time since ICT was not an examinable subject in the primary teachers’ college (PTC) curriculum;
- some participants, particularly women viewing ICT as a “men’s thing” and therefore not being appropriate for women to be involved in;
- others associating ICT with managers and accountants and thinking that ICT could not be used to teach their subjects (science and social studies);
- There being no incentives for engaging in ICT.
During the plenary discussions, participants were asked to brainstorm on students’ response to the ICT training. From those discussions it also emerged that the tutors were not the only people uninterested in the ICT initiative. Many students were reported to be uninterested in attending the ICT training classes at the ICT lab. According to the tutors who spoke during the brainstorming session, the main reasons for students’ lack of interest in attending the ICT training were:

• ICT is not an examinable core subject in the PTC curriculum. Students prefer to concentrate on subjects for which they were going to sit national examinations instead of wasting their time on ICT training.

• rural schools in which most of the students were going to teach after completing their training at the college do not have electricity and ICT labs. So, students find it unnecessary to waste their time learning ICT skills that they were not going to apply in their professional practice,

• the ICT instructor being very rude and disrespectful to students during training,

• the indifference most tutors were showing towards ICT was a source of discouragement among students,

• lack of awareness about the importance of ICT in education considering the fact that majority of the students at the college come from rural family backgrounds where there is very limited encounter with technology in people’s lives.

After listening to the teacher educators’ explanations, I began to realize that the issues they were raising were important and worth interrogating. I immediately began to contemplate the possibility of doing my PhD research at the college and focusing on the role that digital technology and digital literacy can play in improving teaching and learning in such as rural primary teachers’ college in Uganda. My choices of the research topic and site for this study for my PhD research were therefore closely linked to this opportunity that provided itself to me during that workshop. I viewed researching into the role that digital technology and digital literacy can play in improving teaching and learning in such a rural primary teachers’ college as an extension of my MA research, which focused on digital literacy and teacher education in an urban teacher training college in Uganda. Additionally, I viewed
the study as an opportunity to complement a previous larger collaborative study between researchers from the University of British Columbia and colleagues in Uganda investigating how web-based educational resources can enhance teacher development and improve literacy instruction in East African schools. When I revealed to my supervisors my interest in doing my PhD research on the role of the ICT lab at Wati CPTC in promoting digital literacy to improve teacher education I received a positive response from them. They did not only encourage me to go ahead with my plan but they went further to support my project with additional resources (fourteen digital cameras, four digital voice recorders, three laptops, and three eGranaries) to complement the equipment in the ICT lab. Against that background, the rest of the chapter highlights the problem statement, the purpose of the study and research questions, and a brief description of the Ugandan system of education.

1.2 Problem Statement

Globally, ICT has been recognized as an important resource with great potential for educational and social change (Adam, 2003; Coiro, Knobel, Lankshear, & Leu, 2008; James, 2004). To that end, several African countries and their development partners have invested in ICT infrastructure development for the promotion of digital literacy to make education available to the ever-increasing number of students in schools and colleges (De Roy, 1997; Etta & Parvyn-Wamahiu, 2003). While ICT awareness is generally on the rise in Africa, skills for the application of ICT to subject areas have not been fully developed in most African educational institutions (Adam, 2003). African educational institutions are still confronted with a dilemma of turning on-going ICT initiatives into opportunities for understanding what ICTs and digital literacies really mean to the transformation of education in general, and to research, teaching, and learning, more specifically (Adam, 2003). Scholars like Adam

1 The eGranary is a portable electronic storage (intranet) device that comprises a 750 GB hard drive with specialized browsing software that can be attached to a computer or a local area network. It contains approximately ten million educational resources like that can be search just like the Internet (Norton, in press). It is relatively cheap, does not require Internet connectivity, and helps users to learn to browse or search without being connected to the Internet.
(2003), Mutonyi and Norton (2007), and Snyder and Prinsloo (2007) posit that interrogating the role of ICT in African education contexts is essential to understand the factors that contribute to its uptake in different settings as well as the dilemmas, uncertainties, and implications of ICT integration to improve educational standards in Africa. Although ICT held out much promise for improving Ugandan education, research suggests that their potential is not being fully realized (Andema, 2009; Mutonyi, & Norton, 2007). In view of that, several scholars have stressed the need for context-specific qualitative studies to be carried into the ongoing ICT initiatives in the country to better understand the challenges and possibilities of achieving the necessary changes (see e.g., Etta & Parvyn-Wamahi 2003; James 2004). In that regard my study examines the role that digital technology and digital literacy can play in improving teacher education in rural Ugandan primary teachers’ colleges. Further, the study examines the extent to which ICT policy has impacted curriculum development and classroom practice in rural Ugandan primary schools.

1.3 Purpose of the Study and Research Questions

The study had two major purposes, namely: (a) to examine the role that digital literacy can play in improving teacher education in a rural Ugandan primary teachers’ college, and (b) to examine whether ICT policy has impacted curriculum development in Ugandan education and classroom practice in rural Ugandan primary schools.

The study was specifically guided by two key research questions, namely:

1. What role can digital technology and digital literacy play in improving teacher education in a rural Ugandan primary teachers’ college?

2. How has ICT policy impacted curriculum development in Ugandan education and classroom practice in rural Ugandan primary schools?

By answering these questions we can better understand the challenges and possibilities associated with the use of digital technologies to improve teaching and learning in rural Ugandan education and similar contexts elsewhere.
1.4 Significance of the Study

Since the introduction of the Universal Primary Education (UPE) policy in 1997, and universal post-primary education in 2007, Ugandan education has recorded considerable progress, particularly with regard to increasing access to the disadvantaged children including children with disabilities, girls and orphans (Munene, 2009). However a major concern in Ugandan education at the moment is the decline in educational standards. Several studies have confirmed the decline in educational standards in Uganda (Kasente, 2010; Munene, 2009; Muwanga, Aguti, Mugisha, Ndidde, & Siminyu, 2007; National Assessment of Progress in Education & Ugandan National Examinations Board [UNEB], 2012; UNEB, 2009, 2010; Uwezo, 2011). A nationwide study by Uwezo (2011) found out that “92% of all children in primary three [grade three] could not read a primary two English level story text” (p. 14). Even more striking to note in the Uwezo study was the revelation that up to 21 per cent of all the grade three children sampled across the country “could not even recognize letters of the English alphabet” and that 17 per cent of all the primary seven [grade seven] class across the country “could not read and understand an English story text of primary two [grade two] level difficulty” (p. 15).

The declining educational standard is being addressed through reforming the curriculum, and introducing the use of digital technology and digital literacy to improve teaching and learning. This study has the potential to inform the ongoing educational policy and curriculum development in Uganda and other countries facing similar educational challenges. It provides useful insights into the role that digital technology and digital literacy can play in improving teacher education in a resource constrained rural primary teachers’ college. Specifically, it highlights the potential that digital technology holds to transform the dynamics of classroom interaction, increase tutor resourcefulness, promote teamwork among staff, improve college-community relationships, and to integrate the global with the local to make teaching and learning exciting and memorable. The study further examines whether ICT policy has impacted curriculum development and classroom practice in poorly resourced
rural Ugandan primary schools. It particularly highlights the potential that digital technology and
digital literacy holds to enrich the Thematic Curriculum (2007), which encourages the use of local
community practices as pedagogical tools to improve teaching and learning. The findings of the study
can therefore guide the designing of teacher education focused ICT programs in Uganda and in other
similar resource constrained educational contexts in Africa and other parts of the world.

The national experts that I interviewed in the course of carrying out this study are eager to
receive the findings of this study. For example during my interview with deputy director at the National
Curriculum Development Centre (NCDC), she concluded by saying:

I really think you need to share the findings of your research with the Ministry of Education and
Sports and the Ministry of ICT and may be the National Curriculum Development Center and
other agencies so that whatever you gather, if you come up with information [findings] that can
help alleviate the challenges … that are affecting the smooth integration of technology… so that
the policy can be further strengthened and strategies improved - it will go a long way into
improving the efforts that will make technology get integrated into teaching and learning. (G.
Baguma, personal communication, February 2, 2012)

The deputy director’s interest in the findings of the study was also echoed by the Academic
Registrar of Kyambogo University – the national university in charge of teacher education in Uganda
and which supervises the primary teachers colleges, who said:

If you can be able to disseminate your findings and your recommendations … picked up by
institutions and implemented, I think that will be the way to go. As you realize in Uganda we
are still a long way. For this thing [digital literacy] to be of any meaning, it should start right
from primary [primary schools]. Not just from the top. Not at University level ... But then
government has to do a lot in… providing an enabling environment. (Ann Mogerwa, personal communication, February 6, 2012)

A similar interest in the findings of the study came from the director, Directorate of Basic and Secondary Education, MoES, who remarked:

I think …this is a very good subject for you to investigate. And what you are investigating … is not only going to benefit your university alone but it will also benefit us and my plea here is that we would like you to share with us the findings and that volume of knowledge to see how it can enhance our policy formulation and implementations. (Director, Basic and Secondary Education, MoES, Interview January 16, 2012)

Even the permanent secretary at the Ministry of Information and Communications Technology (MoICT) could not hide his interest in the research that I was doing. To conclude his remarks during an interview that I held with him on January 18 20112, the permanent secretary made the following comment to highlight the significance that he attaches to the study:

Your research has touched a sensitive subject which is dear to me … we have come to realize that ICT is at the center of the revolution in the knowledge economy. Otherwise we have no alternative. It is a global revolution; we cannot afford to be left behind because it is the only bus left! (Permanent Secretary, Interview, January 18, 2013)

The study further illuminates the New Literacy Studies (NLS) theoretical stand broadly, and that of the New Literacies that the new literacies, including digital literacies, do not have an intrinsic resourcefulness and that whether they offer opportunities for particular users is best established through situated research (Barton & Hamilton, 2000; New London Group, 2000; Prinsloo, 2005; Street, 1984; Warschauer, 2003). It highlights the usefulness of the NLS theoretical lens in understanding the
affordances of digital technologies in a non-Western educational context such as Uganda. The study also responds to the persistent calls for more studies into the issues of uptake with regard to digital resources in remote corners of the world broadly and African educational contexts such as that of Uganda, particularly (Andema, Kendrick, & Norton, 2010, 2013; Mutonyi & Norton, 2007; Norton, Early, & Tembe, 2010; Norton, Jones, & Ahimbisibwe, 2011; Oates, 2012).

In the next chapter I review the literature relating to ICT, digital literacy and educational change. I begin by spelling out the theoretical frame on which the study leans. I then go further to examine the range of perspectives that different scholars hold on the role of technology in education broadly and Ugandan education more specifically.
Chapter 2: Literature Review

2.1 Introduction

This chapter reviews the literature related to the main subjects of the study, namely ICT, digital literacy and educational change. It begins with an articulation of the theoretical frame that informs the research before moving on to a review of the related literature under the following themes: (a) prospects for ICT integration in African education, (b) explanations for the failure of ICT to take root in African education, and (c) ICT and digital literacy in Ugandan education. Between the theoretical frame and further review of the related literature, I have included a brief description of the traditional and cultural practices of the Lugbara tribal community with the purpose of providing some cultural context to the study and to further support the notion of funds of knowledge (Moll, Amanti, Neff, & González, 1992).

2.2 Theoretical Framework

This research is framed broadly within an emerging theoretical perspective that views literacy as a sociocultural practice rather than as an individual, decontextualized, ahistorical, cognitive process (de Castell & Luke, 1986; Street, 1984, 2005). In this section, I highlight three key research approaches within the sociocultural theoretical framework that informs my study, namely: (a) NLS, (b) Language and identity, and (c) the funds of knowledge. While elaborating the tenets of these theoretical lenses I also explain how they relate to my central research questions that center on the teacher educators’ use of digital and community resources in a rural Ugandan primary teachers’ college to improve pedagogical practice.

2.3 Theory and Research: The New Literacy Studies and New Literacies

NLS is a school of thought that provides an expanded definition of literacy that goes beyond the basic skills of reading and writing to include the broader sociocultural practices within which literacy is performed (Street, 1984). It contests the claim that literacy is entirely a universal cognitive process
(Purcell-Gates, Jacobson, Degener, 2004). Instead, it views literacy in terms of culturally, historically and institutionally situated social practices that is best understood by taking into consideration the very cultural, historical, and institutional contexts in which a particular literacy practice is performed (Gee, 1991, Purcell-Gates, Jacobson, Degener, 2004, Street 1984). The NLS perspective encourages us to move beyond limited psychological accounts of literacy to acknowledging the complexity of literacy practices to better understand people’s engagement with literacy.

The work in NLS that is particularly relevant to my research includes the works of Barton and Hamilton (2000), González, Moll and associates (2005), Norton (2000), Prinsloo (2005), Street (2005, 2003), and Warschauer (2003). These scholars take the stand that literacy practices are inextricably linked to social practices, and that to better understand literacy practices we must take into consideration the wider historical, economic, and sociocultural forces that influence the way people view and take or fail to take hold of any form of literacy in time and space. Barton and Hamilton (2000) have outlined the following aspects as the central characteristics of a New Literacy Studies perspective:

- Literacy is best understood as a set of social practices; these are observable events that are mediated by written texts.
- There are different literacies associated with different domains of life.
- Literacy practices are patterned by social institutions and power relations and some literacies are more dominant, visible and influential than others.
- Literacy practices are purposeful and embedded in broader social goals and cultural practices.
- Literacy is historically situated.
- Literacy practices change and new ones are frequently acquired through processes of informal learning and sense making as well as formal education and training.
- The ways in which people use and value reading and writing are themselves rooted in conceptions of knowledge, identity and being. (p. 8)
Street’s (1984, 1985, 2003, 2005) work has been pivotal in the conceptualization of literacy as a social practice. Central to this is the recognition that literacy is not a neutral, universal technical skill. Rather, it is a value-laden ideological concept that, if not carefully examined within the wider historical, social, political and economic contexts can potentially exacerbate inequality and perpetuate social injustice in society. Street (2005) stresses that

Literacy is a social practice, not simply a technical and neutral skill … it is always embedded in socially constructed epistemological principles. It is about knowledge: the ways in which people address reading and writing [digital literacy included] are themselves rooted in conceptions of knowledge, identity and being … particular versions of it are always ideological, they are always rooted in a particular world-view and in a desire for that view to dominate and marginalize others (pp. 77–78).

Purcell-Gates, et al. (2004) further explain the hegemonic nature of literacy by making reference to literacy learnt at school. They argue that the literacy taught, measured, and valued in schools is academic literacy, which is valued by the dominant sociocultural group for hegemonic reasons. Further, Purcell-Gates et al. (2004) assert

By valuing academic literacy, the institutions of school and governments that give power to the schools devalue, background, and ignore other literacies – local literacies practiced by people who do not succeed with academic literacy. In this way, then, school literacy – academic literacy – and its teachings are hegemonic. (p. 66)

While agreeing that literacy is a social practice, Warschauer (2003) expresses similar sentiments about the social nature of literacy and its potential to perpetuate social inequality and exclusion when he asserts that
The multifaceted nature of literacy, the range of resources it requires, and the social nature of its practice and mastery all point to one inevitable conclusion: the acquisition of literacy is a matter not only of cognition or even culture, but of power and politics … access to literacy intersects with opportunities to attend school, inequitable distribution of resources within the educational system, and curricula and pedagogy that meet the needs of certain groups more than others. (p. 45)

Building on the new understanding of literacy as a social practice, the New London Group (1996) has gone further to generate a theoretical frame to highlight the link between the rapidly changing social, cultural, economic, political and technological environment and a new approach to literacy pedagogy which they decided to call multiliteracies to encompass the multiplicity of linguistic resources and literacy practices in the global community as a basis for curriculum change and literacy instruction. The New London Group (1996) argues that “literacy pedagogy has traditionally meant teaching and learning to read and write in print-bound, standard forms of the national language” (pp. 60–61), which according to them has been a “carefully restricted project” (p. 61). As an alternative they anchor the multiliteracies pedagogy on two core principals, namely: (a) the need to extend the scope of literacy pedagogy to account for cultural and linguistic diversity in today’s classrooms, homes and communities; and (b) the need to account for the plethora of text forms associated with multimedia technologies, and by extension the need to achieve social inclusion and social justice for all.

Cope and Kalantzis (2000) have made significant contributions to the understanding of multiliteracies pedagogy by focusing on modes of meaning-making and representation much broader than language. From their perspective language and modes of meaning (such as digital technologies) should best be viewed as “dynamic representational resources, constantly being remade by their users as they work to achieve their various cultural purposes” (p. 5). This notion of viewing people as active transformers or designers of representational resources to ‘mean’ is further elaborated by the New
London Group (2000) who argue that “meaning-making is an active and dynamic process, and not something governed by static rules” (p. 20). They view representational resources such as language and digital technologies as designs, and explain that

Through their engagement in designing, people transform their relations with each other, and so transform themselves … Designing always involves the transformation of available designs; it always involves making new use of old material … in its turn the redesigned becomes a new available design, a new meaning making resource. Through these processes of design, moreover, meaning-makers remake themselves. They reconstruct and renegotiate their identities. (p. 20)

The concept of design is very pertinent to my central research question, which seeks to better understand how educators in rural Ugandan educational contexts use digital resources (available designs) to improve teaching and learning. We need to know how Ugandan educators are adopting and adapting the digital resources for their purposes. We also need to know how the use of the digital resources as pedagogical tools is impacting on local educational practices in order to better understand their transformative potential in the local situation.

A considerable number of studies have been done on the new literacies in general and digital literacy in particular, including its transformative potential for educational change (Leu, Coiro, Knobel, & Lankshear, 2008). However, as several scholars (Andema et al., 2013; Norton, in press; Prinsloo, 2005; Snyder & Prinsloo, 2007; Warschauer, 2003) have noted, much of the research in this field has focused on the wealthier regions of the world, and “there is a great need for research in poorly resourced communities to inspire global debates on new literacies” (Norton, in press). Prinsloo (2005) notes that “new literacies (digital resources) do not necessarily have intrinsic resourcefulness” (p. 96).
Rather, “whether they offer opportunities for particular users is something that has to be established by situated research, rather than assumed” (p. 96).

In supporting further research on digital literacies in less resourced contexts, Warschauer (2003) argues, “What is significant about tools is not their own abstract properties but rather how they are incorporated into, and fundamentally alter, human activity” (p. 110). He explains that looking at what people actually do with tools rather than what equipment they have “is necessary to make effective use of ICT for social inclusion” (p. 206), which makes a compelling argument for my interest in examining how the teacher educators and in-service teachers in rural Ugandan educational institutions use digital resources to improve teaching and learning. The mere presence of digital technologies in schools and colleges is not enough to conclude that ICT integration is going on in Ugandan schools and colleges. We need to examine what the teachers and teacher educators are doing with those digital resources at their disposal and find out how the use of those digital resources is impacting on the educators’ professional practices and changing the dynamics of the classroom context.

Warschauer (2003) posits that meaningful access to ICT comprises far more than merely providing physical equipment. Rather, meaningful access to ICT is embedded in a complex array of factors encompassing physical, digital, human, and social resources. He therefore proposes an analytic model of four categories of resources as crucial for effective utilization of ICT to access, adopt, and create knowledge, namely: physical resources, digital resources, human resources, and social resources. Meaningful access to ICT, according to Warschauer, can only arise from interplay of these four categories of resources as illustrated in the diagram below.
Warschauer’s (2003) model provides a useful tool for examining the broader context in which the teacher educators use the ICT lab to promote digital literacy to improve teaching and learning. Each of the four categories of resources in the model provides a basis for a close examination of the factors that facilitate or impede the use of digital resources for pedagogical practice. For example, under the physical infrastructure I consider the ICT infrastructure both at the national and local level and find out how it impacts on the Ugandan educators’ integration of digital literacy in their professional practices. The physical resources component emphasizes the need to pay attention to the availability of equipment to the users, and the quality of the equipment. As Warschauer correctly observes, a good deal of variation exists in terms of quality of computers and of the Internet connections, thus the
physical resources themselves enable a diverse range of ICT use by the participants. We need to pay attention not only to the availability and the quality of the physical resources but also how the physical resources are distributed, who uses them, at what times, for how long, for what purposes, and with what effects on their professional identities and practices.

The digital resources component of the model focuses on the availability of appropriate digital content including online resources accessible to the users. It encourages us to take into consideration the range of digital resources available to the users, the appropriateness of the language in which the resources are availed to the users, and the relevance of the digital content in the local cultural context. We need to be mindful that there is no guarantee that the information needs of the rural population in Uganda will automatically be well met by digital resources from elsewhere. As Mushengyezi (2003) espouses, African governments including that of Uganda and their development partners often tend to extrapolate communication models from the developed world and apply them wholesale in local environments in Africa that are quite unique. Such communication strategies often do not impact on the rural masses for which they are meant because they are not necessarily contextualized to the local settings, cultural dialectics and worldview of the local people.

The human resources element of Warschauer model was equally important for me to draw on because it addresses the knowledge and skills required for meaningful use of digital resources. As Warschauer (2003) explains it includes both the traditional literacies of reading and writing, as well as a set of new digital literacies associated with the use of computers and online resources. The emphasis on the human resources necessitates paying attention to the necessary knowledge and skill sets that users’ need to effectively and meaningfully engage with digital technology. Unless users have the necessary knowledge and skills to use digital technologies, they will not be able to meaningfully engage with technologies.
The social resources component of the model is crucially important because it encourages us to determine the effects and use of ICT by examining the social relations, social structures and social capital that exist to support effective use of ICT in families, communities and institutions. Thus, to understand participants use of digital resources, we need to pay special attention to how their use of the digital resources is affecting their identities, practices, and relationships at their workplaces, at home, and in communities, because, as Warschauer (2003) correctly states, “Many important changes in social relations may come from human interactions with technological process rather than from actual operations of computers or the Internet” (p. 212). It also necessitates paying attention to how the participants’ identities and relationships influence their use of the digital resources. It is therefore important that we pay attention to not only the social input but also the social outcomes of participants’ engagement with digital technologies because they in one way or the other influence the success or failure of digital literacy initiatives. It is perhaps for this reason that Warschauer’s model emphasizes the importance of community support as a key aspect of the social resource.

The social resources component of Warschauer’s model is also important for my analysis because it resonates very well with the African traditional practice of communalism as best explained by p’Bitek (1986) who disputes Rousseau’s (as cited in p’Bitek) argument that “Man was born free but everywhere he is in chains,” (p. 10) by counter-arguing that

Man is not born free. He cannot be free... For only by being in chains can he be and remain human … Man has a bundle of duties which are expected from him by society, as well as a bundle of rights and privileges that the society owes him. In African belief, even death does not free him. If he had been an important member of society while he lived, his ghost continues to be revered and fed: and he, in turn, is expected to guide and protect the living. (p. 19).
As p’Bitek has noted, in Africa, particularly rural Africa where the capitalist tendencies of individualism and the private good has not yet taken firm root people still have a strong inclination towards social relations. In such contexts an individual’s way of life is largely dependent on the social norms and practices of the wider community. Thus to better understand participants’ digital literacy practices it is crucial for us to also examine the social networks that support or impede their use of digital resources as Warschauer has correctly noted.

2.4 Theory and Research: Language and Identity

The notion of identity has gained considerable interest in literacy and second language research in the last two decades. Scholars in this field (Canagarah, 2004; Norton, 2000, in press; Norton & Toohey, 2004; Stein, 2004) seek to shift the predominantly psycholinguistic understanding of language learning to a more sociocultural understanding. In the process of pursuing that goal, they challenge the dichotomous representation of learners as motivated or unmotivated, introverted or extroverted, without paying much attention to the socially constructed nature of identity in relations of power. For example, according to Norton (in press), identity is not a “fixed character trait but must be understood in reference to a learner’s relationship to the wider social world, changing across time and space, and reproduced in social interactions.” From Norton’s perspective a learner does not only have a single identity that he or she can be labeled at all times in all situations. Rather, each learner has multiple identities that are fluid and change according to the way the learner is positioned in socially constructed power relations. She explains that identity cannot be essentialized; it has multiple dimensions, is constantly changing, and is often a site of struggle. Norton (in press) introduces the notion of investment to complement the concept of motivation and argues that

Learners invest in the target language at a particular time and in particular settings, when they believe they will acquire a wider range of symbolic and material resources, which will increase
the value of their cultural capital and social power … As the value of learners’ cultural capital increases, … learners reassess their sense of themselves and their desires for the future”.

Drawing on a range of researchers (Anderson, 1991; Kanno & Norton, 2003; Norton, 2001; Pavlenko & Norton, 2007), Norton (in press) asserts that learners’ investment in learning a second language may also be understood with reference to their imagined communities and imagined identities. She explains, “in many language classrooms, learners may have the opportunity to invest not only in the classroom community, but in community of imagination-desired communities that offer possibilities for an enhanced range of identity options in the future.”

The concepts of identity, investment and imagined communities offer very useful tools to examine not only the way participants use specific digital resources in particular ways but also their reasons for being invested in the use of those specific resources. Questions need to be asked around the notion of teacher investment in ICT: What are the teacher educators’ investments in ICT use? What are their imagined identities with reference to ICT use? How do the teacher educators’ investments and their imagined identities relate with policy and curriculum goals? Answering such questions is crucial for us to better understand how ICT can best be promoted to achieve curriculum goals in less resourced contexts.

2.5 Theory and Research: Funds of Knowledge

Funds of knowledge is a relatively new term that has been coined to describe the resourcefulness of household knowledge, skills, and experiences for educational purposes (Moll et al., 1992). It provides a theoretical lens to view households and local communities as “repositories of knowledge” (González, 2005) that teachers can adapt as the basis for the generation of new knowledge specific to classroom circumstances. Scholars who subscribe to the funds of knowledge perspective (Browning-Aiken, 2005; Buck & Sylvester, 2005; González, Moll, & Amanti, 2005; González, Andrade, Civil, & Moll, 2005; Messing, 2005; Moll 2005) assert that understanding the historical,
social, cultural, political and economic contexts of the households and communities from which schools draw children is of critical importance in understanding teaching and learning. They call upon educators to be aware of local sociocultural practices and to try to incorporate culturally sensitive pedagogies in their professional practices. González, Moll and colleagues (2005) further argue that, “by drawing on household knowledge student experience is legitimated as valid and classroom practice can build on the familiar knowledge base that students can manipulate to enhance learning in mathematics, social studies, language arts, and other content areas” (p. 43).

Despite its popularity among literacy scholars, some critical voices have emerged about the concept of funds of knowledge. Prominent among the critical voices is that of Oughton (2010) who posits that while the concept of funds of knowledge is powerful in disrupting discourses of deficit, practitioners or researchers who subscribe to the approach “need to be critically reflexive to avoid imposing their own, however well-intentioned, cultural arbitraries on learners” (p. 1). Oughton (2010) finds three aspects of the funds of knowledge approach to be rather problematic, namely

- the possibility of ‘essentialising’ cultural or ethnic groups as homogenous;
- the appropriateness or otherwise of the ‘funds’ metaphor;
- and the danger of the teacher or researcher imposing their own cultural arbitraries in deciding what ‘counts’ as funds of knowledge (p. 8).

Oughton (2010) further claims to “have found the concept to be over-simplified and ideologically problematic” (p. 13). She explains:

In particular, the concept seems to get more ‘slippery’ the further it is taken from its original formulation by Moll and colleagues. Baker’s (2005) broader interpretation allows us to acknowledge the wider range of resources, experiences and attitudes which adult learners bring to their classrooms, yet the breadth which makes it useful is also a weakness, in that boundaries
become poorly defined, and the teacher or researcher must grapple with what to accept, and what to discard, as a fund of knowledge.

However, despite her reservations regarding the concept of the funds of knowledge, Oughton (2010) still concludes in support of the approach:

The concept of funds of knowledge has proved a powerful model for disrupting discourses of deficit and reconstructing teachers’ attitudes to communities other than their own. My caveat is that teachers and researchers committed to this approach should proceed with the ‘critical self-consciousness’ … and not allow the ideological attractiveness of this concept to blind them to its potential pitfalls (p. 13).

In Africa, for more than a century, colonial languages like Portuguese, English and French enjoyed privileged status as official languages and medium of instruction in education in many African Countries including Uganda. The histories and geographies of faraway lands have also enjoyed privileged status in educational curricula in many African countries. The privileged status accorded to these foreign languages and content has resulted into the marginalization of not only the linguistic and cultural resources in local communities, but it has also resulted into the perpetuation of negative attitudes towards local knowledge and children’s lived experiences. Consequently, as Andema and colleagues (2010) have rightly noted, “In many instances, schools have remained islands in the very communities they were expected to serve because they do not consider the lived experiences of the children and the local knowledge they bring from the community as useful” (p. 455).

However, the good news is that in the last two or so decades, there has been a growing demand for the inclusion of African languages and community funds of knowledge as pedagogical resources for instruction in schools, more so in early childhood and lower primary education (Herman, 2008; Kasozi,
This might prove a challenge or an opportunity for ICT integration for educational change in Africa.

Scholars who support the introduction of African languages alongside English, and French as medium of instruction in schools argue that to a large extent the use of foreign languages as medium of instruction in schools is responsible for the low literacy levels and low achievement levels in education (Kasozi, 2000; Parry, 2000; Prah, 2002, 1993; wa Thiong’o, 1981, 1993; Wright, 2004). They claim that teaching children in a foreign language alone does not only alienate children from their local community, but it also denies them their right and freedom to draw from the cultural and linguistic resources available to them in the local context. Such concerns echo what New Literacy Studies scholars like Street (1984) and Barton and colleagues (2000) have been arguing all along, namely that for literacy programs to succeed they must not only recognize but also validate the local cultural practices, including the local languages through which people engage in the social world.

Some African scholars have gone further to attribute the persistent underdevelopment in Africa to the imposition of colonial languages as the official language and the language of instruction in schools. Brock-Utne and Holmarsdottir (2003) posit that one of the most important factors constraining the dissemination of knowledge and skills and therefore of rapid social and economic well-being of the majority of the African people is the imposition of foreign languages at the expense of local languages. Prah (2002) takes a similar stand and posits that no society in the world has developed in a sustained and democratic fashion on the basis of borrowed or colonial language. He strongly believes that underdeveloped countries in Africa have remained underdeveloped partly on account of the cultural alienation, which is structured in the context of the use of colonial languages and other forms of communication. Prah (2002) espouses the view that the development of a cultural group is imprinted in the language. Thus, he argues that for Africa to move forward educationally, the local cultural,
linguistic, and technological resources must be integrated into the education system and national
development agenda.

Prah could be challenged for overstating the link between the use of colonial languages and
underdevelopment in Africa but we cannot totally disregard the argument he makes because language,
as wa Thiong’o (1993) rightly observes, is not only a medium of communication but it is also the
collective memory bank of a people, a means of cultural re-engineering and knowledge production, as
well as wealth creation in any society. For technology and digital literacy to take root in African
education, its promoters must not only be sensitive to such strong sentiments but they must tap into the
vast cultural and linguistic resources in the local communities to meet the educational needs. Who
knows technology might provide the long awaited bridge to connect the island (school) to the mainland
(wider community).

Wa Thiong’o (1993) has a reason to decry developments in the last four hundred years, which
have led to a situation where world cultures have been dominated by a handful of Western nations to
the detriment of the whole world. The West has come to see itself as the center of the universe and
controller of cultural, social, economic and political power. Wa Thiong’o (1993) offers two approaches
to moving the center – between nations and within nations – in order to free the world from the narrow
confines of nationalism, class, religion, race, and gender. Within nations he suggests the approach
should be to move the center from its assumed location in the West to a multiplicity of spheres in all
cultures of the world. Within nations he says the move should be away from all minority class
establishments to the real creative center among people in conditions of racial, religious, and gender
equality and social freedom and harmony. Technology could play a crucial role in achieving such a
dream. But for this to happen there is need to explore how educators can engage with technology
productively, which is what this research was about.
According to wa Thiong’o (1993), any study of cultures (by extension, language and literacy) that ignores the structures of domination and control and resistance within nations and between nations and races is in danger of giving a distorted picture. He regrets that the world of academics is still almost wholly dominated by that which comes from the language and centers of powers in the West. He encourages African scholars to appreciate the fact that “local knowledge is not an island unto itself: it is a part of the main, part of the sea, its limits lie in the boundless universality of our creative potentiality as human beings” (p. 29). Clearly, wa Thiong’o is not necessarily romanticizing localization. His point is that local knowledge is not diametrically opposed to global knowledge. Rather, the two can serve a complementary role. Thus local scholars should not isolate themselves through the use of local language. Instead they should seek to make a contribution to the wider body of the knowledge for the good of all humanity. Computer labs with Internet connection provide sites for African educators to engage with the international community in exchange and sharing of ideas and knowledge for mutual benefit.

Further, wa Thiong’o (1993) asserts that culture is not only a product of a people’s history but also reflects that history and embodies a whole set of values by which a people view themselves and their place in time and space. He explains that the cultures of Africa, Asia, and South America, as much as those of Europe are an integral part of the modern world. To that end the languages and cultures of the people of Africa, Asia, and South America are not and must not be peripheral in the twenty-first century. Rather, they are central to what has made the world what it is today. The knowledge of the role that digital technology can play in achieving educational change in those apparently obscure corners of the world is equally important for our understanding of the role of digital technology and digital literacy in the wider context.

Kern (2006) provides a useful overview of the research work on the role of technology in language learning. He asserts that the rapid evolution of communication technologies has significantly
changed language pedagogy and language use, thereby enable new forms of discourse, new forms of authorship, and new ways to create and participate in communities. In this regard ICT provides an excellent opportunity to participate more than ever before in generating local knowledge for the consumption of the wider world, which we now need to view as a potential market for our African ideas, our knowledge, and our values. The fact that ICT can enable teachers and students to upload local content onto the Internet for the view of people all over the world are really an opportunity that African educators cannot simply let pass! One of the challenges we Africans must overcome is the feeling of inferiority that has been imposed on us by the negative forces of imperialism and colonialism whereby we always tend to devalue our local knowledge and ideas, and value things that are foreign.

Interestingly, the demand for multilingual education in Africa and the need to infuse local practices into formal education is no longer shared by intellectuals in universities and colleges alone. Ordinary people too are beginning to raise their voices on the same subject. For example in their study on local languages in primary schools in Uganda, Tembe and Norton (2008) noted that Ugandan parents were very specific about their demand for multilingual education for their children. Ugandan parents want their children to be taught English at school in order for their children to enhance their prospects for job opportunities and to be part of the global community. They also want their children to speak the local language at home to fit in the local community and to preserve their cultural heritage and for their children to know Kiswahili to be able to communicate within the newly formed East African Community that is steadily taking root.

While the support for the use of African languages and community funds of knowledge is sweeping across Africa (Prah, 2002), the practical difficulties in the implementation of the new language policies have also come to the fore. African leaders (Museveni, 2009; Nsibambi, 2000) and scholars (Parry, 2009; Tembe & Norton, 2008) have cited the shortage of books and other reading materials in the local languages as one of the major obstacles to the use of local languages in schools.
Alternative approaches including the use of digital technology are being considered to address the lack of resources to improve teaching and learning. It is precisely for this reason that studies to better understand the role that digital literacy can play to achieve meaningful educational change become critical at this stage. However, considering the fact that literacy is a social practice (Street, 1984), it is important that the pursuit of digital literacy should take into consideration the need to understand the sociocultural practices and the world views of the local communities in which a particular digital literacy initiative is located.

In the next section I will briefly describe some aspects of the Lugbara tradition and cultural practices that could facilitate or impede the promotion of digital literacy in the local. The main purpose of describing the Lugbara traditional cultural practices at this stage is to provide the cultural context to the study to help the reader better understand the challenges and possibilities of ICT integration in the local context.

2.6 The Traditional Lugbara Sociocultural Practices

The Lugbara are an ethnic group of people who live in the West Nile region of Uganda, which is located on the North Western part of the country across River Nile, with Arua as the main town. They are believed to have originally lived in South Sudan and moved to the present location due to population pressure and local rivalries among ethnic communities. The last population and housing census in Uganda puts the Lugbara population in Uganda at 1,022,240 people (Uganda Bureau of Statistics, 2002), making the Lugbara the ninth largest ethnic group out of the 56 ethnic groups in the country. A significant number of Lugbara also live in South Sudan and eastern Democratic Republic of Congo. The Lugbara speak Lugbarati, which is part of the Sudanic language family.

According to Middleton (1965), who was probably the first person to do extensive anthropological studies on the Lugbara, before colonialism the Lugbara were not under a central rule. It was an egalitarian society that had no central political authority, unlike in kingdom areas of Buganda.
and Bunyoro where political and military power was concentrated in the hands of a central king. Instead, the Lugbara were held together by a common cultural heritage and tradition in which family and clan elders played an important role not only in cultural preservation but also unity and social harmony.

The Lugbara are deeply religious (Dalfovo, 1998; Drati, 1987) and very relational (Middleton, 1965; Obetia, 2008). They generally believe that God is the source of life (idri) but relationships with people (both kin and non-kin), and the wider community are very important for the sustenance of life. To emphasize the centrality of relationships and the community for the sustenance of life, the Lugbara have a common saying, “Ba aa basi”, which literally translates, “We live because of others” or, “We exist because of others”. The Lugbara call a person who does not know how to relate or live with others as oleo, which refers to a witch, an outcast, a misfit, or someone who has an evil heart. Such a person is usually despised by members of the community. On the other hand a person who loves people and knows how to relate with people is called “ba muke” (good person) and he or she is respected by members of the community.

Sharing and interdependence is a virtue among the Lugbara. They share land through communal ownership. They build houses in clusters to be able to depend on one another for security and defense. During very busy planting seasons, families organize oya (communal ploughing comprising ten to fifty people working together) to clear large pieces of land for planting crops. They also practice a kind of team work called ada ti (rotational help) where two to six people team up to plough each other’s field in rotation in the days of the week such that each person has a chance of having the other five joining him in ploughing his garden at least once a week. In Lugbara families, women commonly share household items like grinding stones, firewood, hoes, axes, knives, pots, baskets, calabashes, foodstuffs, and ornaments. While Lugbara men are fond of sharing hunting equipment such as arrows,
bows, spears, and clothing. The Lugbara typically eat food in open spaces to avoid being called “endrao” (very selfish), a practice that is abhorred among the Lugbara.

Oral literature played a key role in holding the Lugbara community together and in imparting the spirit of unity, love, sharing, hard work, moral uprightness, and discipline in the Lugbara society. Many African scholars (Bukenya, Gachanja, & Nandwa, 1996; Opio, 1996; p’Bitek, 1986) have highlighted the central role that oral literature played in pre-colonial African societies like the Lugbara. For example, Bukenya and colleagues (1996) assert that although people did not go to school during the pre-colonial days, they were still well educated within their communities through the spoken word. “They learnt not only to amuse and entertain themselves,” Bukenya and colleagues (1996) explain, “but also to develop speaking and listening skills and to learn the beliefs, values, and acceptable social behaviour of their communities” (p. 9). Opio, who defines oral literature as “the heartbeat of the people” (p. 15), explains that oral literature was the instrument for societal management because it contained the wisdom, values, aspirations, fears, and hopes of the people, stressing that

The moral lessons that folktales and fables produced helped to constrain rustic behavior and to uphold right behavior in the community. [The] teachings to members of the community through satire, euphemism and solo commentary helped to guide the lives of the members of the community (pp. 14–15).

P’Bitek (1986), in his characteristically hyperbolic style, also goes further to argue that in any society anywhere on earth, there are usually two types of rulers, namely: the artists who from p’Bitek’s perspective provides and sustains the fundamental ideas that build society; and the political chieftain, who comes to rule with the aid of his soldiers and the rich businessmen who merely put the artist’s ideas into practice in ruling or misruling his society. P’Bitek is of the opinion that of the two types of rulers, the artist is the greater ruler because the thought system of a people is created by the most
powerful, sensitive and imaginative minds that society has produced in form of artists who form the consciousness of their time by responding deeply and intuitively to what is happening, what has happened, and what will happen in a particular society. According to p’Bitek (1986) the artist expresses his or her response not in form of abstract philosophical treaties or degrees or the laws as laid down by the judges, but in the most indirect language through metaphor and symbol, in image and fable:

He sings and dances his laws. It is taught, not in the school of law, not at the Inns of Court, but around the evening fire, where elephants and hares act as men. The body movement, the painting, the sculptures are his law books. The drums, the flutes, the horns, the strumming and plucking on the strings of the musical instruments, are the proclamation of his decrees. He lures his subjects by the sweetness of his song, and the beauty of his work. He punishes the culprits with laughter and awards the good mannered with praise (p. 39).

According to Obetia (2008) there were three broad categories of African literary forms that the Lugbara commonly used as their traditional teaching–learning methods. These were: (a) a’diko (the story method), (b) ayi nzeza (the ritual formulae method), and (c) imbata (the didactic method). The difference between the three categories was that the storytelling methods had aesthetic and ethical intent, while the ritual formulae was used to impart skills for performing rituals, whereas the didactic methods are skills of communication that use logic to instruct and to teach about life. Obetia asserts that much as story telling was the chief method that the Lugbara elders, parents, and grandparents used to inculcate in young people social and moral values in the home and local community it was also a way of demonstrating ones dexterity in oral performance. Indeed, the Lugbara took a lot of pride in storytelling. Through the skilful use of humour, suspense, and other narrative techniques the storyteller would take stories from his or her own or other people’s experiences and make them the experience of
the listeners. Thus storytelling was not only a Lugbara method of education, but also entertainment and recreation among the Lugbara of Uganda.

Before the encounter with Western civilization, elders played an important role in the preservation and promotion of Lugbara culture and tradition. They were regarded as living libraries, custodians of cultural knowledge and tradition by virtue of their advanced age, and long experience in life. They performed ritual and presided over cultural ceremonies and rights on behalf of the people. They were source of wisdom and the voice of reason in the local communities. They resolved conflicts in families, clans and the wider community. They were viewed as intermediaries between the living and the dead whom the Lugbara believed had influence over the living. The words coming out of the mouth of an elder was treated with utmost respect, not least because in them lay the power of life and death. For example, Obetia (2008) recounts the story of a revival leader of West Nile who testifies to how his father once cursed an eagle which dared to take a sacrificial meat by angrily “pointing at the eagle and saying: mi ba – you!” (p. 107) upon which the poor bird became confused, circled the skies with the meat for several minutes, and fell dead with the meat in its claws in front of the man as people watched in awe.

Stories like that helped to reinforce the power and authority of the elders among the Lugbara who had the exclusive prerogative to determine which aspects of the society’s institutions, traditions and norms should be upheld or abandoned. Unfortunately, as Obetia (2008) notes, respect for elders and cultural institutions such as the art of storytelling at the family hearth as a form of cultural production are fast dying out among the Lugbara, particularly those living in towns and urban centers where young people are reported to be more interested in reading books and watching movies. Obetia believes this is partly so because such young people have not come across compelling storytellers, but more so because of the changes in lifestyles among town dwellers. The main forces of change in the Lugbara society have been Christianity, formal education, and colonialism. In the next section I would
like to briefly look at how formal education was introduced among the Lugbara, the mistakes that the Christian missionaries made by ignoring the role of local institutions and practices, and how that impacted on the relationship between formal education and local practices.

2.7 The Lugbara Encounter with Western Civilization and Formal Education

Formal education was introduced among the Lugbara by Christian missionaries in the first quarter of the 19th century (Drati, 1987). The beginning of Christianity and with it the introduction of formal education in the West Nile can be traced to the coming of Gardener and his wife to this region in 1918 (Obetia, 2008; Drati, 1987). The two were on their way to Central Africa to fulfill the goal of the African Inland Mission (AIM) to establish a chain of mission stations from the East African coastal town of Mombasa to Lake Chad in Central Africa. While on their way, Gardener’s wife fell sick. This forced them to take rest at Ovisoni (the Lugbarati word for “struck by lightning”) in what is now Vurra County, eight miles to the southeast of Arua town and approximately one mile from the Congo border. Ovisoni was known for violent thunderstorms that had killed many people in the area. Upon treatment the District Commissioner of West Nile District, Alfred Weatherhead, convinced the couple to stay longer to help him distribute relief food to the people of West Nile who were hard hit by a severe famine at the time (Drati, 1987). In the course of distributing food the couple saw a need to evangelize the people of West Nile. They then moved to Arua and were allocated a place at Mvara, two miles to the east of Arua town, by an elder called Awudole (which means “the cry is this way” in Lugbarati). Around the same time also came the Verona Fathers (Catholic missionaries) who settled at Ediofe, two miles west of Arua Town.

After establishing a base in Mvara, Gardener and his wife went on to work collaboratively with AIM to establish churches, build schools, open health centers, and construct roads to facilitate the spread of Christianity in the region. As the church expanded, there was need to render stewardship and to distribute sacrament. Considering that the Christians were still illiterate and the missionaries were
not able to teach all of them, they recruited some of them to work for them as domestic workers for low pay and taught them as part of their compensation (Drati, 1987). In addition to the domestic workers, the missionaries also trained a few other individuals and small groups to read and write. These groups played very instrumental roles in the establishment of schools and churches in local communities and the subsequent spread of western civilization among the Lugbara.

In 1922 the missionaries decided to open up a vernacular teacher training college at Mvara for two major reasons: (a) to train teachers for the missionary schools that had been established in many of the churches, and (b) to provide the necessary biblical knowledge to pastoral candidates before they were sent to the Theological Training College at Bwalasa to become ordained ministers. It was this vernacular Teacher Training College that had transformed over the years to now become the current Wati CPTC where this study conducted.

Within a short time the missionaries learnt Lugbarati and embarked on the task of creating orthography and producing literature in the language. They translated scripture verses, prayers, and hymns into the language. Most important of all, in 1940 the new testaments were translated into Lugbarati for biblical teaching and literacy instruction among the Lugbara. Furthermore, the missionaries opened schools in the villages to teach children reading, writing and arithmetic. They also built vocational schools to train young people in areas of farming, carpentry, building and construction, business, bookkeeping and accounting, typing and clerical service. The missionaries also opened up health centers to treat people with diseases and constructed roads.

In the short run, the missionaries appeared to have achieved a great deal. During these initial stages, as Drati (1987) explains, church services were regularly attended, people received baptism in large numbers; they took Holy Communion, gave tithes, and married according to Christian teachings. The missionary schools were well attended. However, despite these achievements, contradictions and tensions eventually emerged. As time went on many people became disillusioned with work of the
Christian missionaries in the churches and schools. The enthusiasm with which people had embraced Christianity in the villages gave way to indifference, with some openly opposing the Christian faith.

Some scholars (Drati, 1987; Obetia, 2008) assert that the major cause of disaffection towards Christianity and Western civilization, including formal education, was the demonization of traditional African cultural institutions and practices and the blatant refusal of the Christian missionaries to allow the use of African traditional communication tools such as drums, songs, folk stories, and ceres (an emotional outburst) in the church because they were regarded as satanic. Drati (1987) summarizes the errors made by the Christian missionaries in that regard thus:

Some were simply tactical, some were based on cultural misunderstandings, some were socially disruptive teachings and practices of the church, and others were deeper problems, rooted in the differences between the Western world view of the missionaries and the very different Lugbara world view. The latter had more effect on the church than any of the other problems (pp. 32–33).

In 1929 amidst the climate of growth and tension emerged the East African Revival Movement, which began in Rwanda but soon spread in the rest of the East African countries and tribal communities. In Uganda, this movement, which began as a spiritual movement praying for the revival of the churches, was led by Joe Church in Masaka, central Uganda, but quickly spread from tribe to tribe throughout Uganda (Drati, 1987). The followers of the movement, commonly referred to as balokole, played an instrumental role in challenging the banning of the use of traditional practices and modes of communication in the churches. For example, in 1955 a group broke off from the main movement because of an incident over the use of a locally made trumpet. At that time, Joe church was holding a convention in Masaka. During a meeting the leadership of the church had a disagreement with a medical doctor called Lubulwa because of a “commotion” that he was accused of causing by
using his instrument. As Lubulwa went on preaching with his trumpet, the noise became unbearable for the church leadership who ordered Lubulwa to leave the convention to the chagrin of many believers.

From that moment Lubulwa became openly opposed to the excessive Europeanization of Christianity and the demonization of local cultural practices of meaning-making and expression. The resistance eventually led to the formation of a splinter group called “the trumpeters” because they fashioned trumpets from tin and climbed hills, mountains, and sometimes roofs of houses to play their instrument and sing revival songs called *Tukute ndereza*, meaning “Let us praise Him” (Drati, 1987, p. 33). According to Drati, the trumpeters were “enormously appealing to the people because they used African traditional instruments and composed many songs in the African style” (p. 33). Drati explains that people were not happy about the banning of their instruments and native songs and dances by the missionaries who considered them pagan, and therefore evil. The resentment spread across all the tribes in Uganda including the Lugbara, where the researcher’s father was an active member of the revival movement, holding the position of revival leader in Terego Archdeaconry, Madi and West Nile Diocese. In that position he used to hold week-long annual praise and worship events at home where hundreds of members of the revival movement would travel as far as Sudan, Zaire (now Democratic Republic of Congo) and other parts of Uganda to attend the weeklong events. These praise and worship gatherings commonly called *ra ta* (trans-night dances) were usually held during dry season when people had harvested crops and there was less work to do in the fields. They attracted both Christians and non-Christians, who enjoyed dancing to the tune of the locally composed spiritual songs and traditional musical instruments like *ari* (drums), *adungu* (harps), *lekombe* (thump piano), *guka* (trumpet), *koyo* (shakers made of gourds and seeds), and *imgbiri* (iron beads).

In 1975 the church realized that the *balokole* movement was growing stronger among the locals, and that the divisions in the church were shaking the foundation of the very Christian faith that they
were trying to build. Consequently, a reconciliation prayer meeting was convened for both parties to address their difference. According to Drati (1987) the result of the reconciliation was

That the musical tradition of the Lugbara people, formally thought of as pagan, was redeemed and used to compose original songs and psalms which were more meaningful to the people than the imported, Western hymns which had been taught by the missionaries. (p. 34)

Since the acceptance of the use of local traditional modes of meaning making and expression in the church:

The church has become a channel through which each Christian community offers the wider community to God, through *azita* (prayers), *feta* (offering), *ongo* (music), *ongo tuza* (dance), *poi* (panegyrics), *cere* (praise), and whatever traditional practices by which they are identified. The communities are always proud to be who they are, to join with others as *ori’ba* – the people of God – the church (Obetia, 2008, p. 35).

According to Obetia, (2008) the joy of meeting together in Christ is now more pronounced among the Lugbara Christian communities because they now see Jesus to be rehabilitating and reconstructing “their cultural heritage, religious consciousness and identities into what they aspire to become as communities: humane, loving and God-fearing people” (p. 35). He explains that by incorporating local practices in contemporary Christian teaching, the church has

Become a globalizing agent for local experiences of God and for the construction of new ‘globalized’ community whose identity incorporates both the local and the contemporary identities. Multiculturalism and pluralism … are beginning to infect communities with sensitivities that allow them to recognize a diversity of experiences, and opinions.” (p. 36).
In education the attitude of the Christian missionaries towards local cultural institutions and practices was not any different. Local knowledge had no place in the school curriculum, which emphasized knowledge of faraway lands. Instead of learning about the history of their people and their local environment, children were taught European or American history. Local language was strictly forbidden for use as medium of instruction in schools. If a child were caught using local language anywhere on the school compound, she/he would be severely punished. Traditional teaching and learning methods, like storytelling, proverbs, songs, riddles, and rhymes were regarded as useless for inclusion in formal education. The role of the elders in community was severely undermined, which made them develop negative attitudes towards school and churches. Schools have alienated themselves from the very communities they were meant to serve.

Unlike what happened in the church, the resistance towards formal education has generally taken the form of passive resistance. As a result it has not produced the kind of radical changes that have taken place in the churches. In some schools attempts have been made by students to stage strikes against some of the injustices perpetuated by schools, but such efforts have always been thwarted through institutional structure. However, the consequences of some of these unjust educational policies and practices have continued to manifest themselves in high school dropout rates, poor achievement results, and lack of community participation in school programs, which have in turn led to a gap between schools and local communities. It is against this background that the role of ICT and digital literacy to achieve meaningful educational change is being explored. Having described who the Lugbara are and after providing a brief account of their encounter with the Western civilization so far, in the next section I will consider some of the arguments in favour of the integration of ICT in African educational contexts.
2.8 Review of the Related Literature on ICT and Educational Change

It is the desire of almost every nation on earth to provide its citizens with the quality education to respond to its social, cultural, political and economic challenges. Central to quality education is not only the content, but also the means through which such education is delivered. In the traditional societies the oral mode was the main means through which education was transmitted. In the 19\textsuperscript{th} and 20\textsuperscript{th} centuries the technology of reading and writing was the dominant means of transmitting education. Presently, digital technology is viewed by many people as the favoured means for effective transmission of education although in many contexts reading, writing and the oral mode still play a key role in education. In this section, I examine perspectives on the role of ICT in educational change.

2.8.1 ICT, digital literacy, and educational change. The use of digital technology in education continues to escalate globally because of the potential benefits associated with digital technology. In the Western World, particularly North America and Western Europe, digital technologies are now “an integral part of the learning environment – from administration to instruction, and as part of the curriculum” (Kavagi, 2010, p. 1). The successful use of digital technology to deliver educational services in Europe and North America has inspired governments and development partners in other regions of the world to consider investing in modern technology and digital literacy. In Africa, significant amounts of scarce resources have been spent on construction of ICT laboratories and purchase of digital technologies in schools and colleges to promote digital literacy to achieve the much-desired educational change. Yet most of the ICT labs have remained dysfunctional. While some teachers have embraced the use of digital technologies in their professional practice, many teachers are not taking advantage of the ICT labs to enhance teaching and learning. The question then arises, is the expenditure worth it? What is the justification for the investment in digital technology?

Kavagi (2010) outlines four main drivers or justifications for the introduction of computer and digital technologies in schools in developing countries, namely: (a) the social drive which promotes the
general use of computers and digital technologies to make learners digitally literate to fit in the digital world, (b) the vocational drive in which the main goal is to prepare learners for a career in industry, (c) the catalytic drive which aims to trigger innovation in schools, and (d) the pedagogical drive in which the primary goal is to ensure that computers and digital technologies are used to improve teacher output through enhanced methods of lesson preparation and content delivery, which is the major focus of my study.

The pedagogical drive [for ICT use] is premised on empirical research that has shown that computers enhance achievement of learning outcomes by enhancing long term retention of concepts learned. Moreover, computers have the potential of making the teachers’ work easier and more efficient e.g. in lesson preparation, presentation, and record keeping. (Kavagi, 2010, p. 15)

From Kavagi’s (2010) perspective one gets the impression that modern technologies like computers and the Internet have intrinsic value to improve teaching and learning. Yet when Warschauer (1999) studied how people used ICT in four separate contexts, the study revealed that the sociocultural contexts in these settings significantly affected and shaped the nature of the online teaching and learning. Contrary to the view that technology will in itself automatically transform teaching and learning, Warschauer found that technology had an amplifying effect, reinforcing teachers’ underlying instructional approach, whether it was based on second language writing as a form of discipline, liberation, vocation or apprenticeship. This is consistent with Snyder and Prinsloo’s (2007) argument that ICT and digital literacies are not necessarily universal skills. How these skills function depends on the context to which they are inserted and how they relate to the local literacy practices of the people involved. This resonates well with what the New Literacy Scholars (Barton &
Hamilton, 1998; Barton et al., 2000; Gee, 1996; Heath, 1983; Scribner & Cole, 1981) have all along emphasized; that literacy should best be viewed as a sociocultural practice that is context specific.

Robinson (2008), who carried out a study on how distance education and ICT improved professional development for rural teachers in one province in Western China, concurs with those scholars who view ICT as having great potential to distribute opportunities for learning more widely and equitably across the teaching force. Based on the participants’ reports and his own observations, Robinson concluded that ICT could improve the quality and variety of the resources and support available to teachers, such as opening up new avenues to professional development. He asserts that if social justice is to be achieved, in terms of equity of educational opportunity and service, the provision needs to be planned in ways that make it available, accessible, acceptable, and adaptable to all teachers and head-teachers.

Robinson’s line of argument about how ICT can improve the quality and range of resources and support for teachers lends support to that of scholars who advocate the use of ICT for teacher professional development (e.g., Collis & Jung, 2003; Jung, 2005). His line of argument also resonates well with those who advocate the use of ICT for the overall transformation of the system of education (e.g., Leach, Ahmed, Makalima, & Power, 2006; Unwin, 2005). Collins and Jung (2003) specifically maintain that the growth of ICT has added new options for teachers’ professional development as well as raised concerns about the inclusion of disadvantaged groups. Considering that literary, including digital literacy, is a social practice that is context specific, we need to ask, for example, what professional development options digital technology and digital literacy hold for teachers and teacher educators in rural Ugandan educational context, and to what extent the teachers and teacher educators take advantage of these professional development opportunities.

Kern (2006) makes a compelling argument when he notes that the mere presence of ICT tools, like computers in many classrooms or computer labs, may make us think that we are now past the point
of deciding whether or not to use computers in language and literacy teaching. Yet we still need to know how to make the best use of them to accomplish our goals. It is important to ask what it really means to use ICT for meaningful educational change, particularly in the less resourced contexts like Africa, where the greater number of teachers and teacher educators teach under difficult conditions including: acute shortage of resources, high pupil teacher ratios, high school dropout rates, low morale due to poor remuneration, and limited opportunities for professional development. Efforts to promote ICT and digital literacy to achieve educational change should seek to better understand the affordances that digital technology offers to address these challenges that teachers and teacher educators in developing countries face in the professional practice. We need to pay attention to the role that digital technology can play in addressing such challenges. Similarly we must also find out why despite the efforts being made, ICT and digital literacy is struggling to take root in many less resourced contexts like Africa where the agency for the use of digital technologies is perhaps greatest. Before I examine perspectives on the apparent failure of ICT and digital literacy integration to take root in African education, I would like to highlight some of the major arguments for ICT and digital literacy integration in African education.

2.8.2 ICT and digital literacy in African educational contexts. ICT has become the defining feature of quality education and a determinant of socio-economic development in the 21st century, especially in the Global North. ICT is believed to have a potentially huge role to play in educational transformation in Less Developed Countries (LDCs) (Grace & Kenny, 2003). Kern (2006) suggests that the role of technology in computer-assisted language learning can be thought of in terms of the metaphor of tutor, tool and medium. In the tutor’s role computers can provide instruction, feedback, and testing in grammar, vocabulary writing, pronunciation, and other dimensions of language and culture learning. While in the tool role, computers provide ready access to written, audio, and visual materials relevant to the language and culture being studied. They also provide reference tools like
online dictionaries, grammar and style checkers, and concordances for corpus analysis. In the medium role technology provides sites for interpersonal communication, multimedia publication, distance learning, community participation, and identity formulation.

In Africa, the rhetoric about the potential benefit of ICT to improve teaching and learning has inspired many countries to begin promoting ICT for educational change and social transformation. For instance, Cobb (2009) argues that a commitment to ICT as a precondition for development is present in almost every official African development document nowadays. Cobb asserts that a commitment to ICT in education specifically is an official component of the Framework for Action of the landmark Education for All (EFA) conference held in Dakar, Senegal, in 2000, and he notes that the six EFA objectives emerging from the Dakar conference are supported by twelve how-to principles, one of which is to harness new ICTs to achieve EFA goals. In addition to official pronouncements, ICTs are a key component of a number of ongoing training or education projects including the 26 sites of World Bank’s Virtual University (Cobb, 2009).

Grace and Kenny (2003) view the role ICT and digital literacy can play to transform education from equity perspective, noting that ICTs can alleviate urban-rural educational discrepancies, providing all students with access to modern pedagogic methods and knowledge. They assert that due to the interactive nature of ICTs in general and the Internet in particular, it is well suited for creative learning approaches in which experimentation and critical thinking skills are emphasized. Grace and Kenny further posit that the emergence of the digital age requires a technologically literate population to compete in the global economy, which is why every nation, including those in Africa, must strive to use technology to improve the quality of their human resource. (Cobb, 2009) who holds a similar view posits that access to ICTs from the earliest grade levels, has the potential to enhance these skills, and ensure that populations are able to adapt to new technologies and remain competitive.
According to Broekman, Etta, James, and Roberts (2004), there are three significant roles that ICT could play to transform education in Africa, namely:

1. ICT based in schools will enhance access to information and facilitate communication in school-based communities as well as various communities based in the residential areas surrounding the schools;
2. ICT in schools will enhance access to education for those who have been deprived of education in the past;
3. ICTs can contribute to new pedagogical methodologies thereby enhancing learning and teaching in the context of the education crisis in Africa (p. 26).

De Roy (1997) makes equally compelling arguments for the development of modern ICT infrastructure in Africa and stresses that the integration of ICT in education would have enormous benefits in Africa. For example De Roy asserts that the electronic networks would allow Africa access to information that would not normally be available on the continent. It would give African scholars access to the best libraries in the world, thus facilitating the acquisition, use, and exchange of vital information. Even within Africa itself ICT would deal with the control and production of African data within the continent. De Roy further argues that ICT would lead to the establishment of networks that would permit African scientists to repatriate volumes of data and analysis originally obtained from African sources that accumulated in research centers and libraries in the Western world. It would make it possible for African researchers to publish and share their research findings with the rest of the world. Most importantly, ICT has the potential to break down the isolation from which researchers and African teachers have suffered and stop the brain drain phenomenon. Based on the aforementioned potential benefits associated with ICT, de Roy (1997) insists, “These technological developments in networking and communication infrastructure are not a luxury – they are a priority for Africa as they comprise considerable and tangible stakes of power, because nowadays being on the information highway gives power” (p. 897).
From the rhetoric and the commitments made by governments and development partners, one gets the impression that ICT integration is making steady progress in Africa, yet according to available literature the integration of ICT in educational contexts, let alone the wider society is struggling to take root (Ajuar, 2010; Akinmusire & Kalowole, 2010; Etta & Parvyn-Wamahiu, 2003; James, 2004; Kymazhege & Wada, 2010). For instance, according to a study done by Ngugi and colleagues (2007) on the status of ICTs in higher education in eight African countries (Egypt, Kenya, Madagascar, Mozambique, Nigeria, South Africa, Tanzania, and Uganda), the use of ICT in teaching and learning is still inadequate. Similarly, Minishi-Majanja (2007) did a study on the integration of ICT in library and information science education in Sub-Saharan Africa and came to the conclusion that while the Sub-Saharan library and information science schools have embarked on the incorporation of ICT in their curricular, complete diffusion of ICT into the library and information science schools has not taken place. Cobb (2009) also acknowledges that there is a lot to be done for ICT integration to take root in Sub-Saharan Africa.

In his study on ICT and teacher education programs in Nigeria, Ajuar (2010) submits that teacher-training institutions in Nigeria have not fully integrated computer literacy skills in their programs. Robert-Okah (2010) also reports that despite the fact that the MoES, Science and Technology has created syllabi for computer studies “the majority of the teachers and learners in Nigeria are still ICT marginalized” (p. 103). Duze (2010) did a study on ICT integration in Nigeria from which he concluded, “Nigeria is not ready for ICT-led development because majority of the subjects and by inference people in Nigeria, do not have the ICT competence required to harness the development-related benefits that ICT offers” (p. 87).

From this discussion we can clearly see that there is compelling evidence suggesting that on the whole ICT integration and digital literacy is still struggling to take root in African education despite all the efforts being made to promote ICT and digital literacy in Africa. Why are ICT and digital literacy
not taking root in African education as expected? What are the possible explanations for the apparent failure of ICT and digital literacy to take root in African education? The following section highlights some possible explanations to why ICT is struggling to take root in African educational contexts.

2.8.3 Perspectives on the failure of ICT integration to take root in African education.

Outside Africa the pervasiveness of ICT has brought about rapid changes in technology and has caused social, political, and global economic transformation (Nwachukwu, 1994; Yusuf, 2005). In Africa, however, the integration of ICT and digital literacy in education is yet to be realized (Abdul, 2010). Abdul outlines the reasons for the failure of ICT to take root in African countries: limited infrastructure, lack of information, information illiteracy among teachers and students, technophobia, poor or non-existence of Internet connectivity and inadequate learning resources. Abdul further argues that one of the reasons for the failure of ICT to take root in Africa is what he calls “attitude of teacher-trainees and teacher trainers which indicate gross lack of independent learning skills and reluctance to take responsibilities for their own learning” (p. 52).

Abdul (2010) expresses disaffection with African teacher-trainees and the teacher trainers for their apparent reluctance to embrace ICT and digital literacy. He blames them for being information illiterate and technophobic. Considering the kind of language Abdul uses, it is possible to associate him with the autonomous model (Street 1984), which does not recognize local literacy practices as legitimate and valuable and assumes that digital literacy skills are inherently good and that the teacher-trainees and the trainers need them and need to obviously embrace them to function better.

Before we start blaming the teacher-trainees and the trainers for not using ICT we must ask ourselves why they are not invested in learning to use technology in their professional practice (cf. Norton, 2000). What identity options and range of cultural capital does technology offer them? It needs to be realized that if people invest in a second language (literacy practice) “they do so with the understanding that they will acquire a wider range of symbolic and material resources which will in
turn increase the value of their cultural capital” (Norton, 2000, p. 10). Thus, Abdul’s (2010) reasons for the failure of ICT to take root among teacher-trainees and teacher trainers are partially correct, but they do not sufficiently explain the core issues that account for the failure of ICT and digital literacy to take root in schools and colleges in Africa, which is why we have to explore other alternative explanations.

Warschauer (2003) asserts that one of the reasons for the failure of ICT integration in less resourced regions like Africa is because too much emphasis has been placed in the physical provision of equipment without focusing on other attendant factors like the human resources needed to make digital literacy to take root. Warschauer (2003) provides a useful model that does not only take account of the physical and digital resources but also the human and social resources to explain the effective use of ICT in a local context. Warschauer analyses the notion of digital divide using Bourdieu’s (1991) metaphor of social capital to highlight how ICT use can enhance the social capital of the learner thus:

If access to ICT is provided in a way that enhances social capital, then this will likely promote access to the ‘information society,’ in other words fuller opportunities for social, political, cultural and economic participation. If social capital is not enhanced, access to computers may provide nothing more than limited-value entertainment. Of course, social capital is not the only factor helping to explain ICT’s relationship to human and social development, but, on the other hand, it often is a leveraging factor that can help multiply other types of capital (p. 156).

In that regard, having access to ICT is not only about the physical presence of computer and the Internet. It involves very many other factors like the requisite skills needed to access resources online and the relevance of the material. It also means that people have got to be invested for them to be able to take on the new skills (Norton, 2000). Thus, on the question of what it means to have access to ICT, Warschauer (2003) argues that a broader view of access is required if we are to understand what enables people to deploy ICT in personally or socially meaningful ways and he analyses the factors as
falling into four general areas, namely: physical resources, digital resources, human resources, and social resources, which work in combination to make to enable people engage in the appropriate use of ICT.

Snyder and Prinsloo (2007) assert that engagements with new electronic media are shaped by the immediate, interactive, dynamic and wider social practices. They explain that reading and writing, whether in form of print or on the screen, “appears as not exactly the same thing, in their uses, functions, modes of acquisition and status, across groups of people and across specific social domains within societies” (p. 172). Thus, whether, and under what conditions, access and use of electronic media offer opportunities for particular users is something that can only be established through situated research. Like Warschauer (2003), Snyder and Prinsloo (2007) challenge the skills-based and digital divide notions that assume that ICT and digital literacies are universal and have general applicability regardless of how the local is differently configured. In that regard the failure of digital literacy to take root in Africa can be attributed to the fact that digital literacies associated with the digital media do not offer much for integration with the local literacy practices. Thus, there is need for interrogating how best such media can be made to function in the local contexts and the extent to which ICT policies can impact curriculum development and classroom practice.

Prinsloo (2005) also posits that the local context plays a significant role in determining how ICT and digital literacy skills function. He argues that the new literacies of screen-based and Internet communication work in particular ways in low technology and socially distinct African contexts. He asserts that despite their global impact, the new literacies are best studied as “placed resources” (p. 15). The findings from his study also revealed that the new literacies have no intrinsic value in and of themselves. Prinsloo emphasizes the importance of foregrounding contextual issues to better understand the extent to which ICT and digital literacies can function at any one moment. Drawing on Blommaert (2002), Prinsloo (2005) defines placed resources as
Resources that are functional in one particular place but become dysfunctional as soon as they are moved into other places. This process of flows creates difference in value, for the resources are being reallocated different functions. The indexical links between signs and modes of communication on the one hand, and social value scales allowing e.g. identity construction, status attribution, and so forth - these indexical links are severed and new ones are projected onto the signs and practices (p. 15).

Indeed, as Prinsloo (2005) has argued, we need to view technologies like computers and the Internet as placed resources because their usefulness will always depend on the dynamics of the local contexts which explains why sometimes well intentioned problems fail to achieve their objectives because they take the influence of the local context on the projects for granted. Besides, in many of the digital literacy programs participants are assumed to have no knowledge of digital literacy even when in home and work places some of the participants are exposed to modern technologies like mobile telephones, digital cameras, and audio recorders. Their digital literacy skills associated with such digital tools is neither recognized nor validated as being useful in educational contexts. Instead they are dis-respectively and very unfairly labeled as illiterate and technophobic (Abdul, 2010).

Unwin (2004) espouses another interesting view in which he asserts that ICTs have far too often been interpreted merely in the restricted notion of the use of computers and the Internet for teacher training, rather than in the wider sense of technologies used to deliver a diversity of learning solutions. He advocates the value of blended learning solutions which he defines as the combination of printed text materials, radio, video and face to face practical experience alongside the use of computers and the Internet in enabling people to learn in ways that are appropriate to their needs. According to Unwin (2004), six fundamental principles of good practice must be addressed for ICT programs to be effective in teacher education. He highlights the six principles as:
a shift from emphasis on education for ICT to the use of ICT for education; an integration of ICT practices within the whole curriculum; a need for integration between pre-service and in-service teacher training; a need for the development of relevant and locally produced content; a need for appropriate educational partnerships; and an emphasis on the development of sustainable costing models. (p. 2)

The most striking point Unwin (2004) makes in his six fundamental principles of good practice that must be addressed for ICT programs to be effective in teacher education is the one on the need for the development of relevant and locally produced content. The development of relevant and locally produced content is crucial because it is culturally sensitive and it views local cultural practices and resources as legitimate. Further, it is in line with the argument of NLS that literacy practices are socially and culturally situated (Street, 1984).

Yusuf (2005) identifies three major weaknesses with ICT policies in Africa: (a) The policies often have no specific reference to education, and as such, education is subsumed under human resource development; (b) the objectives and strategies related to education as related to human resource development are market driven, which limits the potential of ICT in education to a central force in economic competitiveness and thereby neglecting its potential for addressing challenges in teaching and learning; and (c) being silent on teacher education and teachers’ ICT professional development. He asserts that teachers are indispensable for successful learning about ICT, and learning and teaching through ICT. In his view, computer education introduced into the Nigerian secondary schools since 1988 has largely been unsuccessful as a result of the teachers’ incompetence. Drawing on several scholars (Davis, 2003; Pearson, 2003; Selinger & Austin, 2003; Watson, 2001; Yusuf, 1998), Yusuf (2005) argues that teachers’ ability and willingness to use ICT and integrate it into their professional practice is largely dependent on the professional development they receive.
According to Unwin (2005), one major limitation to ICT integration in education is that many of those involved in helping people to learn in both formal and non-formal contexts have little or no skills in the appropriate use of new technologies. This is particularly the case in poorer countries, and most notably in Africa. Furthermore, to date there have been rather few effective and sustainable schemes designed to enhance ICT for education literacy among teachers. Unwin (2005) posits that there is a profound need to develop systems and capacities that enable policy makers, administrators, teachers, and tutors to engage in professional staff training and development as an ongoing process within programs and to link staff development more closely with service improvement and evaluation. I entirely agree with Unwin that teachers must be recognized as change agents and be facilitated to perform their professional roles, but I must also add that teachers and administrators must also have more opportunities to understand and learn from local problems and to invent local solutions. This begs the question, what are the institutional structures and practices that support or constrain teachers and administrators in their use of ICT labs and digital literacies for pedagogical tools? Unless we know the practices that support or impede the use of digital technologies, we will not adequately understand why ICT integration and digital literacy is failing to take root among educators in Africa.

Hennessy, Harrison, and Wamakote (2010) examine research literature on teachers’ use of ICT in primary and secondary schools in Sub-Saharan Africa, with particular emphasis on improving the quality of subject teaching and learning. They assert that when placed in the right hands and used appropriately, ICT can be an effective tool in supporting teaching and learning. I agree with Hennessy and colleagues (2010) when they argue that the introduction of computers in schools does not by itself improve the quality of education. The pedagogical and technical expertise of the teacher is indeed crucial in facilitating the role ICT can play to improve the quality of education. If technology cannot be accessed by the teacher, which is unfortunately the case in many educational settings in sub-Saharan Africa, then the possibility for them not to be effectively used to achieve meaning educational change
are very high. The role of the teacher in the actual implementation of educational policies and programs is very crucial, which is why I concur with the assertion in Government White Paper on Education Review Policy (1992) that “no education can be better than the quality of its teachers, nor can a country be better than the quality of its education” (p. 152).

According to Hennessy and colleagues (2010), most teachers who use ICT tend to do so because they perceive ICT as very useful and as making teaching and learning easier. Such teachers tend to feel that their own use of computers benefits their learners, and they also feel learners benefit from using computers themselves. When teachers view ICT as kindling students’ interest in learning, their interest in engaging students in active learning and knowledge production will be high. Clearly, ICT promotes a positive attitude towards information technology as an essential part of lifelong interest in learning. Such teachers are more likely to perceive the use of ICT as enhancing recall of previous learning, providing new stimuli, activating the learners’ response, and providing systematic and steady feedback. To that end teachers ought to be the focus of our interrogation of how ICT can be used to promote digital literacy to improve the quality of education in Africa.

Paterson (2007) observes that despite the steady decline in the relative cost of acquiring ICT, the cost of owning and maintaining sustainable computer systems in schools is rising in sub-Saharan Africa. He further notes that while the Ministries of Education in sub-Saharan Africa are under pressure to invest in ICT, there is very little evidence upon which decision makers can base their decisions to allocate finances to ICT. A survey Paterson did on the total costs of owning computer rooms in 62 schools across Botswana, Namibia and the Seychelles, revealed that in Botswana and Seychelles, where government provided computer facilities to all post-primary schools, ICT expenditure per school is much higher than in Namibia, where school computer facilities are funded from several sources, including the government, nongovernmental organizations (NGOs), and the community (Paterson, 2007). Based on the findings of that survey, Paterson argues that high expenditure is not necessarily
associated with efficiency of resource usage, and that internationally benchmarked research is needed in order to support optimal MoES and school level decision-making.

As Paterson (2007) has observed, one of the major weaknesses in educational projects and programs in Africa is the fact that in the implementation of projects and programs, very little, if any, attention is paid to research. In most cases research is viewed as an unnecessary expenditure. This has often resulted in the collapse of many educational programs and the wastage of scarce resources. Given that most of the ICT projects in many countries in Africa are still in their pilot phases, they provide an excellent opportunity for research that can inform ICT policies, curriculum development and classroom practice. If the experience in the global North is anything to go by, we in Africa cannot afford to ignore the crucial role research plays in informing educational change. We need to build research capacity in our educational institutions to constantly interrogate educational policy and practice in order to promote best practices and avoid wasting scarce resources wherever possible. In the following section I examine some of the major reasons for the failure of ICT integration to take root in Africa based on the Ugandan experience. In that way the role an ICT lab can play in promoting digital literacy for educational change will become apparent.

2.8.4 ICT and digital literacy in Ugandan education. The Integration of ICT in Ugandan education is closely linked to the ongoing reforms in Ugandan education. In 1997 the government of Uganda introduced UPE, which abolished the payment of school fees in all public primary schools in the country. This provided critical access to education for girls, orphans, and other marginalized groups from poor families who could not go to school because of school fees. As a result of the policy, enrolment in schools increased from approximately 2.5 million in 1996 to 6.8 million in 2000 (Ministry of Education and Sports [MoES], 2001). This created a severe strain on the existing educational infrastructure and human resource across the country leading to a considerable decline in educational standards.
In order to cope with the influx of children in schools and to maintain the quality of education in the country two major approaches have been adopted. One of the approaches has been the introduction of the Thematic Curriculum in 2006, which emphasized the use of children’s home languages as a medium of instruction from Primary 1 to Primary 3 while English is taught as a subject. From Primary 5 to university English becomes the medium of instruction, while the home language is taught as a subject examinable by the Uganda National Examinations Board (UNEB). Primary 4 is considered as a transition class, where English and home language should both be used as a medium of instruction. The Thematic Curriculum further emphasizes the use of local cultural resources like local stories, songs, dances, riddles, proverbs, rhymes, tongue twisters, and poems to make learning more exciting to children.

The other major approach has been the promotion of ICT and digital literacy in Ugandan education. As we shall further discuss in chapter five later on, some of the steps that the government of Uganda has taken to promote the integration of ICT in the Ugandan education and the wider society have included the liberalization of the telecommunication sector, the establishment of an ICT Ministry to spearhead the promotion of ICT in the whole country, the launching of an ICT policy in 2003, the formulation of ICT in education policy, the introduction of several ICT programs and projects in schools, colleges and universities in Uganda, as well as the introduction of ICT in the school curriculum. However, despite all the efforts being made, studies (Andema, 2009; Baraza, 2010; Farrell, 2007; Kahiigi, Ekenberg, Hansson, Tusubira, & Danielson, 2008; Mutonyi & Norton, 2007; Ogot & Akello, 2010; United States Agency for International Development [USAID], 2006; Zlotnikova & Lubega, 2009) have indicated that although some schools have embraced the use of some modern technologies in different aspects of school life, the practical integration of ICT and digital literacy in teaching and learning is still struggling to take root in many Ugandan schools and institutions of learning. The USAID (2006) study specifically posits that while students and tutors in some Ugandan
colleges have acquired basic ICT skills, these are insufficient to have a significant impact on teaching practice and/or learning.

In a study on the factors influencing tutors’ use of ICT in a Ugandan primary teachers’ college, Ogot and Akello (2010) also report that tutors and students in Ugandan colleges considered themselves not competent in the use of basic computer applications for teaching and learning. Findings from the study further revealed that tutors and student teachers could not apply computer application programs like word processing, spreadsheets, presentation tools and Internet searching and/or learning processes. It was reported that, that was undermining the teachers’ ability to impart any digital literacy skills and knowledge to the students. Zlotnikova and Lubega (2009) also found out that many of the teachers in Uganda who teach in lower institutions of learning such as primary and secondary schools have very little or no skills on how to use ICT as pedagogical tools in the classroom. According to the findings of that study, such teachers become insecure and lose confidence in themselves when challenged by modern technology.

Scholars have offered different explanations to account for the apparent failure of ICT and digital literacy to take root on the African continent with most of them pointing to inadequate infrastructure and hardware as the main constraints to the slow integration in teaching and learning (Abdul, 2010; Aguti & Fraiser, 2006; Ajuar, 2010; Akinmusire & Kalowole, 2010; Kymazhege & Wada, 2010; Minishi-Majanja, 2007; Robert-Okah, 2010; University of Montreal, 2006;; USAID, 2006). According to Minishi-Majanja (2007) for example, we do not have to look far to locate the problem, because in his view the problems are to be found in the overall ICT infrastructure at both national and institutional levels, as well as individual school’s equipage of appropriate hardware and software. While I agree with Minishi-Majanja that infrastructural constraints can contribute to the slow integration of ICT and digital literacy in educational contexts, I argue that the problem is much bigger than inadequate infrastructure alone can explain.
I strongly believe, as Mutonyi and Norton (2007) noted, that one of the major concerns over ICT integration in educational contexts in Africa broadly and Uganda more specifically relates to teacher professional development. In my view the integration of ICT in education is struggling to take root in African countries like Uganda mainly because the ongoing ICT initiatives have not paid enough attention to teachers’ professional development in the area of ICT application as pedagogical tool. Instead of focusing on building the teachers capacity to confidently and efficiently apply ICT to engage students in critical thinking and active participation in knowledge production, most ICT initiatives jump the ladder and start emphasizing equipping students with ICT skills before the very teachers who are expected to help these students develop ICT skills and knowledge to build the necessary capacity to do the job. Yet in most African educational contexts generally and in Ugandan educational context more specifically the teacher is viewed as the custodian of knowledge, while students are viewed as recipients of knowledge (Ssekamwa, 2000). The lack of emphasis on teacher professional development in ICT in Uganda is further exemplified by the fact that while ICT has been integrated in the secondary school curriculum, it has not been firmly integrated in the teacher education curriculum in the country. Worse still, applying ICT in education has not even been extensively considered during curriculum development for Bachelor of Education courses in Uganda (Zlotnikova, & Lubega, 2009). There is therefore a great need to foreground ICT in teacher education curriculum and teacher professional development through in-service programs if ICT is to take root in the country.

Another major cause of the failure of ICT and digital literacy to take root in Ugandan education is that research has not been given the attention it deserves to inform policy and curriculum development in the country. In most ICT programs and projects, both government and its development partners have tended to view research as a costly enterprise that can be left out in project implementation. Yet as Mutonyi and Norton (2007) argued, collecting data through empirical studies is very crucial for policy makers and curriculum developers to better understand how people are
accessing, adopting and using contemporary technologies in different contexts. Mutonyi and Norton further argue that since ICT is a major tool for bridging the gaps in knowledge and information, “such research should focus on what knowledge is sought … in each local community and how policy and curriculum can scaffold the knowledge acquisition process” (p. 206).

Mutonyi and Norton’s (2007) observation about the importance of empirical research is consistent with that of Snyder and Prinsloo (2007) who posit that understanding how people use ICT in local contexts provides insight into how ICT impacts people’s everyday lives. It can thus be argued that not having ICT infrastructure in schools and colleges may not necessarily mean that people are digitally illiterate because they might be having other forms of digital tools like mobile telephones, DVDs, digital camera and recorders in their homes and communities which if interrogated can inform how ICT initiatives can best be configured. Therefore, if ICT integration is to take root in African educational contexts, there is an urgent need to foreground research as a crucial aspect of ICT intervention. Zlotnikova and Lubega (2009) echo the same sentiments when they argue that applying ICT in education has not been extensively considered during curriculum development in tertiary institutions in Uganda. They agree with Mutonyi and Norton’s (2007) view that there is need to cater for this existing gap in research.

Zlotnikova and Lubega (2009) further posit that Ugandan high education institutions do not currently have pedagogical capacity and experience to train teachers in ICT. Thus a consistent educational strategy taking into consideration local Ugandan conditions has to be developed. This can only be achieved through a better understanding of the ongoing ICT training programs in teachers colleges through careful interrogation of the ICT projects in the field. They are of the opinion that since there is great advocacy for use of technology for teaching and learning, there is need for proper training on how to use technology effectively by teachers. Before this can be done Zlotnikova and Lubega (2009) insist that, “we need to strategically understand the current state of technology integration
within the education for teaching and learning” (p. 5). In my view knowledge on how to use multimedia for teaching and learning is crucial. Identifying the knowledge possessed by the teachers in schools on how to integrate technology within their teaching is also crucial.

The failure of ICT and digital literacy to take root in Ugandan education broadly can also be attributed to the way ICT and digital literacy has been conceptualized by the promoters of ICT and digital literacy. As Andema (2009) has noted, in most cases the ICT trainings going on in schools and institutions of learning are guided by what Street (1984) refers to as the autonomous model of literacy where literacy is presented as if it were a set of decontextualized mechanical skills that can be transferred from the trainers to the trainees in a linear fashion after which the trainees can exhibit a predetermined social behaviour. Such a view of literacy does not recognize local practices as legitimate and seeks to impose notions of literacy that the local people may not easily relate to, as they may not address their real needs. Street (1984) contests this notion of literacy and argues that literacy is best viewed as situated, ideological, sociocultural practice that can potentially be used to dominate others. Thus, for digital literacy to meaningfully take root in Ugandan education, it must not only recognize local practices as legitimate and valued, but also prove to be of direct relevance to people’s local needs and aspirations. As long as people, particularly teachers, don’t see ICT and digital literacy serving authentic purposes in the local contexts, and enhancing their professional identities for the better, they might not necessarily be keen to take on these widely published modern technologies.

Such studies as that of Ogot and Akello (2010), which reports that tutors and students in Uganda considered themselves as not competent in the use of ICT and thus could not use basic computer application programs like word processing, spreadsheets, presentation tools and Internet, foregrounds issues of identity, investment and power which Norton (2000, 2010, in press) has ably articulated. Such identities of incompetence that the teachers have ascribed to themselves could
undermine their ability to meaningfully engage with digital technology and to be in a position to effectively impart digital literacy skills and knowledge to their learners.

An important implication of Norton’s notion of learners’ investment and identity in relation to ICT and digital literacy is that the ICT and digital literacy instructors need to help trainees to reclaim their identities of competence to be able to engage in ICT applications in meaningful ways. ICT instructors should also help teachers and teacher trainees to construct positive images of themselves to be able to confront the challenge of adopting modern technology for their professional practice. They should as much as possible build on the teachers’ and teacher trainees’ local digital practices with mobile telephone, camera and recorders to make them feel at ease with modern technology.

Several studies (Andema, 2009; Farrell, 2007; James, 2004; Mutonyi & Norton, 2007; USAID, 2006) have identified the lack of relevant resources from the Internet as one of the reasons for the failure of ICT to take root in schools and colleges in Uganda. According to James (2004), most of the content on the Internet is foreign in most local African contexts and therefore not relevant to the local situation. James suggests that the integration of ICTs into the school curricula requires stronger emphasis on development of school based content material that is more relevant to the local context. This is when the notion of community funds of knowledge becomes critical. With the rising demand for multilingual education and the introduction of the new Thematic Curriculum in Uganda, which emphasizes the use of local cultural resources like songs, stories, riddles and proverbs, through research and teacher development, teachers need to be encouraged and supported to use digital tools like digital cameras, recorders, to transport these local cultural resources from the local communities into the classroom for pedagogical reasons.

Many teachers and students possess a wealth of knowledge and expertise in community practices that could be creatively used to improve pedagogical practice. Others even have powerful phones with a range of digital applications that could be used to capture community practices for
classroom instruction but they have never thought of using these phones to enhance teaching and learning although they express concerns over the shortage of materials in schools. Ugandan teachers need to be encouraged to start thinking outside the box if they are to make the best use of ICT. It is time for us as Ugandan educators to start thinking globally and acting locally for our own benefit and survival in this rapidly changing global environment. One way of doing that is to use modern technology to transport community practices into the classroom to improve teaching and learning. As Dr. Mulira, the Minister of ICT in Uganda once explained in an earlier interview:

Technology is just a tool. On their own, they are of no use. The question is how do we apply them? How do we apply them in education and literacy? Education is so fundamental because today we are looking at the most fundamental requirement for national transformation and development to have educated human resource base” (Interview transcript, August 14, 2009).

However, on their own teachers might find it challenging to use digital resources to document and transport the community resources from the community sites into the classroom to improve teaching and learning as required by the new Thematic Curriculum in Uganda. For example, in her study on the use of cultural resources as pedagogical tools for language education in Uganda, Abiria (2011) found out that whereas the new Thematic Curriculum in Uganda encourages teachers to use local cultural resources like stories, riddles, proverbs, and songs as pedagogical tools, and whereas the use of the cultural resources had the potential to transform the dynamics of classroom profoundly, the teachers have not been adequately trained and supported to meaningfully use these community resources for educational change. Abiko further stressed the need to work collaboratively with the teachers to explore the use of modern technologies to transport the cultural resources from their original sites in homes and communities into the classroom to improve teaching and learning. In the spirit of working collaboratively with the teacher educators in Wati CPTC, my study focuses on
exploring the role that digital technologies and digital literacies can play in improving teaching and learning. It is in the same spirit that my study further seeks to examine the extent to which ICT policy has impacted curriculum development and classroom practice in rural Ugandan primary schools.

2.9 Chapter Summary

In this chapter I have explained the theoretical frame within which this study is located. I have explained that I subscribe to NLS theoretical frame which views literacy as a sociocultural practice. NLS theory asserts that literacy has multiple forms and it recognizes digital literacy as one of the many forms of literacy. The theory further argues that in order to better understand people’s literacy practices we must take into consideration the historical, social, cultural, political, and economic contexts within which a particular form of literacy is performed because they influence people’s literacy practices.

I have also explained that my analysis draws on Norton’s (2000) notions of identity and investment. According to Norton, learners have multiple identities that shift according to how a learner is positioned in socially constructed power relations. Norton explains that learners will normally become invested in learning when they believe that they will acquire a wider range of symbolic and material resources, which will in turn increase the value of their cultural capital and social power. Furthermore I have explained that my study also draws on the funds of knowledge theoretical perspective which views family and local community practices as valuable educational resources to improve pedagogical practice (Moll et al., 1992).

In addition to articulating the theoretical frame I have reviewed the literature on ICT integration in education ranging from global to local perspectives on the basis of which I have argued that ICT and digital literacy may have great potential for educational change, but the realization of that potential will largely depend on the dynamics of the local context. In the next chapter I proceed to explain the research methodology that I employed to collect and analyze the data that inform my research findings, conclusions, and recommendations.
Chapter 3: Research Design and Methodology

3.1 Introduction

Creswell (2009) defines research design as, “Plans and the procedure for research that span the decisions from broad assumptions to detailed methods of data collection and analysis” (p. 3), stressing that informing the decisions “should be the world-view assumptions that the researcher brings to the study, procedures of inquiry, and specific methods of data collection, analysis, and interpretation … the nature of the research problem or issues to be addressed” (p. 3). Likewise, according to Gibson and Brown (2009), research design can be thought of as “a matter of figuring out what kind of data is needed to answer a research question or set of questions, and specifying approaches for gathering or generating that data” (p. 47). In order to do this, Gibson and Brown explain, “researchers need to have a strong sense of their interests and analytic focus” (p. 47).

My interest in this study, as highlighted in chapter one under section 1.3, has been to better understand the role that digital technology and digital literacy can play in improving teacher education in a rural Ugandan primary teachers’ college; and to understand how ICT policy has impacted curriculum development in Ugandan education and classroom practice in rural Ugandan primary schools. To achieve my goal, I chose to frame my study broadly within a constructivist qualitative research paradigm (Chilisa & Preece, 2005) utilizing a descriptive case study approach (Duff, 2008; Yin, 1994) mainly because of its philosophical and methodological appeal to open ended research questions.

Qualitative research is anchored on the understanding that meaning is socially constructed by individuals through their engagement with the social world (Merriam, 2002). According to the proponents of a constructivist qualitative research paradigm, our goal as researchers should be to seek to understand the lived experiences from the point of view of those who live those experiences day by day (Ponterotto, 2005). In order to understand the role that digital technology and digital literacy can
play in improving teacher education in a rural Ugandan primary teachers’ college, I found it useful to frame my study within a constructivist qualitative research paradigm so as to achieve the five intellectual goals for which Maxwell (2013) asserts qualitative studies are especially suited for, namely: (1) understanding from the participants perspective, the meaning of events, situations, experiences, and actions they are involved in; (2) understanding the particular contexts within which the participants act, and the influence that this context has on their actions; (3) understanding the process by which events and actions take place; (4) identifying unanticipated phenomenon and influences and being able to modify the research focus during the study to pursue new discoveries and relationships; and (5) developing causal relationships – the actual events and processes that lead to specific outcomes Maxwell (2013). In that regard I specifically designed the study to be a case study.

3.2 Case Study Research

Yin (1994) defines case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident” (p. 13). Scholz and Tietje (2002) also define case study approach as “an empirical inquiry that investigates a contemporary problem within its real-life context” (p. 9). While Gibson and Brown (2009) posit that a case study is “a detailed exploration of a single case or of multiple cases” adding that a case “might be a single person, an institution, a profession, a role … its methods might involve, interviews, questionnaires, focus groups, document analysis or any other research method” (p. 48). I was interested in documenting the experiences of the teacher educators and the in-service teachers with the use of digital technologies as pedagogical tools in the college and school settings where those teacher educators and the in-service teachers normally work. A qualitative case study approach is useful for this kind of research because it emphasizes detailed description of a phenomenon within its natural context (Yin, 1994, 2003). Case study approach also encourages the use of multiple data sources, high degree of depth of analysis, and reflexivity during data collection and
fieldwork (Chilisa & Preece, 2005; Gibson & Brown, 2009). Before I proceed to describe the specific methods used for data collection and analysis, I will first describe the Ugandan system of education to provide the context within which the role that digital technologies can play should be understood.

3.3 Research Context

This study was broadly set in Uganda, a former British colony located in East Africa. Formal education was introduced in Uganda by the Christian missionaries and later taken over by the colonial administration and eventually passed on to the black administration at independence in 1962. The system consists of seven years of primary school, four years of lower secondary school, and two years of upper secondary school after which successful students can go to the university for three to five years of university education depending on the course one takes at the university. After completing senior four, commonly referred to as Ordinary level (O-level), students have the option of either proceeding to upper secondary, commonly known as High School Certificate (HSC) or joining a tertiary institution like a primary teacher training college, or a technical college. Those who successfully complete HSC may proceed to the university or join a national teachers’ college or other technical and/or vocational institutes although the desire of most students is usually to reach the university because of the privileges and benefits associated with university education like better prospect of employment and better salaries.

At the end of each level of education in Uganda, students have to sit for national examinations, which they must pass in order to proceed to the next level. One of the major concerns about the education system in Uganda has been that the system is too competitive and heavily examination oriented to the extent that teaching and learning are largely driven by the need to prepare students to pass the national examinations with good grades, instead of imparting the appropriate attitudes, values, knowledge, and skills to live productive lives after school (Ssekamwa, 2000; Republic of Uganda, 1992).
In July 1987 the Ugandan Government established an Education Policy Review Commission under the leadership of Professor Senteza Kajubi to undertake a comprehensive review of the system of education in the country with a view to formulating a new national educational policy to improve the quality of education, and make the Ugandan education more relevant to the needs and aspirations of the people of Uganda (Republic of Uganda, 1989). After working for one year, the commission presented its report to the Government. It was debated in cabinet and the national parliament culminating into the current national policy frame work commonly known in Uganda as “Government White Paper on Education Policy Review Commission Report: Education for national integration and development” that was published in 1992 (Republic of Uganda, 1992).

The new policy articulates the following as the national goals of the Ugandan education:

1. To promote understanding and appreciation of the values of national unity, patriotism, and cultural heritage, with due consideration of international relations and beneficial interdependence;

2. To inculcate moral ethical and spiritual values in the individual and to develop self-discipline, integrity, tolerance and human fellowship;

3. To inculcate a sense of service, duty and leadership for participation in civic, social, and national affairs through group activities in educational institutions and the community;

4. To promote scientific, technical and cultural knowledge, skills and attitudes needed to promote development;

5. To eradicate illiteracy and to equip the individual with basic skills and knowledge to exploit the environment for self-development as well as national development for better health, nutrition, and family life, and the capability for continued learning; and

6. To contribute to the building of an integrated, self-sustaining and independent national economy (The republic of Uganda, 1992).
The policy also emphasizes the importance of modern technology, stressing that: “in all future programs of designing curricula, the following are some of the important concerns which need to be reflected in the educational objectives and in curricula at various levels:

1. Scientific and technological orientation of education at all levels;
2. Development of the ability to use data and information for decision making” (The Republic of Uganda, 1992, p. 8).

In 1997, in order to address the challenges facing primary education and to promote the national goals of education, the Ugandan government took a bold decision to launch the UPE policy which effectively abolished the payment of school fees in primary schools and encouraged parents and guardians to send all school-going age children to school, particularly girls, orphans and children with disability. The results were phenomenal: Primary school enrolment rose from 2.5 million to 6.8 million in 2000 (MoES, 2001). By 2006 the gross enrolment ratio had reached 112.5 per cent.

However, by the time this policy was launched, the Government had not planned for this dramatic increase in school enrolment as the introduction of the policy in 1997 was occasioned by the pressure from the opposition leader Colonel Kiiza Besigye who promised to introduce free education for four children per family in lower primary if he was voted to become the president of Uganda during the 1996 presidential election. In order to counter Besigye’s popular appeal to the voters, the incumbent President Yoweri Museveni had to make a bigger pledge. He chose to offer free primary education as of 1997 if voted into office. When he won the disputed elections he had to honour his pledge to the voters. He therefore ordered MoES to proceed with the implementation of the UPE policy from 1997, despite the lack of resources to put in place the necessary infrastructure and recruitment of the necessary human resources.

Over the years a significant amount of resources have been invested in classroom construction, procurement of books and other instructional materials, as well as improvement of staff welfare. A new
curriculum, known as the Thematic Curriculum, which emphasizes the use of home language and local cultural resources in the lower grades, has also been introduced to improve teaching and learning. Other initiatives have been introduced to mobilize parents and communities to support the education of the parents in different part of the country.

Despite all these efforts, the Ugandan education is still characterized by low achievement. It is against such a background that the use of modern technology as pedagogical tools is being pursued to improve Ugandan education. According to the draft ICT policy in education dated 2005, ICT labs have been established in schools and colleges to promote digital literacy among students and staff to make the teaching and learning experience more exciting and rewarding to learners. This study focuses on the experiences of tutors with digital literacy in one primary teachers’ college as the main site and the experiences of teachers in two primary schools as complementary sites.

3.4 Site and Sample Selection

According to Stake (1995) our first obligation while selecting a site should be to understand that particular case and to maximize what we can learn from that case within the available time frame. Stake further explains that “our time and access for fieldwork is almost always limited” (p. 4) and if we can “we need to pick cases which are easy to get to and hospitable to our inquiry, perhaps for which a prospective informant can be identified and actors willing” to participate (p. 4). As highlighted in 1.1 above, the participant selection procedure for the present study was purposive (Duff, 2008) in that the research sites and research participants were selected because they were expected to provide rich information about the phenomenon under investigation.

3.4.1 Research sites. Dyson and Genishi (2005) posit that researchers make decisions about how to angle their vision on research sites, depending on the interplay between their own interests and the grounded particularities. Dyson and Genishi assert that any educational setting, whether that setting is a class, a school, a family or a community program is always flowing with rich human experiences
and with human stories. I was inspired to research on the role that digital technology and digital literacies play in improving teacher education in a rural primary teachers’ college by the personal stories that the teacher educators at Wati CPTC shared with me during a workshop that I attended in the college in 2010 (See Section 1.1 above). At that time an ICT lab had already been established at the college to promote digital literacy to improve teaching and learning. But the teacher educators had shown some reluctance in embracing ICT in their professional practice. Instead of seeking to understand why the teacher educators were not embracing digital technology, the college administration started blaming the teachers for not embracing digital technology. Yet from what the teacher educators told me, they had genuine reasons to explain their reluctance. As the blame game went on the ICT lab remained largely unused. I was keen to understand the nexus between ICT policy and professional practice and thought the college would provide an excellent case for interrogation.

Wati CPTC, the main site for my research, is located in Arua District in the West Nile region. Until one of the sons of West Nile by the name of General Idi Amin Dada became the president of the Republic of Uganda in 1971, West Nile had always been an insignificant and little known region in the national life of Uganda (Leopold, 2005). In fact it was only earmarked by the colonial government as a labor reserve for recruiting unskilled labor to work in sugar cane, coffee, and tea plantations, in the central region of Uganda (Ahluwalia, 1995, Drati, 1987; Leopold, 2005; Obetia, 2012. The rise of General Amin brought West Nile to the forefront of national politics in Uganda as he used his powers to appoint his kinsmen in top positions of leadership in the country (Leopold, 2005). Thousands of young people were recruited from secondary and primary schools to join the armed forces.

Since the overthrow of Amin in 1979 the political history of West Nile has been characterized by persistent armed conflicts, which have led to severe destruction of social and economic infrastructure including schools and hospitals (Leopold, 2005). To date West Nile has not yet recovered fully from the destruction of its educational infrastructure, which has in turn affected the quality of
education in the region at primary secondary as well as tertiary levels. UNEB (2010) puts all the West Nile districts ofAdjumani, Arua, Koboko, Maracha, Moyo, Nebbi, and Zombo among the worst performing districts in Uganda. The situation is made worse by the fact that West Nile has a predominantly poor peasant population, which survives on subsistence agriculture. According to the Uganda Bureau of Statistics (2012), 25 per cent of the total population, approximately eight million people, live below the poverty line of one dollar a day. A significant proportion of the poor people live in West Nile. The vicious cycle of poverty in most families makes it difficult for many parents in the region to provide for the educational needs of their children.

Wati CPTC is a government-sponsored college located approximately three kilometers from Arua Town. The college is part of Kyambogo University’s network of 48 primary teachers’ colleges that train teachers who teach in primary schools in Uganda. It was originally founded by the Christian missionaries to train vernacular teachers to teach their converts to read the bible and later on taken over by the government of Uganda to train teachers to teach in primary schools. The college offers a grade three teaching certificate which is the minimum requirement or qualification a person needs to be able to teach in a primary school in Uganda.

Wati CPTC has a student population of 450 and a staff population of 31 teacher educators/tutors. Nine of the teacher educators commonly known as pre-service tutors work with the pre-service students (teacher trainees) within the college while the other 22, known as coordinating center tutors (CCTs), work with in-service teachers in the outreach program under the Teacher Development and Management System program. The major role of the CCTs is to give continuous professional development support and mentoring to teachers already serving in schools. Some of the Ugandan teachers have not been formally trained to teach in primary schools, but were recruited to teach when there was an acute shortage of qualified teachers in schools particularly in the 1990s and have continued to provide useful service. These teachers are now being trained using the same syllabus

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designed for the pre-service students while they serve in the various schools in the different coordinating centers. They attend classes at their respective coordinating centers every weekend on Saturdays from 9:00 a.m. to 3:30 p.m. However, at school holiday time, they all converge at the college for ten days for a face-to-face residential training. At the same time the CCTs follow their students and teach them at the college during school breaks. While the pre-service students take two years to complete their teaching certificate course, the training for these in-service teachers takes three years. Besides the regular course the college also offers some basic training in ICT for both the pre-service and in-service students. Each student pays an additional fee of 30,000 Uganda shillings (approx. $15) per student per year for ICT training.

The study had other two complementary sites. These were Obizea Primary School and Aramua Primary School (pseudonyms), both under Obizea Coordinating Center, which is one of the coordinating centers operating under Wati CPTC in-service program. The schools are located in rural areas and they operate under the UPE policy and the Thematic Curriculum. They have large number of students, inadequate infrastructure and shortage of instructional materials. The relationship between the Wati CPTC, the coordinating centers and the schools is as shown in Figure 3.1.
Wati CPTC is one of the few in Uganda in that has an ICT lab. It has been established to equip teacher trainees and staff with computer knowledge and skills. The lab was established in 2005 through collaboration between the MoES, the college administration and the students. In that collaboration the Ministry provided the initial computers for establishing the lab and offered to pay salary for a lab attendant/ICT instructor, the college administration provided a room to house the lab while students agreed to pay 30,000 Ugandan shillings (approx. $15) per student per year for maintenance and running costs. Since its establishment in 2005, no research has ever been done on the extent to which the ICT lab is contributing to digital literacy development and meeting the educational needs of the target group. The lab had the following equipment at the ICT lab (see Table 3.1).
Table 3.1. List of available equipment in the ICT lab.

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Computers</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Computer monitors</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Keyboards</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>External mouse</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Printers</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Uninterruptable power supply (UPS) units</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>Central processing unit (CPU)</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>Extension cables</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>DSM4 landline telephone</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>eGranary</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Laptop</td>
<td>1</td>
</tr>
</tbody>
</table>

In addition to the equipment that existed in the ICT lab, I brought to the sites fourteen digital cameras, four digital voice recorders, three small laptops, and three eGranaries to facilitate the participants’ engagement with the digital resources. I provided each of the participant tutors with a digital camera and asked them to share the rest of the resources from the ICT lab. I took two digital cameras, two digital voice recorders and one laptop with a modem for wireless internet connection to Obizea Coordinating Centre for the four teachers from Obizea and Aramua primary schools to share for their lesson preparation and presentations.

3.4.2 Research participants. There were a total of 14 core research participants involved in this study. These included nine pre-service tutors – tutors who teach pre-service students. Pre-service
students are those students who joined college immediately after completing secondary school and who have never been teachers before. The pre-service tutors live in staff houses within the college. The pre-service tutors who participated in this research were purposively selected to participate in this study because they stay at the college, they teach in the regular program, they have lessons every week with pre-service students and they can use the ICT lab on daily basis. However the core research participants also included one CCT who is not a pre-service tutor. The CCT whom I selected to participate in this study is a center coordinating tutor in charge of Obizea Coordinating Center to which the two complementary sites of Obizea and Aramua primary schools belonged.

My participants also included two primary school teachers (both female) from Obizea Primary School and other two (both male) from Aramua Primary School. These four teachers had all participated in a related study carried out by our UBC research team. I found it convenient to include these teachers because of the professional relationship that we had already established with them. I did not want to behave like a research tourist who, after collecting data from participants, never cares to go back to give feedback or establish lasting relationships. I would like to have long-term professional relationship with these teachers who have shown great interest in our research work. Most importantly, I included the two primary schools and the four teachers in the study in order to gain a more nuanced understanding of how the actual implementation of the ICT policy impacts classroom practices at the grassroots level. I thought that involving the primary school teachers would further enrich my understanding of the challenges and possibilities associated with converting a macro educational policy into regular educational practices at a micro level. Indeed going to these schools, working with the teachers, observing the classes and discussing with the teachers my observations considerably enhanced my understanding of the interaction between policy and practice in local contexts.
The names (pseudonyms) and profiles of the research participants are as shown in Table 3.2 below.

**Table 3.2. Names and profiles of research participants.**

<table>
<thead>
<tr>
<th>Tutor/teacher</th>
<th>Gender</th>
<th>Age</th>
<th>Post-secondary education</th>
<th>Role at PTC</th>
<th>Years of teaching</th>
<th>Prior Formal Training in ICT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorcus Anderu Abiko (tutor)</td>
<td>Female</td>
<td>34 yrs.</td>
<td>MA (Literacy Education), BA (Education)</td>
<td>CCT, Obizea Coordinating Center</td>
<td>7 yrs.</td>
<td>None (self-taught)</td>
</tr>
<tr>
<td>Nelly Cadria (tutor)</td>
<td>Male</td>
<td>44 yrs.</td>
<td>MA (Counselling Psychology), BA (Sociology &amp; History)</td>
<td>Tutor, Pre-service program</td>
<td>15 yrs.</td>
<td>Yes (did ICT as a course unit during his MA in Nairobi, Kenya)</td>
</tr>
<tr>
<td>Jokindu Alidipi (tutor)</td>
<td>Male</td>
<td>44 yrs.</td>
<td>BA (Theology), Post Graduate Diploma (Teacher Education)</td>
<td>Tutor, Pre-service program</td>
<td>5 yrs.</td>
<td>Yes (attended an ICT training workshop in Wati CPTC)</td>
</tr>
<tr>
<td>Bella Angualiru (tutor)</td>
<td>Female</td>
<td>33 yrs.</td>
<td>BA (Education), Post Graduate Diploma (Teacher Education)</td>
<td>Tutor, Pre-service program</td>
<td>5 yrs.</td>
<td>Yes (did ICT as a course unit during graduate studies)</td>
</tr>
<tr>
<td>Sally Angucia (tutor)</td>
<td>Female</td>
<td>58 yrs.</td>
<td>BA/Education Diploma (Teacher Education)</td>
<td>Tutor, Pre-service program</td>
<td>38 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>Maratino Uckokonyakua (tutor)</td>
<td>Male</td>
<td>45 yrs.</td>
<td>Diploma (Education)</td>
<td>Tutor, Pre-service program</td>
<td><strong>5 yrs.</strong></td>
<td>Only for this research project</td>
</tr>
<tr>
<td>Rikido Anicua (tutor)</td>
<td>Male</td>
<td>44 yrs.</td>
<td>Diploma (Education), Certificate (Education)</td>
<td>Tutor, Pre-service program</td>
<td>18 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>Mundumundu Ruzalia (tutor)</td>
<td>Male</td>
<td>43 yrs.</td>
<td>Bed., DTE Certificate (Education)</td>
<td>Tutor, Pre-service program</td>
<td>22 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>Okuvua Mudea (tutor)</td>
<td>Male</td>
<td>52 yrs.</td>
<td>Diploma (Education), Certificate (Education)</td>
<td>Tutor, Pre-service program</td>
<td>32 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>Tutor/teacher</td>
<td>Gender</td>
<td>Age</td>
<td>Post-secondary education</td>
<td>Role at PTC</td>
<td>Years of teaching</td>
<td>Prior Formal Training in ICT</td>
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</tr>
<tr>
<td>Owini Atonio Anuwara</td>
<td>Male</td>
<td>40 yrs.</td>
<td>BA (Education), Diploma (Education)</td>
<td>Tutor, Pre-service program</td>
<td>15 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>(tutor)</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nanaru Bingararu</td>
<td>Female</td>
<td>37 yrs.</td>
<td>Diploma (Special Needs Education), Certificate</td>
<td>Teacher, Obizea Primary School</td>
<td>16 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>(teacher)</td>
<td></td>
<td></td>
<td>(Primary Education)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abazoa Saverio</td>
<td>Male</td>
<td>35 yrs.</td>
<td>Certificate (Primary Education)</td>
<td>Teacher, Aramua Primary School</td>
<td>6 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>(teacher)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Robaa Abirimamazo</td>
<td>Male</td>
<td>30 yrs.</td>
<td>Certificate (Primary Education)</td>
<td>Teacher, Aramua Primary School</td>
<td>6 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>(teacher)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dricingaru Betina</td>
<td>Female</td>
<td>45 yrs.</td>
<td>Certificate (Primary Education)</td>
<td>Teacher, Obizea Primary School</td>
<td>15 yrs.</td>
<td>Only for this research project</td>
</tr>
<tr>
<td>(teacher)</td>
<td></td>
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</table>

3.5 Methods of Data Collection

3.5.1 Key informant interviews.

3.5.1.1 National experts. The researcher used a one-page interview protocol to hold nine key informant interviews with senior persons holding important positions in the government to get their perspectives on the national vision for ICT integration and the state of ICT in the country broadly, and ICT integration in education specifically. These individuals, who were purposively selected by virtue of the privileged positions they hold in their respective ministries and institutions, included: the Minister of ICT; the Permanent Secretary at the Ministry of ICT; the Director at the Directorate of Basic & Secondary Education; a senior information scientist at MoES. The national experts also
included the Assistant Commissioner at the MoES; the Academic Registrar at Kyambogo University; the director at the NCDC; and the Local Language Specialist at the NCDC. The interviews were initially planned to last for 30 minutes only. However, in practice the interviews lasted from 10 minutes to 55 minutes, resulting in 4 hours and 35 minutes of recorded data that were transcribed and analyzed to provide a better sense of the national context of ICT application.

There was a range of reasons for the variation of the time the interviews took. For example, while my interview with the ICT Minister was planned to last for 30 minutes, in fact the interview only lasted approximately 10 minutes because the Minister had an emergency to make a presentation to a committee of parliament at around the same time that the interview had been scheduled. On the other hand, whereas my interview with the Permanent Secretary for the ICT Ministry was scheduled to last for only 30 minutes, in fact the interview lasted approximately one hour, because the discussions became so interesting for the Permanent Secretary and I that he even decided to delay a meeting he was scheduled to chair by more than thirty minutes. Even when I suggested that we could bring the interview to an end to allow him go for his meeting he insisted that we should go ahead with the discussion because he felt the issues we were discussing were very important to him and his Ministry. He even had to forego lunch, which had been served for him on his table. I was really humbled by the Permanent Secretary’s commitment and the importance he attached to my research.

3.5.1.2 Local educational experts. In order to have a better sense of the local context, efforts were made to interview local experts who understand the local situation. The local experts that I interviewed included the District Education Officer (DEO) of Arua District and the Principal of Wati CPTC. I also had informal interactions with many other local leaders; although these did not constitute a major part of my data, they still contributed to my understanding of the wider context.

3.5.1.3 Focus group with cultural leaders. I held a focus group meeting with cultural leaders instead of having individual interviews on the advice of the chairman of Lugbara Agofe (Lugbara
Cultural Institution) who explained that the Lugbara cultural protocol demands that issues concerning community perspectives on culture, education, and technology are best discussed when a group of elders sit together to address them. The chairman took the responsibility to identify the participants for the meeting. These included the Minister in charge of Culture and Tradition in Agofe, the Prime minister, and the spokesperson for the Agofe. The interview took place on the 19th of May 2012 at Wati CPTC. The “Agofe” did not attend the meeting due to ill health, but he sent in his apologies. The discussions were based on a one-page interview protocol seeking to understand the historical, social and cultural context in which the study was carried out. The discussions also provided useful insights on the elders’ views regarding community resources and the use of digital technologies to promote Lugbara culture and modern education. They also provided insights into the changes that have taken place in the Lugbara community and how those changes have influenced the way the Lugbara respond to external forces.

3.5.2 Questionnaires.

3.5.2.1 Tutor questionnaire. I administered two sets of semi-structured questionnaires to nine pre-service tutors who were purposively selected based on the fact that they had regular lessons with students at the college every week, unlike the in-service tutors, commonly called CCTs, who usually stay in their coordinating centers and came to the college on rare occasions. However, one CCT was included among the core research participants based on the fact that she coordinates the center where Obizea and Aramua Primary Schools – my complementary research sites - are located, and she also taught in the pre-service program. Another reason for having nine research participants was to ensure that a wide range of curriculum subjects were included. One set of questionnaires was administered at the beginning of the study and another towards the end of the study. The first set of questionnaires mainly sought to establish the teacher educators’ professional background, their familiarity with digital resources, and their readiness to participate in the study. The second set of questionnaires sought to
obtain further insights from the participants on their experiences with the use of digital and community resources as the study progressed. Further it sought to get their final thoughts about the project and their plans for the future.

3.5.2.2 Teacher questionnaires. Two sets of questionnaires were administered to all the four teachers purposively selected from the complementary research sites of Obizea and Aramua Primary Schools. One set of questionnaires for the teachers was administered at the beginning of the study and the other towards the end. The first set of questionnaires captured information on the teachers’ bio data and professional background, including their familiarity with digital resources. The second set allowed participants to share their experiences with the use of digital and community resources during the research period. It also sought to get the participants’ final thoughts about the study and their plans for the future.

3.5.3 Focus group meetings with core research participants. I held two focus group meetings with the core research participants at Wati CPTC ICT lab. I held the first focus group on April 19th, 2012 and the second in August 2012. The discussions were tape recorded and transcribed for analysis. During the focus group meetings, participants shared with me their experiences with the use of digital technology and community resources. The focus group meetings were useful to corroborate the data obtained from questionnaires and lesson observations. They allowed participants to express views they could not express in writing. It also enhanced team spirit among research participants and with the research team. It also helped to generate constructive discussions on topical issues that needed to be corroborated through group discussion. Furthermore, it was useful in building trust and good working relationship with the participants.

I held one important focus group meeting with the four teacher participants from Aramua and Obizea primary schools on May 30, 2012, at Aramua Primary School. This focus group meeting was attended by Professor Bonny Norton, one of my co-supervisors from the University of British
Columbia who had paid a visit to the site to observe for herself how the teachers were using the digital resources and how the use of the digital resources was impacting classroom practices. During the focus group meeting, we asked the teachers to tell us how the use of digital resources was impacting their classroom practices and their relationships with the local community. We also asked them to share with us the challenges that they encountered while trying to use digital technologies in the local context, and any suggestions that they might make to address such challenges. Participants responded to the questions thoughtfully and with rich insights which further enhanced my understanding of how the ICT policy was impacting classroom practices in the local contexts.

3.5.4 Lesson observations.

3.5.4.1 In-class observations. Lesson observation was a major source of my data collection method both at the college and the two primary schools. It involved working collaboratively with research participants to plan lessons, take pictures, record videos, upload locally generated content, search the Internet, and set up equipment in class before sitting down to observe the lessons from a strategic location in the classroom. I observed at least two lessons from each research participant and took notes during lesson observations. I took pictures of interest to me during lesson presentations and recorded all the lessons on tape for transcription. In the evening I retreated to my reading room at home to write reflections and updates on the lessons observed. Although I observed many lessons, in chapter four which focuses on digital literacy and teacher education, I will mainly draw on data from six selected sample lessons. The selection of the six lessons was based on two key principles, (a) inclusion of all the PTC curriculum subjects and (b) coverage of a wide range of themes and topics. In chapter five, which address issues of policy and classroom practice, I will present one sample lesson and draw more on the collection and analysis of artefacts, the common narrative among the national experts, and the teachers’ personal comments about their classroom experiences.
3.5.4.2 Post-lesson interviews. I held a 30-minute post-lesson interview after every lesson that I observed in all the sites. These interviews were tape-recorded for transcription and analysis. I transcribed 16 post-lesson interviews. I made sure the entire transcripts were typed. The post-lesson interview transcripts were analyzed to identify themes and patterns to draw conclusions. The transcriptions yielded useful data on issues such as changes in classroom interactions, community school relationships, validation of local knowledge, and identity shifts. The post-lesson interviews enabled me to follow-up on the key issues that I identified during lesson presentations. Through these post-lesson interviews I was able to seek immediate clarifications from the tutors and teachers on some of the issues that might not be clear to me during class presentations. They also enabled me to provide the participants with some kind of feedback. It allowed participants to seek my comments on their presentations with a view to identifying the most exciting aspects of their presentation and those that needed some improvement. Whenever possible we discussed strategies for improvement. Participants found the post-lesson discussions very useful as they helped them gain confidence and improve in their presentations.

3.5.5 Analysis of documents and artefacts. I also collected and analyzed artefacts and documents as background checks to understand the research context and to complement the primary data that I collected through interviews, questionnaires, and lesson observations. The documents I analyzed included: The national ICT policy for Uganda (Republic of Uganda, 2003), Information Technology policy for Uganda (Ministry of Information and Communications Technology, 2012), ICT policy in education (Republic of Uganda, 2005), Funding and Implementing Universal Access: Innovations and experiences from Uganda, by Uganda Communication Commission, and the Ministerial Policy Statements from both MoES and MoICT. I also analyzed the National Council for Higher Education reports on the state of higher education in Uganda, UNEB reports on national assessment of progress in education for primary and secondary schools. During the course of my
fieldwork, I also examined the Thematic Curriculum, particularly for lower primary classes, and reviewed relevant newspaper articles from national dailies (New Vision, Daily Monitor, The Observer, and the Independent Magazine).

3.5.6 Workshops.

3.5.6.1 Workshop at the Ministry of Education and Sports. A crucial stakeholders’ workshop was organized on June 7, 2012 at the MoES boardroom, ministry headquarters, Kampala. It was officially opened by John Chrysostom Muyingo, the Minister of State for Higher Education, who represented the Minister for Ministry of Education and Sports. During his official opening speech the minister expressed his gratitude and support towards the workshop and he said

As a ministry, we believe that the creation of a practice and user platform to help create knowledge from evidence as demonstrated through such workshops is crucial and must be encouraged and supported at all times (Muyingo, personal communication, June 7, 2012).

The minister explained that the focus of my research on ICT integration in Ugandan education was timely. According to the minister the workshop had come at a time when the government of Uganda in general and the Ministry of Education and Sports more specifically was “grappling with how technology could best be promoted to transform the education system and improve educational standards” (Muyingo, personal communication, June 7, 2012).

The minister’s comments underscored the importance that the stakeholders attached to the workshop which was attended by 27 participants who were carefully selected from MoES, universities and research institutions, educational NGOs, community based organizations (CBOs), and civil society organizations. The workshop had multiple objectives. These included: (1) creating a platform for our research team, including my supervisors from the University of British Columbia, to interface with policy makers, technocrats and other stakeholders; (2) updating the policy makers and technocrats about our collaborative research work in Uganda; and (3) seeking participants’ perspectives about the
ICT policy, its implementation, the challenges and possibilities associated with the implementation of the ICT policy. Specifically, I wanted to know the participants’ perspectives about the ongoing ICT and digital literacy initiatives in the country to further enrich my understanding of the national digital literacy context, particularly regarding the use of digital technology as pedagogical tool.

During the discussions several participants appreciated government’s effort to promote technology in schools and other institutions of learning. However, they noted that despite the efforts, ICT integration - particularly its integration as pedagogical tool to improve teaching and learning had not been given sufficient attention. Participants held the view that in order to address the declining educational standards in Uganda (UNEB, 2011; Uwezo Uganda, 2012) there must be a shift in policy to emphasize the use of ICT and digital literacy as pedagogical tool instead of teaching it as a curriculum subject. The policy makers too agreed with participants’ view that less progress has been made towards ICT integration as a pedagogical tool. While giving an overview on ICT and digital literacy integration in Ugandan education at the conference, Humphrey Mukooyo, the assistant commissioner, Communications Information Management, MoES also noted

Despite evidence that the use of ICT as pedagogical tool improves the teaching and learning process as well as the motivation to learn, progress towards ICT integration [as pedagogical tool] is quite slow. Low access levels and poor Internet connectivity, coupled with inadequate training of teachers and the whole range of attitudes about computers has adversely affected the utilization of ICT for pedagogical purposes in Ugandan institutions. ICT is mainly viewed by many institutional mangers and educators as a tool to improve administration (Mukooyo, personal communication, June7, 2012).

Mukooyo concluded his presentation with a strong appeal for government to demonstrate leadership in investing in ICT and teacher training in order to realise the national goal of using ICT to achieve social transformation and national development
Government should take a leading role in equipping the institutions it supports with adequate ICT to realize its long-term vision of providing quality education. Without heavily investing in equipping schools and training teachers, it is difficult to envision how Government will use ICT as the most powerful tool for modernization and development (Mukooyo, personal communication, June 7, 2012).

It also emerged during the discussions that research had not been given adequate attention in Uganda’s strategy to promote ICT integration in Ugandan education. Participants noted that there was need to establish strong research networks to push for the prioritisation of the research agenda to drive evidence based policy for ICT and digital literacy integration in Ugandan education. Their concern regarding the need for evidence based interventions resonates well with a view expressed by the minister of state for higher education who had said during the official opening of the workshop “We are in need of more evidence based data to inform ongoing policy and curriculum reforms to improve the quality of education in the country” (Muyingo, personal communication, June 7, 2012).

3.5.6.2 Community workshop in Arua. Another workshop was organized for the local community stakeholders within Arua District in September, 2013. The main purpose of that workshop was to show case to the local community stakeholders the interesting work that the teacher educators are doing with the use of digital technologies and community resources to improve pedagogical practice at the college. The mistake many researchers have made has been to alienate the local community from their studies (Chilisa & Preece 2005). I was keen to avoid that mistake. Instead, I wanted the local community to be involved and to feel a sense of ownership of the initiative. The workshop was officially opened by the area Member of Parliament who made a contribution towards the purchase of an LCD projector for the college in appreciation for the work the tutors are doing to improve teacher education. It was attended by about 70 participants, including principals and deputy principals from Gulu and Kitgum PTCs, district education officials from Arua District and the
neighbouring districts, cultural leaders, religious leaders, local business community, members of Board of Governors of the college, and students and staff at the college. Participants appreciated the workshop. They have continued to thank us for the work we are doing at the college. In November 2013 I received an email from one of participants who had this to say:

Hello Sam,

Happy New Year, it has been long since we met for the other one day workshop you organized in Arua. It was marvelous [sic] and educative. I personally liked it and have tried to implement it back home here at Cakula PTC [pseudonym] Gulu, but still face challenges on the IT [information technology] equipment which seems to be so scarce and expensive, but with time I believe, we shall catch up with the situation. Otherwise how is the going, and Wati core PTC? Any new project [plans] so far? I will still communicate to you more. I wish you all the best in this year. God Bless you. Vincent [pseudonym].

The workshop was covered by many local FM radio stations for many days. This has triggered a series of events. For example, the principals of Gulu and Kitgum PTCs want tutors from Wati CPTC to go and train their tutors on the use of digital technologies. Secondary School has invited tutors from Wati CPTC to go and train their teachers on the use of modern technologies to improve teaching. They have had a nice ICT lab for more than year, but the teachers never use the ICT lab. The headmistress of Arua Hill primary school asked me to write a proposal for them to establish a computer lab, which I did. They have presented the proposal to a company that has agreed to help them establish a computer lab. On the day I was leaving home to travel to Kampala and eventually to Canada, an elder from Okuvu Church came to my residence early in the morning to tell me about a storytelling session they were organizing for young people in the church. They wanted me to video record the performances so that the stories would later on be transcribed and published into booklets in local languages for use in
schools. I have heard of plans from some organizations to plan training sessions for their staff. The tutors in Wati CPTC will be the ones to provide the trainings. On March 22, 2013, I received an email from Nelly Cadria, the ICT head of department at the college, stating that tutors at the college were invited by Arua District Secondary School Head Teachers’ Association to make a presentation on the use of digital technology in classroom instruction during their 7th Annual General Meeting. According to Nelly, the head teachers were “amazed, astonished, impressed, and longed for more presentations”. He further reported that The Agha Khan University has approached the college with plans to start early childhood education, language development and ICT integration in collaboration with the college. The pace at which events are unfolding is faster than I could anticipate.

Others have chosen to use social media like LinkedIn and Facebook to express their interest in our digital literacy research project at Wati CPTC. For example, on July 14th, 2013, a lady working with UNICEF project called Volunteer Service Over Seas (VSO) based in Karoli PTC (Pseudonym) in Eastern Uganda sent me the following post via LinkedIn social media:

Hello Sam, I read your recent post in relation to education and technology. I wonder if you are working with Wati CPTC as they seemed to have something interesting happening there on ICT, which I wanted to follow up. I visited the day before there was to be a presentation but my program did not allow me to stay over. I hope to return before term II ends. I am based in a Core Primary Teachers’ College... I had a Flip camera which I was using to record aspects of school visits but knew that we could go no further until some ICT skills were actively developed amongst CCTs and pre-service tutors, principally.

When I visited Wati one of the pre-service tutors took her camera out of her handbag and explained what they were doing in a very positive way. We used the clip of her speaking as part of our termly program review. I would be interested in any preliminary reports, which you have prepared as my placement ends in a few months and I am trying to think about the best
ways to sustain the developments that we have made. I also found your comment about equipment interesting… We were able to update the lab - not replace the kit. We were also able to buy three Flip cameras, a laptop, data projector and two ITB extension drives as storage quickly became an issue (Polines [pseudonym], 14/7/2013)

Such comments highlight the interest that the digital literacy research project at Wati Core Primary Teachers’ College has generated within Arua District and other parts of Uganda. It shows the possibilities for the project to be replicated in other parts of Uganda.

3.6 Timeline.

The data collection process which lasted from September 2011 to January 2013, approximately 15 months was divided into four phases:

**Phase I: September – December 2011**

- Prepared research proposal;
- Prepared research instruments;
- Obtained ethics approval;
- Collected documents and artefacts for review and analysis;
- Received research equipment (digital recorders, digital cameras, eGranary, small laptops) to take to Uganda;
- Travelled to Uganda to embark on field work;
- Made contacts with principal Wati CPTC, the “gatekeeper” to the research site;
- Discussed and reviewed research plans with college administration;
- Made arrangements for expert interviews;
- Recruited participants and signed consent forms;
- Administered first set of questionnaires;
• Held expert interviews;

• Had a training workshop for research participants on the use of the digital resources.

**Phase II: January 2012 – May 2012**

• Began the most intense fieldwork period with core research participants;

• Observed lessons in class;

• Did post-lesson discussions with core research participants;

• Trained focal research participants on how to write reflections on the experience with the use of the digital technologies;

• Did focus group meeting with research participants.

**Phase III: June – September 2012**

• Continued with lesson observations;

• Carried out post-lesson observations;

• Held focus group meetings;

• Administered second set of questionnaires;

• Had a stake holders’ workshop with national experts in Kampala;

• Had a local community stakeholders’ workshop in Arua.

**Phase IV: October–January 2013**

• Organized raw data into files and folders;

• Transcribed recorded data;

• Wrote reflections;

• Analyzed data;

• Reviewed further literature

• Travel back to the University of British Columbia to embark on my thesis writing

• Wrote and revised draft dissertation
• Put dissertation in final form for submission to the Faculty of Graduate & Postdoctoral Studies.

3.7 Data Analysis

For my analysis I found it appropriate to adopt thematic analysis approach (Gibson & Brown, 2009). In this approach the analysis is guided by three considerations, namely the examination of commonalities, the examination of differences, and the examination of relationships across data sets. I used the teacher educators’ digital literacy practices as my unit of analysis and I examined each data set carefully to identify common themes for categorization and sub-categorization in relation to each of my research questions. For example, with respect to my first research question regarding the role that an ICT and digital literacy can play to improve teaching and learning, I examined participants’ digital literacy practices to identify common themes in each data set and gave them codes. In addition to looking for commonalities I also looked for distinctive features across a data set. My aim here was to identify peculiarities and contrasts within a data set and across data sets to be able to determine their relevance to each of my research questions. Finally, I examined the relationships between the various elements of the data sets and used triangulation to draw conclusions.

3.8 Trustworthiness of the Study

According to Yin (2003) the quality of any given research can be judged on the basis of its trustworthiness. Regardless of their theoretical orientation, several scholars recognize trustworthiness as an important consideration in social science research (Duff, 2008; Stake, 1995; Yin, 2003). Chilisa and Preece (2005) view trustworthiness as the confidence that researchers and the consumers of research place in the procedures used in gathering data, the data collected, its analysis and interpretation, and its findings and conclusions. In this study several strategies were used to address the question of credibility and trustworthiness of the study. The first strategy was prolonged time in the field and engagement with participants, which according to Chilisa and Preece (2005) is “important in enhancing the credibility of a study” (p. 166). I spent a total of 15 months in the field, working
collaboratively with the research participants. This gave me ample time to establish rapport with the participants, build trust in each other, and observe salient issues, notice trends, and patterns being repeated. Creswell (2009) recommends spending prolonged time in the field as means of increasing the credibility of research findings. He stresses that:

The researcher develops an in-depth understanding of the phenomenon under study and can convey detail about the site and people that lends credibility to the narrative accounts. The more experience that a researcher has with participants in their actual setting the more accurate or valid will be the findings (Creswell, 2009, p. 192).

The second strategy that I employed to increase the credibility and trustworthiness of the present research was the use of triangulation. According to Chilisa and Preece (2005), “triangulation is another strategy for enhancing the credibility of a study … based on the assumption that the use of multiple methods, data sources … can eliminate biases in the study” (p. 167). Creswell (2009) takes a similar stand regarding the importance of triangulation for enhancing the trustworthiness of a study, and argues that, “If themes are established based on converging several sources of data or perspectives from participants, then this process can be claimed as adding to the validity of the study” (p. 191). As described in Section 3.5, I above, used multiple methods to collect multiple types of data from multiple sources, which made it possible for me to evaluate my evidence and corroborate the information from different sources before drawing conclusions.

I also used member checks (Creswell, 2009; Chilisa and Preece, 2005) to enhance the trustworthiness of the present study. This involved verifying with the research participants themes and patterns that are developing as data are collected and analyzed. For example, during interviews I would summarize what has been said and ask the interviewee to confirm if my summary accurately reflects what the person has said. I held two stakeholders workshops, one at the MoES head offices in Kampala, and another at the research to present preliminary findings of the study and seek their
comments and further input to my understanding of the issues emerging from the study. In a few cases, I sent extracts from interview transcripts to research participants for them to confirm the transcripts accurately reflected the views they expressed during the interview and I allowed them to make any necessary corrections. For example, the permanent secretary at the ICT ministry, the head of department for Literature Department at Kyambogo, and the head of department for ICT at Wati CPTC read through copies of extracts from the interviews that I held with them and made appropriate revisions with respect to how they would like to be quoted, spelling of their names, and punctuation marks. I also shared the draft report with research participants and asked for their final input before I produced the final copy of my dissertation.

3.9 Ethical Considerations

Standard practice requires professional bodies to provide guidelines for researchers to follow in the design and conduct of research in their disciplines (Gibson & Brown, 2009). In order to ensure that the study complies with ethical standards, this research had undergone an ethics review process of the University of British Columbia, which was approved on July 11, 2011 under Behavioural Research Ethics Board (BREB) number H11-01099. The application for ethical review and the research documents were all reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects. As a graduate student, I worked closely with my co-supervisors Dr. Bonny Norton and Dr. Margaret Early and supervisory committee member, Dr. Maureen Kendrick, who are experienced researchers based in the Department of Language and Literacy Education, University of British Columbia. They did not only stress the importance of following the ethics guidelines as expected, but they also conducted site visits to Uganda, and confirmed that the ethical standards were followed.

I made sure that all the research activities that I involved the research participants in constituted regular activities in the daily lives of the tutors and the in-service teachers, for whom professional
development was a recommended practice. What was potentially going to be inconvenient for both sets of participants was being interviewed about their experiences with digital resources and the possibility for the teacher educators, in particular, to be unsettled by the classroom observations. To address that concern I made every effort to reassure the participants that I was not evaluating them, but rather investigating the possibilities and challenges of using digital resources. I assured them of my support throughout the duration of my study. They understood me and all went well.

In line with standard practice, my research participants were all informed of the purpose of the study, the study procedures, duration of the study, their rights and responsibilities right from the beginning of the study. They were informed of their right to refuse to participate and to withdraw from the study at any time without any consequence. They were told if they had any questions or concerns about the study I would be available to listen to them and attend to their problems. They were also provided the contact addresses for my supervisors in case they had questions or concerns about the study that I could not address myself. Further, they were informed that if they had any concerns about their treatment or rights as research subjects, they could contact the research Subject Information Line in the UBC Office of Research Services. I asked them to freely decide whether I should use pseudonyms or their actual names to refer to their comments. They all signed for me to attribute their comments to their real names.

A potential challenge that I had to deal with was that Dorcus Anderu Abiko, one of my focal research participants is my wife which could potentially affect our researcher – participant relationship. Luckily, Dorcus is an experienced tutor. She understands the teachers’ code of contact and professional ethics which emphasizes the importance of drawing a distinction between private life and professional practice. As a former UBC graduate student, she has also done a tutorial on behavioural research ethics guidelines, and she understands the human ethics application process and the need to uphold ethical standards. We agreed to maintain a distinction between our marriage relationship and my research
work. The administration of the consent forms, the questionnaires, the interviews and the focus group discussions were all done at the research site. Strict confidentiality was exercised in the collection, storage and use of the data accruing from the research. Personal information was further protected through the use of pseudonyms to safeguard the identity of the subjects. At home, the data were kept under lock in a room set aside for my research work. Further, to limit unauthorized access to the data files in my laptop, I kept all the computer files with information on the study under password protection.

3.10 Reflexivity

Reflexivity is an important issue in social science research. Gibson and Brown (2009) define reflexivity as “the process of reflecting on the role of the researcher in the construction of meaning, and, critically of data” (p. 8). Chilisa and Preece (2005) view reflexivity as a strategy to help ensure that the over-involvement of the researcher is not a threat to the credibility of the study. Reflexivity from Chilisa and Preece’s (2005) perspective refers to “the assessment of the influence of the researcher’s background ways of perceiving reality, perceptions, experiences, ideological biases and interests during research” (p. 168). Hammersley and Atkinson (2007) hold a similar view and add that the orientation of researchers will always be shaped by their socio-historical locations, including the values and interests that these locations confer upon them. It is therefore important for us to always be transparent about the positions we take during the research process and how those positions impact our analysis and interpretation of the data that we collect and the conclusions that we draw.

In that regard, the approach that I took in this study was that of being a participant observer. Yin (2014) describes participant observation as “a mode of data collection whereby a case study researcher becomes involved in the activities of the case being studied” (p. 2040). Being a participant observer enabled me to work collaboratively with my research participants during lesson preparations and presentations. I supported the tutors and teachers whose practices I was investigating in drawing their
schemes of work and lesson plans, going out into the community to record community practices, uploading the local content onto the computer for presentation, and setting up equipment during lesson presentation. Positioning myself as a participant observer enabled me to gain an insider perspective of the digital literacy practices of the research participants.

I subscribe to the view that social research is not a neutral activity that can be carried out in some autonomous realm that is insulated from the wider society and from the biography of the researcher in such a way that its findings can entirely be unaffected by social processes and personal characteristics (Hammersley & Atkinson, 2007). Social research, as Hammersley and Atkinson (2007) have noted, involves participating in the social world in whatever role and reflecting on the product of that participation. It means there can be no way in which we can escape the social world in order to study it. The important thing to note is that when people entrust their views to us part of our moral obligation as social scientists is to ensure that they are treated with the respect and fairness they deserve. In that regard I made every effort in the course of carrying out this study to rely on evidence drawn not only from observations alone but from multiple sources as a basis of my analyses and conclusions.

3.11 Limitation of the study

A major limitation of this study that suggests directions for future studies is that our understanding of the role that digital technology and digital literacy can play in improving teacher education in a rural Ugandan primary teachers’ college was mainly based on my personal observation of the observable classroom practices and the information obtained from the tutors through questionnaires, interviews and focus group discussion. I did not pay sufficient attention to the students’ perspectives to enrich my understanding of the role that technology played in changing the dynamics of the classroom contexts, particularly those aspects that might not be easily observable. Similarly, my understanding of the impact of the ICT policy on classroom practice in the two rural Ugandan primary
schools was mainly based on my own observations and information that I obtained from the teachers whom I worked with. I did not pay attention to what the children and their parents thought about the use of digital technology in those classes. Future studies will need to pay attention to the children’s voices and the voices of their parents in the analysis of the potential that digital technology and digital literacy hold to transform Ugandan education.

3.12 Chapter Summary

In conclusion this study took the form of qualitative case study on the role that digital technology and digital literacy can play in promoting digital literacy to improve pedagogical practice among nine teacher educators at Wati CPTC and four teachers in two primary schools: Amura and Obizea, both in Arua District, Uganda. The fieldwork started in September 2011 and it ended in January 2013. My major sources of data included classroom lesson observations, semi-structured questionnaires, interviews, focus group discussions, field notes and journal reflections. In addition to obtaining data from the research participants, I also held interviews with national experts, including the Minister for ICT Ministry in Uganda, the permanent secretary for the ICT Ministry, the director for basic and secondary education, and local experts, including the DEO, the principal Wati CPTC, and cultural leaders. See Appendix A to F for copies of the questionnaires and interview and focus group questions employed. Further, I collected and analyzed important documents and artefacts to complement my data. In the next chapter I present the major findings of the study based on the two research questions.
Chapter 4: Findings and Analysis: The Role of Digital Technology and Digital Literacy in Improving Teacher Education in a Rural Ugandan Primary Teachers’ College

4.1 Introduction

In this chapter I present the major findings and analyses of the data relating to my first research question: What role can digital technology and digital literacy play in improving teacher education in a rural Ugandan primary teachers’ college? In order to better understand the role that digital technology and digital literacy can play in improving teacher education in a rural Ugandan primary teachers’ college, I chose to focus on participants’ digital literacy practices as my unit of analysis, and I drew on classroom observations, interviews, questionnaires, and focus group discussions as my main data sources. Evidence from the data suggests that digital literacy can indeed play an important role to improve teaching and learning in eight specific ways: (a) Enhancing teacher/tutor identity and investment (theme 1), (b) transforming the dynamics of classroom interactions and context (theme 2), (c) fostering teamwork and cooperation among staff (theme 3), (d) integration and validation of local cultural knowledge and practices for formal education (theme 4), (e) enhancing college/school and community relationships (theme 5), (f) integrating the local with the global (theme 6), (g) inspiring teacher and student resourcefulness (theme 7), and (h) promoting sharing and sustainable use of educational resources (theme 8). In this chapter I present the data explaining the role that digital technology and digital literacy can play in promoting teaching and learning under each of these themes.

4.2 Enhancing Teacher/Tutor Identity and Investment

A key finding from the study relates to the way participants’ use of digital technology was changing their professional and nonprofessional identities and practices. Whenever participants were asked to share their experiences with the use of digital technology they consistently reported how their use of digital technology had changed how they viewed themselves and their role in society. For example, on October 20th, 2011, we had a digital literacy workshop with research participants at the
ICT lab where participants were trained during the morning sessions on the use of digital cameras, audio recorders, computers, eGranary, and the Internet as pedagogical tools. After lunch we asked participants to take out their digital cameras, go out into the local community in small groups, take pictures and record videos, come back to the ICT lab, and upload their local content onto the computers for presentation as demonstration lessons.

During the presentations Dorcus, one of my focal research participants, came to me and asked in a very low tone whether I had noticed an interesting thing about the participants’ identities and the photos or video each participant had produced. I told her I had not noticed anything particular except that the kinds of materials that the participants had brought were completely different from the kinds of materials that I was expecting them to bring. I told her I was expecting participants to go out and interview people about Lugbara cultural resources like folk stories, traditional songs, proverbs, riddles, and rhymes, yet none of them had brought any such materials. Instead they went out to document animals, houses, people and foodstuffs.

She then told me that one thing which she had noticed about the photos and videos participants had taken was that they revealed something about each participant’s identity and interest. For example, Anicua, who practices some farming in his court yard, left everything else and went to record his goats and crops with his best photo being that of his biggest goat. Sally, the president of the mother’s union in Madi and West Nile Diocese, went out to take photos of their newly completed housing project, with the photo of the new guesthouse as her best shot. Antoni, the tutor in charge of school practice, went out to record student involved in group discussion, Ruzalia, who is charge of staff welfare and food, went out to record the process of making bread and cakes. Bilha, who has newly been recruited to teach geography at the college because of her passion and love for the subject, went out to video record silt to explain soil erosion, while Betina and Nanaru who had never held a digital camera went out to take people’s pictures at Mvaradri – a nearby trading center. As I continued to reflect on Dorcus’s
observation, I was reminded of Barton and Hamilton’s (2000) conceptualization of literacy as a “situated” social practice that “always exists in a social context” (p. 8). From then I began to pay attention to the situated and purposeful nature of participants’ literacy practices (Barton, Hamilton, & Ivanič, 2000) and issues of identity and investment (Norton, 2000). I came to realise that the participants were more interested in using the digital resources to take photographs and videos of things that were of greater significance to their lives than the things I was expecting them to do with the digital resources. They had apparently resisted the use that I had ascribed to the resources and they had chosen to determine the usefulness of the resources in the local context on their own terms which reminded me of Prinsloo’s (2005) assertion that “new literacies do not necessarily have intrinsic resourcefulness … whether they offer opportunities for particular users is something that has to be established by situated research, rather than assumed” (p.96).

Towards the end of the workshop when I asked participants to describe how they felt about using the digital tools to make such amazing presentations, many of them made very positive and interesting comments about their experiences with the use of technology. One of the comments that made the rest of the participants burst into a prolonged laughter came from Betina:

I feel very powerful like a man because I had never held a camera in my life. I have always seen only men carrying cameras and taking photos in big public functions like may be independence celebration, political rallies and wedding ceremonies. But now as I move in the community taking pictures with my camera, I feel I am also very powerful, like a man.

Betina’s comment opens a window through which we can view her experience of identity shift with the use of modern technology. She comes from a community in which access to modern technologies like cameras was a preserve of men. As a woman in her late forties, Betina had never held a camera in her hand in her entire life, let alone used it to take a photograph, just because she is a
woman. She had never even dreamed of ever carrying a camera because she grew up knowing that cameras were for the men folk who have the freedom and liberty to go to public places and functions to take photographs. When I gave the participants the cameras I had no idea why – of all places – Betina had chosen to go to the trading center to take photos of the people, especially the men there. I learnt later that she needed to go out there to feel and show off her new power in the community. That is why her experience with the use of digital technology made her feel she is “also very powerful like a man.”

I find Betina’s use of the word “also” very striking, because it signals her determination to claim her new identity as digitally literate and therefore a powerful person. In that regard digital literacy has provided Betina the lens to view herself from a completely different perspective. She no longer views herself as an insignificant and powerless individual in her community. She feels she is now an equally powerful person because she can now take photographs just like any other person. Her experience with the use of digital technology has not only made her recognize herself as a powerful person but it has also made her view herself as being equal to a man. She spoke energetically in a deep voice of a typical Lugbara man while nodding her head and punching into the air to demonstrate how she felt as she walked like a man with her camera in the community, which made participants at the workshop burst into a prolonged laughter.

During a focus group meeting that was attended by, among others, Dorcus Anderu Abiko and Bonny Norton (one of my supervisors who visited me during data collection) Betina’s experience with the use of digital technology and her identity transformation came up for discussion, and during the discussion Betina further explained her earlier comments as reported in the following conversation:

Dorcus: And by the way it was Betina who talked about feeling powerful with the use of technology – now feeling like a man because of being able to use technology because throughout her life she used to see only men carrying cameras but now as she moves in the villages with a camera she feels powerful. May be she could say it in her own words.
Betina: Yes, when I first learnt how to use the camera, I was able to take photograph of everybody: men and women. And when I was asked to share my experience during the training workshop at Wati [core] PTC recently, I told participants that I am now a powerful woman because I can now take photographs like men do and I will continue doing that one in my life time because I am now a learned person!

Bonny: Why is it that it is men who have controlled technology? Why is that? Why have women not …

Betina: Tradition! Tradition has made women to be in the lower class. Our society does not expect women to do great things like men. They feel that women are the weaker sex; they cannot do the things that men do, especially taking photographs, moving to important places. They expect women to be in the kitchen or around the home. So, now technology is making me to move to different places, taking photographs. For example this time I will move to Wati [core] PTC for a digital literacy workshop and leave the home to the man [my husband] who will take care of the home and the children. It makes me feel really great that I am also improving in life.

Bonny: Do you think that other women feel the same way?

Betina: Yes, some of them feel minimized but through the use of technology I will tell them that we shall be even more powerful than men because my husband [who is a headmaster] does not take photographs using the digital camera but I am able to do it. I can even now decide to take his photograph and also show it to him to tell him that this is what we have been doing (laughs).

Bonny: It is very interesting, isn’t it? These are some of the unexpected effects of technology, that we wouldn’t even have perhaps anticipated but then suddenly you begin to see changes in cultural practices.
Betina: Yes! Technology has also made me popular. People admire me. I now swell [walk confidently and proudly] in front of other teachers because I now know what others don’t know. Yes, because I can take photographs, I can shoot [record] videos, and I am able to use them [the pictures and videos] in class. (D. Abiko, B. Norton and B. D. P’Ojoa, personal communication, May 30, 2012)

From the conversation above we see Betina revealing how technology has transformed her identity. She says, “I told participants that I am now a powerful woman because I can now take photographs like men and I will continue doing that one in my life time because I am now a learned person!” In addition to feeling very powerful like a man, technology has afforded Betina another identity of being “a learned person.” which has in turn increased her investment in using technology to achieve educational change. Her understanding of a learned person is linked to being able to use modern technology. This new identity that Betina has derived from her engagement with technology is very important for classroom practice because teaching is not all about what a teacher knows in the curriculum. But it is also about the teacher’s level of self-confidence, which to a large extent determines her effectiveness in class. Like Betina, many teachers in Uganda carry scars of socially inflicted wounds in their hearts due to the positions of powerlessness imposed on them by society. Her comment echoes the cries of many Ugandan teachers, especially the female teachers.

It is also interesting to note that participants’ digital literacy practices are also transforming cultural norms and practices particularly those that disadvantage women. For example in the conversation above, when Bonny asked Betina to explain why men tend to dominate technology in the local community, Betina exclaimed with urgency, “Tradition!” She could not even wait for Bonny to complete the question, which seems to indicate how strongly she feels about the disadvantaged position that society has ascribed to her fellow women in the local community. From Betina’s experience we can clearly see that technology has the potential to promote gender equality and challenge those
cultural norms and practices that confine women as only cooks in the kitchen. That is possibly why she is happy about her plans to travel to Wati CPTC for a workshop and leaving her husband (who is actually the head master of the school in which she teaches) to take care of the home, which would not ordinarily have happened. Surprisingly, her husband offered to drive Betina to the workshop before going back home to take care of the children. According to Betina this was the first time her husband had driven her to a workshop and gone back home to take care of the children in her absence. She now talks confidently and proudly about herself and about the possibility of women becoming even more powerful than men through the use of digital technology.

Betina’s experience with digital literacy has not only enhanced her personal and professional identity and transformed her relationships both at home and among her fellow teachers, but it has also increased her investment in her professional practices. When Betina was asked during a post-lesson interview to comment on how the use of modern technology in her lesson made her feel, she made the following comment:

Now I feel I am … educated. I used to feel inadequate but I now feel more confident of myself. Being able to use technology has given me power and energy. Talking in class without the digital resources would make me easily get tired. But these days I do not easily get tired. Time is not even enough for me these days.

From her comment one can see that Betina feels she is “more educated” because of being able to use technology. This has made her develop confidence in herself. She makes a direct connection between her ability to use modern technology and her professional practice. Using technology has changed her professional identity and increased her efficiency and effectiveness in class, which is why she says, “Talking in class without the digital resources would make me easily get tired. But these days I do not easily get tired. Time is not enough for me these days.” Considering the large number of
students that Ugandan teachers have in their classes under UPE, and the stress they teach under, it is encouraging to learn from Betina that the use of digital technology does not make her easily get tired, and that the time allocated for each lesson has even become too short for her to complete her lesson. As we shall see in the sample lesson under Section 5.4.2, the use of digital technology has made Betina’s lessons more interactive and less teacher centered. Instead of doing all the talking herself, she is now able to use digital images to engage students in very constructive discussions.

Betina’s engagement with technology has also enabled her to gain a new identity of being viewed by her colleagues as a teacher with global connections. For example, when asked to explain how her use of digital and community resources have affected her identity among her peers and how she feels about herself, Betina said, “People have also known me as a teacher with Canadian connection and a computer literate teacher. Therefore I am [now] an important teacher in the school”.

Indeed, many participants echoed the view that the use of digital technology has enhanced their professional identities and increased their investment in teaching. Nelly (one of my focal research participants and head of ICT department), when asked during a post-lesson interview how he felt after presenting a wonderful lesson using PowerPoint™, said, “I felt elevated, I felt great because after my lesson Mr. Owini went and announced to the students that he too was going to use PowerPoint for presenting his lesson the next day, which he did, and at least I inspired him and I even inspired other tutors”.

Nelly’s use of words like “elevated” and “great” to describe how he felt about being able to use digital technology is consistent with Betina’s use of expressions like “powerful”, “equal to a man,” and “more educated” to describe her own feelings about being able to use digital technologies for her professional purposes. The descriptions all point to the fact that participants viewed their experiences with the use of digital technologies in positive light and they believe that the use of digital technology had positively impacted their identities and professional practices. Furthermore, participants’
experiences with use of digital technologies have also increased their investment in teaching, as was summed up in Bilha’s remarks during an interview, where she said:

I think this is just the beginning for me; I have developed more interest in using technology in teaching for the reason that there are things that we have always taught as teachers, which remain abstract to the students and they would be moving around not understanding what they have learnt. They would pick concepts but without any understanding of this concept but I think if I get all the equipment that are required to use technology I will be grateful and I know that will even improve my profession as a teacher and I know I will be creating more impact in the learner… I believe that this is the beginning of a new thing [phase] in my teaching career.

Bilha could not hide her excitement about her experience with the use of digital technologies. Her passion and enthusiasm for digital literacy to improve her pedagogical practice is revealed through the use of expressions like “this is just the beginning for me … I have developed more interest in using technology in teaching … I believe that this is the beginning of a new phase in my teaching career” which underscores her identity transformation and further investment in improving her professional practice. She has gone further to make a self-assessment of her practice before, and after using technology, and she has come to the conclusion that teaching through the use of modern technology is more effective because it enables the teacher to access useful resources from the Internet. She concludes her comments by making a direct connection between her identity transformation, tutor investment and improvement in teaching and learning as follows: “I think if I get all the equipment that are required to use technology I will be grateful and I know that will even improve my profession as a teacher and I know I will be creating more impact in the learners.”
4.3 Transforming the Dynamics of Classroom Interactions

One of the major concerns about the system of education in Uganda has been that the system is teacher-centered and it makes students play a passive role in the teaching and learning process (Nsibambi, 2000; Republic of Uganda 1992; Ssekamwa, 2000; Tiberondwa, 1998). However, according to the findings of this study the use of digital technology is changing the dynamics of classroom interactions in the following ways: (a) promoting teacher innovation and creativity in lesson preparation and presentation; (b) increasing student interest and participation in class; (c) shifting the focus away from the teacher to the digital content as the subject of discussion in class; (d) drawing on students’ funds of knowledge to explain concepts and enrich teaching and learning; (e) making teaching simple, more interactive, and student centered; (f) engaging students to think critically; (g) enhancing student understanding by making learning less abstract; (h) making the classroom more friendly and enhancing the relationship between the tutor and the students. In the next section I present how the use of digital technology changes the dynamics of the classroom interaction and context by considering only three lessons. During the selection of those lessons I took into consideration the need to include a range of curriculum subjects and topics.

4.3.1 Lesson 1: The importance of children’s games in early childhood education, by Sally Angucia, April 18th, 2012.

4.3.1.1 Sub-theme 1: Promoting teacher innovation and creativity. The lesson was presented on Monday, April 18th, 2012. It was a lesson in early childhood education for second year students. It took place in the chapel, which the college has now adopted as its conference hall where large classes are conducted. Sally began her lesson with a popular cultural song that highlights the gender inequalities in the Lugbara society. She asked male students to sing the first line in which women are accused of eating chicken while the female students sang the second line in which women accuse men of being selfish and greedy with respect to the gizzard. They sang the lines in turns as follows:
According to the Lugbara cultural tradition, women were not supposed to eat chicken, and especially the gizzard. It was believed that if a woman ate chicken, she would never settle in marriage. Instead she would “fly” from one husband to another like a bird. It was therefore a taboo for a woman to attempt to eat chicken. However, as time went on some women began to eat chicken. This was considered an abomination and invasion of men’s territory. Thus, in the first line, men express their anger and disappointment with women who eat chicken. However, in the second line we see women fighting back. They accuse men of being selfish and greedy, especially of the gizzard, which is culturally viewed as the most important part of the chicken that is supposed to be eaten by the family head, usually a man.

The tutor’s innovative use of this cultural song as a precursor to the video clips around which the lesson centered, profoundly changed the dynamics of the classroom. It afforded the students the opportunity to free themselves of the usual formalities of sitting quietly to listen to the teacher. As soon as the singing began the students spontaneously sprung from their seats and randomly started pushing their desks to create space for dancing. Within seconds they all took to the floor with women facing the men. They sang and clapped and danced with such passion that the class was literally turned into a cultural theater with each group shouting at the top of their voices, wanting to out-compete the other in singing and dancing. The women sang in high-pitched tone while bending and clapping their hands in typical Lugbara traditional style. The men roared in deep loud voices while jumping, and pointing accusing fingers at the women. Some were using their books as fly whisks to point into the air, while
others hammered their desks as drums to further enrich the melody. By importing the existing tensions between women and men within the Lugbara community into the classroom, the tutor successfully managed to electrify the class and set the lesson in motion. The performance was just reaching its climax when the tutor asked the students to stop and take their seats. A considerable amount of time had passed without anybody realizing it. The song was both entertaining and enlightening. The students went back to their seats ululating and uttering “cere” in excitement.

_Cere_ is a long whooping sound whose melody usually corresponds to the tonal pattern of an expression or a phrase commonly associated with the person who utters the _cere_. A _cere_ is regarded among the Lugbara as a vocal symbol of cultural identity. Traditionally, every adult Lugbara man has a _cere_ with which he is identified. The pace and tone with which a _cere_ is made determines the particular message it conveys. _Cere_ made with a heightened tone at short intervals and desperate voice means the person is in danger and calling for help. It could also mean that something serious like a sudden death has happened in the community and people are called upon to converge to respond with urgency. However, during traditional dances of the type the students were performing, men make _cere_ as a ritual to express pride and excitement, to draw attention, and to increase their visibility.

After the singing and dancing and the excitement calmed down, the tutor then introduced her topic “The importance of children’s play in early childhood education.” She asked students to identify common children’s plays in their homes and communities. Examples of games students identified included: _ozizia_ (hide and seek), _ilayia_ (a game of stone throwing), and _kangi_ (game of stamping the feet and jumping). Here we see the tutor drawing on the students’ funds of knowledge to solicit their participation. We also see students giving answers in the local language, which highlights their awareness about the affordances of the local language to express their ideas better.

The teacher then asked the students to watch three video clips that she had personally recorded for use during the lesson. In the first video there were four children involved in a game of racing. They
were competing in running. In the second video there were eight children role-playing in a natural
home setting where they built their own home of two huts using sticks, grass, and pieces of cloth. The
children were between the ages of four and ten. Among them were three boys and five girls. The girls
were cooking on a three stone oven while the boys sat like typical Lugbara men under the veranda
making ropes for the animals while waiting for food. Inside the house the girls put utensils and a
papyrus mat on which they lay their toy babies nicely wrapped in pieces of cloth. The third video was
taken in school setting where children were playing a range of games on the school compound during
break time. After watching the three video clips for a few minutes the tutor posed a question to the
class, which turned the lesson into a discussion between the teacher and the students:

Tutor: Based on the videos that you have just watched what do you think was the significance
or benefit of the games or plays in which those children were engaged?

Student: Development of physical fitness.

Tutor: Yes, any other benefit?

Student: It strengthens their muscles.

Tutor: Yes. They grow stronger and become physically fit.

Student: They become very happy.

Tutor: That’s correct. They learn to experience joy and happiness as they play.

Student: Social development.

Tutor: Yes, there is social development. When you look at these children …they belong to
different families. But they have been brought together by play to interact freely. Any
other benefits?

Student: Language development.

Tutor: Very good, there is language development. As they interact during play they talk to each
other and their language improves.
I was struck by Sally’s resourcefulness and her innovative use of digital technology and community resources to make teaching and learning simple and more exciting. Instead of simply coming to the class to give a lecture to the students on the importance of games in early childhood education, as is usually the case in most Ugandan classrooms, she chose to go out into the community to record real children playing real children’s games in real time as a basis of engaging the students in a discussion on the topic. The tutor’s use of digital technology in form of the video clips significantly changes the dynamics of the classroom context by making teaching and learning take the form of a dialogue and a discussion between the tutor and the students. She was able to bring the outside world into the classroom in a very concrete way. Instead of the tutor lecturing the students on the benefits of children games, we see her engaging them in a discussion. She draws on answers from the students to further explain the benefits or significance of children’s play, which makes learning very simple and more meaningful. This gives the students opportunity to not only be recipients of knowledge but also producers of knowledge. It encourages students to watch the videos with keen interest to be able to identify the ways in which children’s games are important in early childhood education. By affirming the students’ answers through comments such as “yes,” “that is correct,” and “very good,” the tutor is able to validate their knowledge of the subject which encourages them to be more confident of what they know. By allowing the students to draw on traditional media like cere, clapping, singing and dancing to express themselves, the tutor managed to create an exciting environment for the students to learn with ease and to appreciate the importance of informal interactions.

4.3.1.2 Sub-theme 2: Increasing student interest and participation in class. After adequate discussion on the benefits of racing in the first video, the tutor then asked the students to focus on the second video that centered on children’s cooking game. The discussion proceeded as follows:
Tutor: Now let us consider the video in which the children were cooking. You all saw how they were cooking, putting food in their mouth and so on. What do they learn during the play?

Student: Responsibility Sharing.

Tutor: Yes, that is true… The girl was cooking the source meanwhile the other one was mingling the *enyasa* [local bread] (Laughter among students) while the big man (boy) was sitting comfortably waiting for the food like a typical Lugbara man (Further laughter among students).

Student: The skill of cooperation.

Tutor: Yes, the skill of cooperation is also learnt through children’s play or developed among the children as they learn to work together.

Student: They also learn to appreciate.

Tutor: Yes, they learn to appreciate! I think when these girls took the *enya*, the food to the boy who was seated in the veranda, he was very happy and he appreciated their work after they had served him.

Tutor: Yes, that is correct.

Student: They learn creativity.

Tutor: Yes, the girls thought of cooking *osubi* [greens] … they also innovatively managed to construct their huts. That was creativity.

Student: The play develops their senses.

Tutors: The senses of what?

Student: The senses of touch, smell, taste, and sight.

Tutor: Excellent!

Student: The skills of cooking or work habits.
They also learn to be responsible and take part in home activities.

As can be seen from the flow of the discussion above, the use of the video clip has not only made the class more interactive, but it has also increased students interest and participation in class discussions. They are able to provide a range of intelligent and interesting answers to the questions posed by the tutor. Their answers were precise and to the point except in one instance where a student said, “The play develops their senses,” which the tutor thought was rather vague. In response the tutor asked, “Senses of what?” However, another student was quick to clarify by answering, “Senses of touch, smell, taste and sight,” which the tutor eventually agreed with by saying, “Excellent.” It is this kind of interaction that has been lacking in the Ugandan classrooms (Republic of Uganda, 1992). It is also interesting to note that during the course of the discussions the teacher is also learning from the students. For example she has learnt to draw on the richness of the local language resource to communicate with the students when she uses Lugbara words like *enyasa* (local bread) and *osubi* (greens) to communicate with the students which made the students burst into laughter probably because this was an unusual occurrence considering the fact that the national language policy in Uganda obliges teachers and teacher educators to use English as a medium of instruction in schools and colleges.

**4.3.1.3 Sub-theme 3: Shifting focus away from the teacher to the digital content as the subject of discussion in class.** The use of digital technology has also changed the dynamics of the classroom context by shifting attention away from the tutor to the digital content as the subject of interest. After making introductory comments the tutor asks students to focus on the video and she now takes a backseat. All the attention was geared towards the video, which becomes the center of discussion with the teacher only playing the role of a facilitator as can further be illustrated in the last part of Sally’s lesson:

Now let us come to our third video [the video from Oduluba Primary School].

Tutor: Now let us come to our third video [the video from Oduluba Primary School].
Tutor: Let us now come to modern play activities, activities in school setting.

Tutor: Okay, how many activities can you identify in the video?

Students: Very many. (Students answer in chorus)

Tutor: Name them.

Student: Skipping.

Tutor: Yes, we have skipping. What is the importance of skipping?

Student: Physical development.

Tutor: Yes, there is physical development. What else?

Student: Counting.

Tutor: Yes, there is counting. As the person jumps they count while skipping.

Student: Social development.

Tutor: Yes, there is social development as they interact with each other.

Student: Turn taking.

Tutor: Very good! They also learn to take turns, to share and to be patient. Have you seen? One person does not skip for a long time. He skips and makes sure that the other person also comes in. They give opportunity for others to participate. So they are learning to be patient and to share.

Tutor: Very interesting, any other activity?

Student: Ayia ‘beza [Stone throwing].

Tutor: Yes, there is stone throwing. They have made a hole in which they put stones. They keep picking the stones from the hole while throwing up a stone and catching it in the air without falling down. What do children learn from the throwing of stones?

Student: Eye and hand coordination.
Excellent! There is eye and hand coordination because you throw up the stone and your eye is following it while the hand is picking another stone from the hole and you must be able to catch the falling stone in time before it touches the ground. That was a very good answer. Any other?

Student: Counting.

Tutor: Yes, counting the stones.

Here we see the tutor using a range of strategies to arouse and sustain the students’ interest in the discussions. She uses the first person plurals “us” and “we” to identify with the students during the discussions. For instance, in the introductory remarks she says, “Now let us come to our third video.” In the second bullet she again says, “Let us now come to modern play activities.” The teacher seems to unconsciously acknowledge the transformation of her relationship with the students. She no longer uses the pronoun “you” to refer to the students. Instead, she either uses the pronoun “us” or “we” to signal her new relationship with the students. She presents herself as one of them because technically she too is also learning from the students. She further encourages students to participate by making positive remarks on their responses through the use of comments like, “Yes”, “Very good”, “Very interesting,” “Excellent,” which made the students enjoy the discussions. At the end of the lesson the tutor asked me to make comments. I thanked her for the opportunity she had given me to make comments. However, instead of making comments, I took the opportunity to randomly ask the students their thoughts about the lesson and their responses confirmed my own assessment that this was indeed a highly successful lesson that the students enjoyed. Their comments included: “Very enjoyable” (Adania Scovia), “It was very enjoyable and interesting” (Adiru Proscovia), “The lesson was real.” (Anguyo Ronald), “It was student centered” (Anonymous), and, “I enjoyed and absorbed many things out of it” (Anonymous).

Sally’s lesson reveals that her use of digital technology in the form video clips changed the dynamics of the classroom context in her class in several ways. It made teaching and learning more
interactive and learner centered, drawing on students’ funds of knowledge; increased students’ interest and participation in class activities; and shifted the focus away from the teacher to the digital content as the subject of the discussion in class. At this point, let us consider another lesson to highlight the potential that technology holds to transform classroom dynamics.

4.3.2 Lesson 2: Organizing a mathematics classroom for effective teaching and learning, by Rikido Anicua, May 31st, 2012.

4.3.2.1 Sub-theme 4: Drawing on students’ funds of knowledge to explain concepts and enrich teaching and learning. This lesson was presented on May 31, 2012. It was a mathematics lesson with year one students. It took place in the chapel hall. There were about two hundred students in the class. The topic for his lesson was “Organizing a mathematics classroom for effective teaching and learning.” Unlike Sally who began her lesson with a cultural song, Anicua began his lesson by drawing on students’ funds of knowledge. To begin his lesson he asked students to explain what they knew about the distinction between a good home and a bad one:

Tutor Anicua: Before we consider the classroom, we have all come from homes. How should a good home look like? Why do you label some homes as good homes and others as not good homes? Yes. (Points at a student for an answer.)

Student: It must have a shelter.

Tutor Anicua: Yes, there must be a shelter in such a home. Is there anything else?

Student: It must have a pit latrine.

Tutor Anicua: Yes, a good home must have a pit latrine. Is there any other answer?

Student: It must have a large compound.

Tutor Anicua: Yes, large compound.

Tutor: Similarly, when children are in a school we expect the children to be in an environment that is very conducive to make them learn. If the school environment is not conducive,
children will not be able to learn. In our Ugandan situation you have all seen the conditions in our schools, particularly in the rural villages. We are going to show you images of some of the classrooms we have in our schools. I would like you to critically examine the pictures before answering questions that I will pose shortly.

By asking students to share what they know about the distinction between a supportive and unsupportive home Anicua was not only able to set the lesson in motion but he was also able to skilfully use the knowledge that the students already had to introduce the digital content. This kind of approach enables students to make easy and quick connections between home experiences and the new knowledge they are receiving. It helps them to build the new knowledge on the knowledge they already have which makes learning simple and enjoyable as further illustrated in the following class interactions:

4.3.2.2 Sub-theme 5: Making teaching simple, more interactive and learner centered.

Tutor Anicua: My colleague [Nelly, who was giving him technical support], can you show us the pictures of the classrooms.

Student: (Curiously examines the pictures projected on the wall while talking among themselves in low tones.)

Tutor Anicua: What things can you see in that classroom?

Student: Poor arrangement of boxes. (Students burst laughing.)

Tutor Anicua: Are there boxes here?

Students: Yes. (In chorus.)

Tutor Anicua: Okay. There are boxes. Is there any other thing that you are able to see?

Student: I can see the teacher.

Tutor Anicua: Yes, we have the teacher. Where is the teacher?

Student: In the corner.
Tutor Anicua: Yes, the teacher is there. The children are on this side. (Points at the photo using a pointer made from sugar paper.) Can you see anything else?

Student: Darkness in the classroom.

Tutor: Yes, the classroom is very dark. If you went there [to the school] now that is exactly how dark the classroom is. (Students laugh)

Tutor: Any other? Yes, you. (He points at another student to give his answer.)

Student: Poor ventilation.

Tutor: Yes. The ventilation is very poor.

Student: In which school were the photos taken?

Tutor: No. I don’t want to mention the schools (While students laugh). You will see those schools with time. What else?

Student: A question. (Another student suggests)

Tutor: Questions will come later. Let’s go to another classroom.

Students: (Watch the picture while laughing, talking among themselves in whispers.)

Tutor: What do you say about the pupils?

Students: Organized, packed, smart, congested.

Tutor: Professor Margaret has been telling you about a class she visited in Obizea Primary School, this morning. She said when she was there she could see that the pupils were very attentive, can you see how attentive these children are in the picture and their number. Okay, let’s move to another picture. After two years of training here with us, you will find yourself in front of these classes. That’s why we are bringing them. Okay.

Student: (Laughing).

It was also interesting to note that in addition to making teaching and learning simple and interactive, the use of digital technologies was also changing the dynamics of the classroom.
interactions by affording students the space to ask questions in the middle of the lesson, which is very unusual in regular Ugandan classroom where asking questions in the middle of the lesson is viewed as disruption by most teachers (Ssekamwa, 2000; Tiberondwa, 1998). Thus, when a student asked the tutor, “In which school were the photos taken?” we see the tutor’s reluctance in answering the question. He grudgingly says, “No. I don’t want to mention the schools. You will see those schools with time. What else?” By hastening to ask the question “what else” he was perhaps trying to gloss over the question to avoid disruption. However, to his surprise, another student who was probably unsatisfied with the tutor’s response, puts up his hand and says “question,” to which the tutor responds by saying, “Questions will come later. Let’s go to [watch] another classroom.” Here we see digital technology affording the students the space to contest the highly structured and teacher-centered nature of Ugandan classes which in turn increases their interest and participation in class. We also see the tutor struggling to remain in charge by insisting that they move to look at the next image. While the students would like to push for a student fronted lesson the tutor was still inclined toward a fronted lesson.

This incidence gives us a glimpse into the realities of the complexities of ICT integration in teaching and learning. It specifically highlights the need for teacher educators to be more flexible and allow class discussions to take their own directions for the transformative potential of digital technology to be fully realized. Although the use of digital content may prompt students to ask questions in the middle of the lesson, the tutor in charge may be reluctant to allow a student-fronted lesson. For example, by refusing to answer students’ questions in the middle of the discussion and insisting that questions must always come at the end of the lesson, Anicua may have unconsciously denied the students an opportunity to take full ownership of the teaching and learning process because he still thought he knew what was most essential for them to learn which may not necessarily be the case.
One lesson that we can learn from this experience between the tutor and the students is that the use of digital technology as a pedagogical tool has the potential to generate tensions between the teacher and the class which if not carefully handled may lead to unnecessary disruptions in class. For example when Anicua refused to take students questions in the middle of his presentations students began talking among themselves in whispers and they were slowly becoming noisy and disruptive which could have made the tutor lose patience with them. The tension could have escalated at some point. There is thus a need to find ways of addressing the tendency for tutors like Anicua to relapse back into the traditional practice of having structured class interactions, which undermines the evolution of more organic class interactions. This could possibly be achieved through further training focusing on digital literacy and classroom interactions. Although Anicua did not answer the questions, the fact that he at least allowed the students to raise them in the middle of the lesson must be appreciated and viewed as a step in the right direction. It never diminished their interest and participation in the class discussions as can be seen in the extract below:

4.3.2.3 Sub-theme 6: Increasing students’ interest and participation in class.

Tutor: Let’s go to another picture. (Nelly projects another slide.)

Students: (More laughter as they see their own classes in Wati core PTC displayed on the wall.)

Tutor: Do you recognize this class?

Students: (Thunderous laughing as students see their own images flashed on the wall. They appeared in the photos in a range of postures.)

Tutor: We go to the next picture. (After giving students a few minutes to examine the picture)

Students: Woo … (Express shock upon seeing the picture of a class heavily packed with some children sitting on others’ laps. Some students shake their heads in shock while others laugh cynically. Some talk among themselves with others pointing at the picture on the wall.)
Tutor: You can see some pupils are seated down here in front, on the floor.

Students: Students continue to talk among themselves in whispers and low tone.

Tutor: Let’s proceed to the next slide. What can you see?

Students: Packed class!

Tutor: Packed! No seats (Anicua emphasizes the point further.)

Students: (Laughing.)

Tutor: Now let’s go to the last photo. Which class is that?

Students: Our class. That’s the Chapel Hall. We are here in this class. (With lots of laughter and excitement.)

Tutor: Who are these students?

Students: Year one students of Wati [core] PTC. (With lots of excitement and laughter.)

Tutor: So, I have shown you the type of classrooms. There are some classes that are worse than these. And you will be expected to ensure that there is teaching and learning of mathematics in all these class.

The tutor was trying to walk on a tight rope. On one hand he was trying to yield to the forces of change imposed by the use of digital technology, and on the other hand he was trying to do what he knows best – remain in charge of all the interactions in class by being the one to ask questions and positioning students as recipients of knowledge. That notwithstanding, one of the striking things about this lesson was the innovative way in which the tutor used a photograph of his own students to explain classroom organization which made the students get excited. The students were excited to see their own images being used in the presentation. The moment they recognized their faces in the pictures shown they all burst into a prolonged laughter as if they never expected this to happen. It was exciting for them to see their own class and its seating arrangement, which they might not have paid attention to being used to explain the concept of class organization in a mathematics lesson. He successfully used
technology to infuse regular practices at the college into the teaching and learning process in this class. Perhaps that was why there was a lot of excitement among students throughout the lesson. He then went on to give students group or pair activity based on the video clips that they had seen:

Tutor: Now [After watching images of various types of classrooms], I have a task for you. Remember we are looking at how to organize a mathematics classroom. In pairs, I would like us to answer these questions within a few minutes. The questions are: 1) based on the classrooms you have seen in the photos, what are the strengths you have seen in those classrooms? Was there any strength, any good things about those classes? If yes, what were they? Briefly, [you] put [jot] them down. 2) What were the challenges in the classrooms that you saw in the photographs? Where there some challenges that you would expect when teaching in those types of classrooms? If so, what are they? 3) How would you establish class control in such situations? Is it possible for you to ensure class control in such classes so that there is effective teaching and learning of mathematics taking place? 4) What are the most common requirements a teacher should think of when organizing a mathematics classroom? Feel free to share with your colleague. You are free to talk to your colleague while answering the questions. You are free to ask each other questions or seek clarifications.

Students: (Engage in very lively discussions in pairs as the tutor walks around.)

The students spontaneous reactions to the photographs through laughter and whispers reveal the vividness with which the photographs communicated the message they were meant to convey. However in some cases, the tutor had to provide some background information to explain what was going on in the picture make students contextualise the message. This highlights the limitations of photographs as pedagogical tool. It would have possibly been more appropriate for the tutor to use a video recording to capture context that photographs could not depict well.
4.3.2.4 Sub-theme 7: Engaging students to think critically. One of the most amazing aspects of tutor Anicua’s lesson was his innovative use of digital technology to engage his students in critical thinking. After letting them have fun with the photographs, he went further to engage them to respond to a set of intriguing questions that required the students to think critically before giving the correct answers. The students were specifically asked to identify the strengths and weaknesses in each class, and challenges they could see in each class shown in the photographs and suggest strategies through which they would address such challenges to ensure class control. The tutor asked the students to jot down their answers individually before sharing them in pairs and later as a class, which was an effective way of making them reflect on their responses. Even in the general class discussions, the teacher continued to push the students to think harder by probing into their responses as illustrated in this extract:

Tutor Anicua: Okay. Let’s now work together [discuss as a class] and you can find out whether what you have been discussing with your friend was correct. So what do you think are the strengths in those classes you have seen?

Student: The children were active.

Tutor: Was there any sign of activeness in the children?

Student: Yes. No. (Students gave mixed reactions)

Tutor: Was there any sign of activeness in the pupils?

Students: Yes/no (Again mixed reaction)

Tutor: What were those signs? Somebody is saying there was activeness among the pupils. I am asking for any evidence to show that those pupils were active. Yes [while pointing at a student to answer the question].

Student: They were looking at the teacher attentively.
Tutor: Yes, they were very attentive to the teacher. They were watching what the teacher was writing on the chalkboard. That was one major strength in the photos. Is there any other strength?

Student: Being organized.

Tutor: Were the pupils well organized? What was that organization?

Students: Sitting down quietly in class.

Tutor: Which particular ones? There was Arua Public Primary School class, there was Arua Demonstration and there was Wati core PTC that had well organized seating arrangements. To which one are you referring?

Tutor: Shows the pictures again for the students to further examine the seating arrangement in each class leading to more exciting discussions.

Students: Students give different answers in chorus with others saying Arua public and others Arua Demonstration and a few saying Wati [core] PTC.

Tutor: Are you saying you [Wati CPTC class] were well organized?

Students: Yes, no… [Still agreeing and disagreeing among themselves].

Tutor: The seating arrangement was well organized in only one of those schools. Yes, there is yours [Wati CPTC class]. I don’t think your seating plan was proper. Let’s look at another class. Is that Arua Demonstration School? You can see they were congested. That is not a proper seating arrangement for a good mathematics lesson to take place. In this seating arrangement it would be very difficult for me to see what each child was doing. I would not have access to each individual child in the class to be able to help those who are in need of help. So when you are in the field teaching mathematics you must make sure that there is access for you to reach every child so that you can know the children you should help there and then. Is that okay?
Another advantage that the tutor had while using technology to present his lesson was the ability to move back and forth with the slides. Whenever they were needed the tutor would ask his colleague who was operating the equipment to bring out the relevant picture for the students to look at before the discussion could be concluded.

4.3.2.5 Sub-theme 8: Making teaching and learning simple, more interactive and learner centered. By asking students to work individually, and then in pairs, and later on as a class Anicua was not only able to engage students to think critically but he was also able to make sure that they had more opportunities to interact with each other. As the lesson unfolded you could clearly see that his strategy was very effective. Students all remained alert from the beginning of the lesson to the very end. They participated very actively in the teaching and learning process. Sometimes students would put up their hands to answer questions before the tutor finished asking the questions. By playing an active role during the teaching and learning process students assumed ownership of the lesson which made them enjoy the lesson to the maximum. At the center of their interest was the use of digital technology which made the lesson more interactive and student centered as further highlighted in the discussions below:

Tutor: Is there any other strength?

Student: The classroom in Arua Public Primary school was large.

Tutor: Yes, the classroom was large, spacious.

Students: Adequate ventilation.

Tutor: Yes, there was adequate ventilation in some of those classes except one which was very dark.

Student: There was learning aid.

Tutor: Which classroom had a lot of learning aids? Was there any classroom that had a lot of learning aids in the photos?
Student: Yes.

Tutor: What learning aid can you see in the photo? Tell me.

Student: Box.

Tutor: Was the box a learning aid? Tell me another strength you saw in the photo.

Student: Charts.

Tutor: Alright, let’s narrow it to mathematics. What chart was there for mathematics? Our lesson is focusing on organizing mathematics classroom. What chart was there for mathematics? Not all charts are meant for teaching and learning mathematics.

Tutor: Let’s come to challenges. Based on the classrooms we have seen in the photographs are there some possible challenges that the teacher can face during the teaching and learning of mathematics?

Students: The congestion of children in the classroom.

Tutor: Yes, there is too much congestion in this class. The number of children I have managed to capture in this photograph is merely half of the whole class. The rest are this side. (Points at the photo). They have been cut off. I could not capture them all. It is a classroom of very many children handled by only one teacher. That is the situation on ground. After the two years of training here at the college, that is the situation you are going to face. There are some classrooms that have more than two hundred pupils in one room, particularly primary 1, and primary 2 classes. They mostly have more than two hundred pupils and there is only one teacher handling them. So what are the challenges that you can face so that you can be aware of these challenges. Yes. (Tutor points at a student to give an answer).

Student: Class control.
Tutor: Yes, the first challenge you can face under such circumstances is that class control becomes very difficult with large numbers. That’s a very big challenge. If you don’t know how to control a class of this size, it means the pupils have come there to waste time. The one hour we have is not enough. Otherwise I took a video of this class. From the time I entered the class up to the time I left, the class was noisy throughout. There was almost no effective teaching and learning taking place in that class. On one side pupils were fighting. Another side a child is pinching another child. While at the back another one is crying. Almost for thirty minutes, I was watching this chaos. So that is a very big challenge for us teachers when we are teaching mathematics in such a class.

Any other challenge that you can mention?

Here again we see the limitations of still pictures to document an ongoing process. The best would have been for the tutor to show the students the videos that he took showing the disruptive nature of the classes he was referring to. But that too had its challenges. He need time to edit the video and reduce it into short clips for his class presentation. Unfortunately he did not have the expertise required to edit those videos at that point. However that did not stop him from proceeding with his presentation. He had to complement the pictures with his personal comments to provide the students with some background information that the pictures alone could not provide. As such the discussions proceeded despite that challenge.

Student: Some pupils may not be attentive.

Tutor: Definitely! For most of these pupils if you are not using modern technologies like this one (points at the slide) the pupils will not be attentive. But the moment you bring digital technologies like the one we are using now when you are teaching, they will all be very attentive. But when you start boring them by talking, you will simply be wasting time for other teachers. Is there any other challenge?
Student: Identifying the children’s individual problems will be difficult.

Tutor: Very good! A teacher is not likely going to cater for the individual needs of all these children within the thirty or forty minutes’ lesson. Can you meet the individual needs of all these pupils within forty minutes?

Students: No! (In chorus.)

Tutor: So, there is no wonder that children are not performing well in schools because teachers are not in position to address the children’s individual needs because of the large number of children in classes. It means no effective teaching and learning is taking place in many schools. You as a teacher will just be wasting time in that school.

Student: Assessment will be very difficult to carry in such a big class.

Tutor: Yes. Assessment of the class will become very difficult. You know under the Thematic Curriculum, you are expected to do continuous assessment based on competencies that a child has achieved. For example during literacy hour if a child who had not been able to express herself in class manages to express herself, you are expected to mark that competence against the child’s name to indicate that the child has developed that competence of expressing herself in class. A child may not have been able to read and write a word and if the child begins to read and write you are expected to mark that competence in her assessment form. You need to remember that under the Thematic Curriculum, you do not give tests in primary 1 and primary 2 classes. They are assessed on daily basis. So if the number is very big the assessment you give to the children may not be appropriate. Is there any other challenge that we can face in such a class?

Student: The distribution of learning aids becomes difficult.

Tutor: Correct! Even making the learning aids themselves will be difficult. For example if I am teaching numeration system and place value, I want to use counters; can I get counters
for all these pupils so that they are able to use the counters for addition or subtraction of whole numbers during the lesson? Can it be possible? No! And that is why most teachers end up teaching mathematics in abstract ways without using instructional materials. For a child to remember best, you must use real teaching and learning aids for teaching concepts in mathematics. In that way a child will never forget easily. But when the real objects are not there you can use such digital technologies. You know when my colleague was teaching science a short while ago here you were able to see those rays and I don’t think you can easily forget about those rays. That is why we say instructional materials are very useful for the teaching and learning process of mathematical concepts.

Throughout this lesson, Anicua kept making reference to the advantages of using digital technology in large classes seems to reveal his consciousness about the potential that digital technology holds to address the challenge of having large number of students in Ugandan classrooms. Before his lesson, he had watched one of the tutors presenting a science lesson using digital technology. The effectiveness with which that lesson was presented is still fresh in Anicua’s memory. That is why he went further to use digital technologies when they do not have real objects to use as teaching and learning aids.

4.3.2.6 *Sub-theme 9: Increasing students’ interest and participation in class activities.* One could see the students’ interest in the class through their participation. They paid a lot of attention to the photographs that the teacher showed, and interest in the questions that the tutor asked. They participated very actively in answering the questions that the tutor asked them. The quality of their answers showed that they really understood the lesson. They gave correct answers to the questions raised. The tutor easily agreed with their responses as can be seen in this extract:

Tutor: Let’s look at how you can establish class control. How do you think we can establish class control? Yes. (Points at a student to give an answer.)
Students: By assigning some of these pupils to lead in class.

Tutor: Assignment of class prefects or monitors among the children, yes. That is one way.

Students: Coming up with an appropriate seating plan.

Tutor: Yes, seating arrangement, the seating plan depends on the teacher. There are some kids who are exceptionally stubborn. You should make such children sit in front so that you can interact with them or you can watch them closely. You remember in one of the classes where I went crying was normal in that class (laughter). Other pupils specialized only in pinching their friends. He will pinch one here and another one there, just like that.

Tutor: You can also use generic methods, methods that are child friendly. If the method you are using is interesting to the children, they will abandon whatever they have been doing and pay attention to you. But if the method you are using is not friendly to this child, the child will easily get bored and will begin to play or do his own things. Is there any other methods?

Student: Introduction of class rules.

Tutor: Yes, class rules and regulations. For example do not fight in class. You have to agree on those rules with the pupils [children]. The rules must be written and hang up on the wall so that each person can see them clearly.

Student: Giving them energizers [ice breakers to reduce boredom].

Tutor: Yes, those are important. Amidst your lesson you can make the children to sing a song, dance, or jump for a while to reduce boredom. You remember how I used to give you energizers. Can you remember? There should be energizers in between your lesson. Once the children start getting bored you bring an activity to keep them alert. Those are energizers.
Student: The number of pupils should be proportional to the number of teachers.

Tutor: Where will the others go? We have very few schools in rural areas. In a whole sub-county you may only have five schools. There is no way for you to chase the rest of the children and say this number is enough. Where will the rest go?

Students: (Murmm.)

Tutor: That one is tricky.

Tutor: What are the most common requirements a teacher needs in a mathematics class? I can give you one, records. You need to have records. Give me an example of records that the mathematics teacher must have.

Student: Register.

Tutor: Yes, one is a register. However that is general. Let’s zero on mathematics. Is there any other?

Student: The progress records.

Tutor: Yes, the progress records. We shall talk more about the nature of records later. Your daily assessment record. The assessment we talked about you will put it in record so that for example in theme one in mathematics a child has been scoring less than ten, you can have remedial. If most of the pupils have done poorly in theme one, you can re-plan for it. If they have done well you can leave [proceed]. But there may be others who need special attention. In theme one, they may have done poorly, theme two they may have done poorly. It is the duty of the teacher to pay keen attention to that learner who is not performing well. That has been determined by the progress record. Is there any record that you must take as a teacher? Yes. (Points at a student.)

Student: Instructional materials.
Tutor: Yes, records of instructional materials. Records are very important. You may have records of work. That you have covered. It must be kept. And the format of how those records should look like will be our topic for the next lesson.

Tutor: Is there any question or comment that you might have?

Student: I would like to know the difference between assessment record and progress record. Are they the same things or they are different things.

Tutor: Those are the same things. But they are of types. You may have the daily record. But towards the end of the term, you may want to give a report may be to the parent or guardian. What do you call that? Do you give an assessment record or something else?

Students: Progress report.

Tutor: Those are term report cards. You don’t give assessment records.

4.3.2.7 Sub-theme 10: Enhancing students’ understanding by making teaching and learning less abstract. At the end of the lesson I decided to let me know what they thought about the lesson.

Those who offered to responded all reported that the lesson was very successful and they enjoyed it very much. When I went further to specifically ask the students “How did the use of digital technology help you understand the lesson?” their responses were as follows: “We were able to see pictures,” “It reduces boredom and gives variety,” “It helps my memory,” “I was able to see the class arrangements,” “Seeing the photographs makes things real and practical,” and, “It motivates.”

The students’ responses about how the use of digital technology helped them to understand the lesson were consistent with my own observations in this class, where I could see the excitement and eagerness on their faces, and they were very attentive, watching the videos with interest and participating actively in class discussions. They gave correct answers. The class was very lively throughout the lesson. To further appreciate the role digital technology plays in transforming the classroom context let us consider another lesson.
This was a lesson with second year students. It took place in the Chapel Hall. There were over 200 students in the class. The lesson focused on individual differences among children and how they influence children’s learning. The tutor, Jokindu, began the lesson with video clips showing groups of children in a range of contexts. Jokindu’s use of digital technology changed the dynamics of the classroom context in many ways. However the most significant ways through which the use of digital technology changed the dynamics in the class included:

4.3.3.1 Sub-theme 11: Making teaching simple, more interactive and student centered.

Tutor: Ladies and gentlemen, from the videos we have seen there are a number of differences that we call individual differences among children. Based on what you saw in the videos can you tell me those factors responsible for individual differences among children?

Student: Differences in family background.

Tutor: Yes.

Student: Differences in environments in which children grow.

Tutor: Very good. Environment in which children grow causes individual differences among them. Any other.

Student: Poverty.

Tutor: Yes, poverty causes individual differences in young people.

Student: Heredity.

Tutor: Yes, someone may appear different because he inherited that from their parents. Yes, any other factors?

Student: Maturity.

Tutor: Yes, maturity. As children grow bigger they behave differently.

4.3.3.12 Sub-theme 2: Engaging students to think critically.
Tutor: Ladies and gentlemen since we have seen these differences what does it now mean to you as a teacher?

Student: Since the children come from different backgrounds we have to handle them differently in class.

Tutor: Quite good. You should not treat children equally in the same way because they come from different backgrounds. Some are from rich families others are from poor families, some are strong others are weak, so you need to understand these difference. Some are ladies and others are … Is there any other response?

Student: you can use it to counsel the students.

Tutor: Yes, you can use that knowledge to guide and counsel students. Is there any other use of having this knowledge of individual differences?

Student: You can use it to form groups, to group the children.

Tutor: Very good! You can use that knowledge to encourage them to form groups according to their characters and behaviours.

Student: It helps you to discover their problems.

Tutor: Very good. You can discover their problems and help them through guidance and counselling to give them a sense of direction and solutions. What else?

Student: It helps you to choose the appropriate method that suits a particular child.

Tutor: Very good, excellent! Are you from Terego? (Tutor makes a joke and student laugh) To use a proper method that suits that child to learn very well. You see we talked of individual differences … children learn in different ways: others by reading, others by seeing pictures like this, others by writing, others by touching. You sing together with them when they are memorizing something, o.k. You can even form what they are learning into a song so that they can sing it. For example, alu mi o’ba iri be na, alu mi
o'ba na be su … (one plus two is three, one plus three is four)… You see. Let them sing it. Form a song out of it because as they sing and move their bodies things enter into their heads [learning takes place], you can make others write. Is there any other implication?

Student: It can help you to organize their sitting arrangement in class.

Tutor: Very good! Are you from Terego? (Tutor cracks joke causing students to laugh. He too comes from Terego. The people from Terego take pride in being recognized as the most intelligent ethnic group in Arua) Yes, you have to make the seating arrangement according the knowledge of individual differences. You can make the stubborn ones to sit close to you.

Student: It helps you know what form of punishment to administer on each child.

Tutor: Very good. Yes, you assign punishment according to children’s backgrounds.

Student: It helps you to identify the slow learners and take them at their pace.

Tutor: Yes, that will help you to move slowly with those slow learners so that they are not left behind. And then you give different tasks to each category of students. You give some tough work for those intelligent ones and then less difficult ones for the slow learners so that you follow them. Everybody as I said earlier can learn but you must make them learn according to their speed. Is there any other point?

Student: It helps you to make them accept their differences.

Tutor: Very good. You see, we learnt that a child who is different from the others can easily be teased or intimidated by others or made fun of which can even make such a child to drop out of school. So you need to encourage them. Tell them this is how God has created us. We are all children of God. God created us differently so that we can be beautiful. You can see you appear so beautiful in front of me. You can see the beauty of God here, the
nature, so well: others have very round smooth baby faces, others juggled … (amid laughter from students) and others are what you call chocolate brown, others have box face (further laughter from students). So with this you find all these are beautiful. You can see the beauty of diversity. If everybody was created the same way, you can imagine how dull the world would be, how dull the class would be. You see, we are different. Those who have known mathematics can help us, those who do not know much English can rely on others, those who know science more can teach others. God gave different gifts to each person so that we can share them, we can enrich ourselves so that we can all become better. With this you will find all the children will remain in school. You encourage them to be friends and you counsel them. Yes, Perepetoa do you have something to tell.

Student: It helps you to know how to motivate them.

Tutor: Exactly! Let me tell you when an introvert tells you, after a long time, an answer – they normally tell beautiful answers, you say very well! Bako that is very good, next time you do that again. You clap for her. Do you think Bako will miss school again? She might even get up at dawn and ask mammy is it time to go to school (Students continue laughing). You have encouraged her. So you motivate the children according to their responses and according to their personalities so that they can also come up.

4.3.3.3 Sub-theme 13: Enhancing the students understanding by making teaching and learning less abstract and more real. When I asked how they felt about the lesson the following responses came up from the students and tutor, indicating the extent to which the use of digital literacy facilitated students’ understanding of the lesson:

Student: I’m Bada Ronald. I found the lesson very interesting.

Sam: Another person.
Student: Am called Numasaka Vincent. The lesson was very interesting because you find mostly we have just been covering things theoretically. But here we are now getting it … at least now it is practical because we are seeing the pictures vividly. Now we can understand the way children behave and after here when we go into the field we shall know how to handle them.

Sam: O.K. Is there any other comment?

Student: Am called Draleru Jacqueline. So the lesson was very interesting and we learnt very many things to do with children who have different personalities.

Sam: Finally, yes, give us your name and comment.

Student: Am Driwaru Judith. The lesson motivated me to be active in the class, and I could not sleep up to this time. (Students burst into laughter).

Sam: Why? Why didn’t you sleep during the lesson?

Student: Because of the many video clips.

Sam: So videos don’t make you sleep during lesson, is that what you are saying?

Student: Yes, because I will be watching what is happening in the videos.

Sam: O.k. finally …

Student: Am Joyce. It also gave me interest in learning how to handle different children, how children differ in their behavior and in other things.

Sam: How about you, Fr. Jokindu, how did you feel about the lesson?

Jokindu: I felt the lesson was very easy to conduct because I actually taught very little, everything was taught by the pictures and videos which made my lesson very simple and easy. Actually I have not felt tired as I used to feel because I used to do everything myself but the machine has done a lot for me and the students were only telling me the answers
from what they were seeing in the pictures and videos. I think this technology is a very good thing for me. I need to use it more.

The three lessons illustrate the various ways through which the use of digital technology transformed the dynamics of classroom context. In the lessons we see students becoming keener to take a center stage in their learning. They are interested, and their learning becomes more concrete as the outside world is brought into the classroom through the use of digital technology. They relate more freely with their tutors. Classrooms which would normally be lecture rooms turn out to be rooms for discussions. Classrooms which normally remain quiet except for the tutor’s voice became noisy with excitement. Having looked at how the dynamics of the classroom context had changed through the use of digital technology and cultural resources, I now continue with other roles that the use of digital technology and cultural resources played in improving teacher education.

4.4 Fostering Teamwork and Cooperation Among Staff

Teamwork was commonly observed during the lessons where digital technology was used by tutors to present their lessons. An example of team work and cooperation among staff was during Maratino Ucokonyakua’s lesson about forms of energy and energy conservation methods, April 22, 2012. This lesson took place in the college chapel. Maratino was the tutor. This was a science lesson. The lesson was attended by five other tutors including the deputy principal in charge of pre-service program. The title of the lesson was, “Forms of Energy and Methods of Energy Conservation.” The tutor lectured for 40 minutes to explain the different forms of energy, such as sound energy, light energy, electric energy, mechanical energy, potential energy, gravitational potential energy, solar energy, geothermal energy, nuclear energy, wind energy, and chemical energy. He made these explanations without much observable reaction from the students, and the students appeared bored. I could see some of them dozing as the tutor struggled to explain his points verbally. Some were leaning against the wall half awake and half asleep while others buried their chins in their hands as they
struggled to remain awake. Some of them were really struggling to keep their necks straight while others sat sluggishly at the desks. Others curved themselves towards their desks to hide their sleepy faces. The tutor was apparently talking to himself as the students were in their own world with hardly anyone in the class paying attention to him as happened when he tried to use an example of a car crushing a trailer to explain kinetic energy:

One thing to note about kinetic energy is that it depends on the mass of the substance and speed of the substance. For example if a trailer is crushing with a smaller vehicle moving in opposite direction in which direction will the combination move? (There was no response from students.) Are you getting that picture in your mind? A trailer is moving in opposite direction, a small car is moving in opposite direction and when they crush, are we there? In which direction will the combination move? [The tutor waited for students to respond in vain] … towards the direction of my car, no? [Tutor answers his own question after waiting for a response from the students in vain].

However, when he began to use pictures and video clips to illustrate his explanations the reaction was spontaneous. Students all woke up from disengagement and began watching the video clip without anyone asking them to do so. Their faces brightened. The sleep in the eyes disappeared. They all became alert and started paying attention as the tutor went on with his presentation on the major sources of energy:

We have got two major sources of energy. We have renewable sources of energy. These are those which can be replaced within the earth’s energy system. The renewable sources are those which can be replaced within the earth’s energy system like the bio-mass – the one before this (tutor instructs a colleague operating the computer to show another picture of a heap of dung as
students laugh and giggle in excitement with some pinching each other as they look at the picture). The bio-mass are the products from the dung of animals, even human dung… we can store this dung. In the course of its fermentation it produces a gas which can be used even for cooking in the kitchen. Animal dung … There is the other one. The other animal dung, the one before … Yes, this one! (Tutor instructs his colleague operating the computer to show the right slide). You can see the amount of this dung. We are wasting a lot of energy here. You go to (turn to) the abattoir (Tutor instructs his colleague operating the computer to show another slide with a picture of an abattoir as students watch while laughing.) We could collect that waste daily. It could be enough to provide fuel for cooking at Wati [core] PTC for a term. That energy could be enough for cooking you food, for one whole term. Even your latrines are producing a lot of energy here. We could use it in the kitchen for cooking but we are wasting it of course. So these are renewable sources that can be replaced (Students continue to react whispering to one another, pointing at the photo, nodding while laughing, pinching etc.). You can now go to the cows (Tutor tells his colleague who is operating the computer to proceed to another slide). You can imagine how many times a cow like this will defecate in a day (Tutor points at the picture on the wall as students continue to laugh). This cow can defecate any time which means the energy from cow dung can be replaced easily and within a short time.

At this moment the atmosphere in the class had completely changed. Excitement replaced the boredom that had engulfed the class. Both the tutor and the students became lively. The lesson was now more interesting not only to the students but also other tutors who had taken seats in the room. Everyone is becoming involved. Amidst the excitement, Nelly, a tutor who has been quietly helping Maratino to operate the computer stands up to add some complements and inject some humour into the discussion:
The Indians do not use firewood, they don’t eat cows but they use the cow dung for cooking. They dry it and burn it instead of firewood. And it cooks their food very first. And as he (Maratino) was saying we are wasting our dung here in the toilets. If there was a place where we could compress that dung instead of throwing it away we would not have to buy firewood to cook food. You are here already; which means we would not have to look for fuel for cooking (Students burst in a prolonged laughter. Some had tears on the edges of their eyes because of too much laughter while others kept rubbed their stomachs to minimize the pain caused by laughter). We would compress that thing into gas and use it for cooking your food. It is even much cheaper to use gas than using firewood. (Students shake their heads in amazement.)

As Nelly and students recover from the prolonged laughter Maratino takes to the floor to re-emphasize his point on renewable sources of energy:

Renewable sources of energy. This is the energy, which can be replaced easily within the earth’s energy system. There is no point where they are fixed, where after using them they cannot be replaced for a longer time like when you cut a tree, it will take five years for this tree to be utilized again, can you see that? Now after five years are you going to wait like that without cooking? Are you going to stay like that without ironing?

At that point I assumed the role of a participant observer and found myself interjecting to emphasize the importance of knowledge application to improve lives:

And I think the point he (Maratino) is now making is pertinent. He is making a direct appeal to you individually. Apart from taking this knowledge as an academic knowledge let us also try to see how we can apply this knowledge in our homes, in our individual lives. What sources of energy do we have in your homes, do we have electricity, possibly not, and do you have cows?
Possibly yes. Do you have trees? Possibly yes which means we need to start planting trees for our families, we need to protect our animals not only for the milk and meat but also for source of energy. And am sure at homes you have been having these animals for sources of energy without seriously thinking about them as such. How many of you have roasted potatoes or cassava using cow dung? (Students burst laughing probably because that used to be a common practice among the Lugbara but is despised these days.) At an elementary level you have started but our problem in Africa is that we don’t do research on things that we initiate locally. If somebody did a research on the potential for generating energy from cow dung using the traditional method we have been using- roasting potatoes and cassava, I am sure a very important discovery could be made. So let us now begin to look at this subject, this lesson as something for not only passing examinations but also for opening our eyes to improve our lives in our homes and local communities. Is that right?

“Yes!” (Students roared with passion and excitement)

Nelly takes to the floor again and brings a personal experience to further explain the importance of renewable energy and conservation in his characteristic style:

Just one minute. Is there anyone who comes from Kasese here, people from Maracha? (Some students put up their hands while smiling and laughing.) Now, I had the privilege of living in Bundibujo, Kasese and Maracha districts. When I was in Maracha, when I was in Bundibujo, Kasese, I learnt that those people do not have firewood. In Maracha, the place is very flat and you can see very far. The trees that you see are eucalyptus trees. If you are from Maracha and you stay away from home, unfortunately my boss (Deputy Principal Pre-service who was also present in the room) is from Maracha, if you have your grass thatched house and you leave it
for one year without living in it, you will find all the grass has disappeared. Even the rids, the ozu, the poles will all be removed for cooking food. The issue of firewood in Maracha is so extreme that when am digging I remove the odrokodro grass, get rid of the soil on it, dry it, and use it for cooking food. That’s why they [people from Maracha] eat ngenzea the small silver fish (students burst into a prolonged laughter because of the reference to ngenzea and nzenze (grasshoppers). These are very easy to cook using grass. When you go to Kasese, they use one source pan for cooking the food, the source, and the beans, the greens everything is put in one source pan and cooked at ago because firewood is very dear [scarce]. In Maracha here, when I plant cassava, they break off the cassava stalk, they clean it using a knife, put it to dry and use it as firewood. They plant another crop in the garden immediately. That is because of population pressure. Population explosion means we shall have less and less fuel wood. Now for your grandchildren, if you are from Maracha, your garden is the size of a football field, and you are ten children, divide that among yourselves, and see how much you are going to leave for your child, And then your child will also have ten children, now where is the land? So that is the scenario he (Maratino) is talking about. I want you to appreciate it and know that as you grow, you must start to seriously think about your future. Ask yourself, how many children will I have, depending on the resources that you have and continue that way? After one hundred years, your children’s generation will be compelled by Uganda Government to have zero children. [Students stare at the Nelly in shock and amazement.]

Maratino continues to refocus the discussion and connecting it to real life situation, using pictures that he deliberately took for use in the lesson:

We have said use energy sparingly. Are you using energy sparingly, Jerico? (Women students burst laughing because of the mention of their dormitory - Jerico). The principal was
complaining that there is a problem in Jerico. They said use energy sparingly. We are not scientific in our use of energy here – in Jerico. That’s why our electricity consumption there [in Jerico] is so high. But you are going to use energy at your home level. How do we use energy sparingly? Use energy saving appliances, or else when you enter a room you put the switch on and when you leave that room you must put the switch off. You don’t have to put all the lights on like they are doing in Jerico (This causes girls to laugh).

As the class went on I saw more and more tutors joining in the discussions and adding their voices to the topic thereby turning the class from a purely academic forum into a platform for students to get holistic knowledge. Gladys (the deputy principal pre-service) comes in to infuse some administrative message into the discussions:

Let me add some emphasis on that point. You are saying the right thing. After the principal addressed students and said the bill for electricity in Jerico was 600,000, yet here it is 200,000 for the administrative block. Yesterday, I wanted to find out why the bill in Jerico was so high. As we went through the dormitories we found out that all the switches there were put on. Then we also found the chargers for mobile phones being left on the sockets. They [ladies in Jerico] could not remove the chargers for the phone batteries from the sockets. We also found out they removed some of the sockets particularly those for controlling the lighting. All the wires were left bare. And that is very dangerous. We went round with female tutors to switch off. Lights were switched on in nearly all the rooms. Then we understood why the expense for electricity in Jerico was high – because power is constantly being lost. Let me tell you people whether there is electricity or not you should always make sure you put off the switches. It is good you have emphasized that point. Even in your own houses, you will need to be mindful of how you use your electricity. We are very careless. We are not used to electricity. I think if we picked may
be a European child that child would show you that [how to use electricity well] because for them they start learning that habit when they are very young. Most of their gadgets use electricity. So they are used to these things. So you emphasize that point so that we learn even the dangers of leaving the power like that. Suppose there is a short circuit. The whole house would burn. In fact for those who were around, you will remember last year Jerico caught fire and the house was going to burn terribly. Luckily it was seen early and we called the fire brigade to put off the fire.

Maratino takes to the floor again to emphasize the point on knowledge for practical purposes not simply for passing exams.

So you can see that it is not now only for passing examinations. This knowledge is for your daily use. You should use the available energy sparingly. So when it comes to methods of conservation of energy, it now points [relates] to you as an individual. It ceases to be year one students. It should be everybody’s responsibility. Use the available energy sparingly. When you are going to the kitchen put off the light in the seating room, then put on that one in the kitchen. When you leave the kitchen to go to the seating room, put that one off and as you enter the seating room put on that one. When you are leaving the seating room for the bedroom, put off the one in the seating room and put on the one in the bedroom. Spare your energy.

Although this was not the lesson that best explains the theme of validation of local knowledge, I wish to point out here that in this lesson and at this point Maratino also attempted to value local and cultural knowledge. In addition to emphasizing the need for students to seek to apply their knowledge on types and sources of energy, Maratino also talked very positively about local innovations to
Another method of conserving energy is to rely more on renewable sources of energy and then using more efficient energy conserving appliances. Like now although it is not the most efficient, you can now use the ovens that utilize less charcoal. Go to the next one [next slide]. (The tutor tells his colleague Nelly whose is operating computer.) Yes, that one! Can you see this one here (Tutor points at the digital picture on the wall)? It is smokeless. This oven is just like the charcoal oven but it is more efficient. There is no loss of energy. There is no smoke.

But something is cooking on it as you can see. You can’t easily realize that something is cooking there [inside the oven] because there is no smoke. So we should use appliances, which conserve energy like this one. We should not now use the metallic sigiris. (Students laugh because of the cynical reference the tutor makes to metallic oven to emphasize his point.)

People are now cooking just like cooking in a basket. You put in everything there – you put osubi [greens], you put beans, you put paste, you put everything there then put it on fire, let them find their own level provided it will be edible (Students laugh). It might look [seem] funny now but that is what is now happening. You cook in hay baskets. There is a place where you design a solar cooker where you put everything in a basket. Then you put hot stones here – you should have heated some hot stones here (uses a pointer to show), use non heat conductors to cover everything, then you put it in a corner, after six hours your food is ready. Everything – salt, water, this ai ti pa [potash], osubi [greens], etc. the heated stones can be used for three days then you can reheat them for further use. You can see that picture – energy conserving!

The use of digital technology, coupled with different perspectives offered by various tutors during the lesson, seems to facilitate critical thinking among students and making them ask very
constructive and engaging questions leading to deep discussions. For instance, after listening to the different perspectives offered by the tutors, one of the students put up his hands, and when he was selected he asked a very pertinent question:

My question is about nuclear energy. It is feared that the 3rd World War might be fought over fossil fuel or oil. But currently you find that America is against North Korea and Iran. They don’t want them to possess nuclear energy, now I would like to know more about the significance of nuclear energy and why is America insisting that other countries should not have nuclear energy when they themselves have it. But as I understand America is the one who possesses the biggest nuclear bomb and it is even the one who has ever used nuclear bomb.

The question really took me by surprise as it was beyond what was to be covered in the PTC curriculum. I was not sure if the tutor would give an appropriate response to the question. But to my surprise, the tutor gave an excellent response and said:

As I was saying, there is that other topic about nuclear energy that we haven’t touched on. We call it radioactivity. However, I can even answer the question here because it is still part of energy. Our concern here is the form of energy we need, namely the heat energy and light energy ... When the nucleus of an atom breaks while looking for stability, it releases a lot of heat as a result of exothermic reaction which is our concern here. But apart from the heat energy it also releases electromagnetic radiations. I didn’t talk about the x-rays, I didn’t talk about gamma rays, I didn’t talk about the alpha particles. So when the nucleus of an atom breaks, it releases those dangerous rays that when passed through human body or indeed any living thing, they tend to destroy some body cells. And that is what the Americans … in fact the United Nations, not only Americans don’t want. UN is critical about nuclear. Uganda has uranium but
when Uganda wants to develop this uranium to generate electricity, UN must be there to watch what Uganda is doing. Uganda must not use it to release those unwanted radiations for human destruction.

I offered a complementary explanation to the one offered by Maratino and said:

The explanation he [Maratino] has given is perfect. Am glad that Maratino went to the details of explaining how heat energy is released when atoms break and the radiations that they produce and how dangerous the radiations are to the human and plant life. A typical example of this was, if you can remember your history of World War I and World War II and the throwing of the atomic bomb in Hiroshima and Nagasaki in Japan, the consequences still exist up to this day where children are born without limbs, because some of the radioactive materials have stubbornly remained in the air and in the soil and when it rains they find their way into water and foodstuff that people take. When people come into contact with such radioactive materials they denature people’s genetic composition resulting in people being born without heads, others without limbs, and so on. This creates some kind of undesirable situation. America has been the first country on earth to drop a nuclear bomb and yet they are the first country to stop others from acquiring nuclear bombs. Their argument is that they know how dangerous it can be and they are the only people who are capable of containing its proliferation. So they don’t want any other country apart from the five permanent Members of the Security Council – USA, Russia, China, Britain and France, to possess nuclear weapon. But some countries have gone ahead despite the UN resolution against the acquisition of nuclear weapon to develop the weapons secretly. These include North Korea, Pakistan, and India. North Korea now uses its nuclear capability to negotiate bilateral and multinational agreements. That’s how complex the issue is.
When I entered the class I did not expect to be involved in the class discussions. I had initially thought that I would not be directly involved in the class discussions but the kind of atmosphere that ensured was very compelling for anyone who had any useful information to contribute. It made me experience the team spirit engendered by the use of digital technology in that class. It was very difficult to resist the temptation to join in the class discussion. I understood why tutors found themselves joining in the class discussion.

One other thing that struck me in Maratino’s lesson was how the curriculum was organically re-enacted/negotiated in that class to address local issues such as the escalating cost of electricity in the women’s dormitories that the college was facing and the global tensions over fossil and nuclear energy. By infusing their lived experiences and local examples the tutors were able to make students appreciate the importance of energy conservation in real life situations. The tutors who had opportunity to speak during the lesson brought different perspectives to the discussion which helped to enhance the students understanding of the issues.

4.5 Integration and Validation of Local Knowledge and Cultural Practices for Formal Education.

The findings from the study further reveal that the use of digital technologies is promoting the validation of local knowledge and local cultural practices as useful resources to improve pedagogical practice. I will use Owini Antoni Anwar’s mathematics lesson of April 20, 2012 to illustrate how the use of digital technology has promoted the integration and validation of local knowledge and cultural practices to improve formal education. In that lesson, the tutor went into the local community and recorded an elder who helped to explain the origin of numbers and counting among the Lugbara who live around the research site. Below is how the discussions went in the video:

Owini: Thank you very much for honouring my invitation. This one next to you is my colleague Mr. Okuvua Mudea. We are going to have a brief discussion about numbers. I am preparing to teach my students about numbers and how counting of objects started,
numbering of objects which I want you to help me explain as a resource person. Can you explain for us how counting traditionally originated among the Lugbara community. How did the Lugbara start counting and using numbers.

Elder: In Lugbara land, we used to have our resources in form of animals, birds particularly chicken. So our people would like to know how many cows they had. The most important form of wealth was the cow. To count cows, we used to have some objects to be used to represent the number of cows that one had. For example we could use stones or sticks to represent the number of cows. If you had four cows you would keep four stones or sticks somewhere in the house to represent the number of cows you have out there.

Owini: Now when you want to relate the number of objects you have kept with the number of actual cows how would relate that?

Guest: For example if you had given out one of your four cows, you would also remove one of the four stones you had kept in your house and throw it away so that the number of cows you are remaining with is equal to the number of stones you are left with.

Owini: What happens if you have an additional cow may be your cow has given birth how do you take care of that?

Guest: You bring another stone and add it to the ones you already have to make sure that the number of cows you have out there is equal to the number of stones representing them.

Owini: How about relating the objects with words or numbers, how did that come about?

Guest: The words came from children’s games. When they were playing children would make different types of sounds and when the need to refer to abstract numbers arose, some of the sounds were adopted to refer to specific number.
Owini: Yes, my colleague may be you have something to add on what mzee [Mr.] has explained.

Okuvua: Yes, he is right in what he has said. Of course from the presentation, it is exactly what actually took place. Some people would use sticks instead of stones or pebbles. They would know this is one, this is two, etcetera. And perhaps if it reaches ten they would say one bundle of ten and they would tie the ten sticks with a string. If there was an additional one it would be kept besides it which would mean additional one on top of ten until it reached the number of animals this person wanted to represent. Of course these animals would be straying into the bush during grazing but at home you would keep this record. If a colleague or visitor came home they would have conversation and this person would say I have such a number of animals by referring to the number of sticks he has. Sometimes these people, particularly the shepherds would move round together with the pebbles inside their bags made out of hides and skins. If any one of the animals got lost they would begin counting using the stones and they would know how many animals are missing. And again mzee has said counting words came from children’s games. You know children like playing very much and that one became eminent when the word alu [one] came in. He was saying alu iri na [one two three]. Alu meant the idea of oneness, loneliness, singularity. It meant a single thing. Iri [two] came with the concept of other. It means you don’t only have one but you have another. You would refer to the second cow as the other cow or simply as the other one. Then na [three] came because when you have three cows you would allow them to graze in the forest as they were many enough to graze together. So, na is associated with grazing. Su [four] meant the animals had become a community because the word suru in Lugbara means community or clan. Towi was derived from the word to which means to put or place or
accommodate or put into a place or a container. When the animals reached five they had to be put in a kraal for them to be safe. Hence the number five was hatched. Azia [six] came as an addition on top of the five animals already kept in the kraal. The word azia in Lugbara also means another one or an addition. Aziri [seven] means two more on top of the five. Aro [eight] came in because one of the animals produced a female calf. It derives from the Lugbara word aroni, which means female. Then after the eighth animal this man waited for a very long time for another animal to produce and when it finally came he the man said he really got tired of waiting for this one so he called it oromi to denote the Lugbara word oro, which means tired. After reaching the number nine, the man did not know how to count further. So, he came to his fingers and he forgot about [set aside] the stones and pebbles. He began using his fingers for counting alu [one], iri [two], na [three], su [four], towi [five], azia [six], aziri [seven], aro [eight], aroma [nine], and when he reached ten he folded all his fingers together and he gave the name mudri for ten. In Lugbara mudri may mean folded arms or hidden fingers.

This elder was able to trace the history of counting and explain to the class how each number came into existence. This kind of knowledge could not be found anywhere in the books of mathematics. Through the use of technology, the tutor is able to document this knowledge and bring it to the classroom to simplify abstract mathematical concepts, which would be difficult to explain without the mediation of technology. This recording can be edited and produced on CDs for students and other interested persons to buy for their personal use. This should be done with the permission and consent of the elder for ethical reasons.

Other than the classroom observations, our interactions with participants elsewhere also revealed that local knowledge and cultural practices are indeed being validated through the use of modern technologies. For instance in a focus group meeting that was attended by Dr. Bonny Norton
(one of my supervisors who visited me during the data collection) and I, Dorcus (a focal research participant) gave us this report:

Dorcus: In one of… was it Betina’s lesson, they [the teachers] moved into the community and found the reverend pastor in the local community church at Obizea Primary school who is a farmer with lots of animals. Betina was going to talk about animal habitats in the class. So she visited him and took photos, asked him questions and after giving Betina all the information she wanted, he was asked if he thought it was good that Betina had taken his photos and the photos of his animals and he had given to the school whether that was really important, and he talked a lot about what had happened.

Bonny: What was his central point?

Dorcus: He said he himself had never been to an agricultural school as such but had learnt his practical skills of animal rearing from the church and from NAADS organization and they have trained him on how to keep the animals and this [practical skills] is what the children in the classrooms in Uganda lack. They are blocked by the four classroom walls from the real world but now it is important for them to see what is outside through the use of modern technology. They can see that a person like him who has not gone into any agricultural school can also be useful to teach in schools and that there are practical skills a person can also learn outside the classroom and these days there are not many jobs even if they get into the classroom and they don’t succeed in school they can still come out and keep animals. And he thought that it had also given him a chance to go into the class and talk to the children without physically being there… And he also felt honoured to be recorded for purposes of teaching and learning. We found the wife in the garden and she said when she first saw Betina with a camera, she was terribly scared and wondered what her husband had done for which people had come to arrest him. She
thought her husband had committed a crime, but then to learn that what they were doing which was seemingly of no value and very ordinary was being appreciated and recorded using modern communication technology and to be taken into the classroom was so overwhelming for us.

The local people were not the only ones who valued the use of their local practices to improve teaching and learning. The national experts also view technology as a useful tool to bring cultural resources into the classroom to improve teaching and learning as highlighted by the permanent secretary in the Ministry of ICT during an interview I had with him on January 18, 2013:

In my primary [primary school days] we used to sit with my parents and grandparents and there was a time for storytelling and we used to gather around the fireplace. We learnt a lot of things. The story would end with a question on what did we learn from the story, the moral. Up to today we have used and continue to use some of the lessons learnt from such stories. So when you use technology to capture such things it is exciting. They are disappearing! In fact you better run very quickly and teach us how to capture them, record them and store them electronically and that information will stay. So technology can contribute to development of morals which subsequently contributes to good learning. It sets the environment for the learner and the teacher because a teacher without morals is not a teacher at all. The challenge is how do we keep the student in class through technology like you were talking about … Your research has touched a sensitive subject … we have come to realize that ICT is at the center of the revolution in the knowledge economy. Otherwise we have no alternative. It is a global revolution; we cannot afford to be left behind because it is the only bus left! You either embrace ICT or … (Permanent Secretary, Ministry of ICT, personal communication, September 7, 2011)
Okaka, a scholar who also heads the Department of Literature at Kyambogo University agrees with the permanent secretary about the urgency with which technology should be used to preserve and promote local cultural heritage:

I would actually say that as far as technology is concerned we are still in the Stone Age. Essentially our oral literature is great, but we (in the wider world) are already moving away from primary orality to secondary orality and secondary orality as you know is oral literature packaged in television, packaged in radio and in folkloric film and all these avenues. So, as long as we are in our old word of mouth communication strictly, we are not going to reach anybody with that, but when we package our oral literature in the new form, oral literature in written form, oral literature recorded in radio, in TV recorded in film form we will be able to maintain our cultural mode of communication within the new context of communication which is driven by technology and that is where we should be going. (O. D. Okaka, personal communication, September 7, 2011).

The permanent secretary and Okaka both view digital technology not only as a means to validate local cultural resources for use in the classroom but they also digital technology as a means for sustainably preserving those useful cultural traditions and practices from extinction. From their perspective, there is value in the African oral traditions and practices but for these valuable traditions and practices to survive the global technological era they will need to be converted into digital form to make them more attractive not only to the local but also the global community.

4.6 Enhancing College–Community Relationships

In Chapters One and Two it was noted that one of the major challenges currently facing Ugandan education is that there is a huge gap between schools and communities arising from the failure to recognize local community resources as valuable educational resources. One of the key
findings of this study was that digital literacy plays a significant role in bridging the gap between the college and the local community documenting the locally available knowledge in the communities and bringing them into the classroom to improve teaching and learning. As the tutors go into the local community with digital technologies to look for local content they are able to meet and interact with very important people in the local community whose work has direct implications on the lives of the college students. To illustrate how the tutors are using digital technologies to bridge the gap between the college and the local community and improving the college – community relationships, we shall look at one of Maratino Ucokonyakua’s science lessons. The lesson was presented on July 19, 2012. The topic centered on water and sanitation.

Thirty minutes to the start of the lesson Maratino and I are seated in the staff room perusing the Daily Monitor and the New Vision newspapers for that day. As I turned the pages by a rare chance I stumbled on an article entitled “Most Ugandans Fetch Water from Unprotected Sources” which the editor regarded as the letter of the day that demanded special consideration. As we read the article, we kept smiling and shaking our heads in amazement; it was as if the article was written with Maratino’s lesson in mind. It highlighted the importance of safe water for daily survival and made very compelling arguments for investment in safe water resources for the benefit of the Ugandan population. Maratino very much wanted to include the article in his presentation. However his challenge was how to convert it into a digital format to be projected on the wall for the whole class of approximately two hundred students to read. We went to the ICT lab to try to get a digital version of the newspaper from where we could then download the article. Unfortunately, there was no network at that time and internet was not working well. There was no scanner in the ICT lab either to scan the article. Maratino thought of riding to Arua Town to scan the article but the time left could not allow him to do that. He decided to pull the page containing the article out of the rest of the newspaper. He put it on a table and used his digital camera to take a picture of it which we then uploaded onto the laptop for Maratino’s presentation.
We still had some fifteen or so minutes before the lesson but Maratino could not wait. He insisted we should head to the class. His impatience was perfectly understandable. This was the fourth time he was attempting to teach this lesson. The lesson had failed for three consecutive times due to the absence of electricity or equipment failure – LCD projector or loud speaker not working well. Despite all that he has been persistent. This time we were sure the lesson would go on. We took all the necessary measures and had an alternative public address system and a standby generator in case of electricity failure. By the time we finished assembling equipment for the presentation; the college students had already entered the class and taken their seats and were waiting with great anticipation.

In a moment, Maratino stepped forward as if he was going to say something. Instead, he stepped back and looked at the equipment for some seconds as if to plead with it not to disappoint again. The students got the message and burst into a hearty laughter. “Good morning class.” Maratino greeted the class. “Good morning sir!” the students roared with lots of excitement on their faces. He told the class that his lesson was going to focus on safe water and sanitation, which he argued was one of the biggest challenges facing the country. To support his argument he put up his first PowerPoint which contained the New Vision editorial article that incidentally centered on the critical importance of investing in safe water and he asked the students to read the article. Suddenly, there was a deafening silence in the room. For about five minutes nobody spoke a word. Everyone was quiet. Only Maratino’s footsteps could occasionally be heard as he paced up and down, waiting for students to finish reading the article. All eyes were fixed on the article. Judging from the looks on their faces, it appeared the students were absorbing the message. They all looked serious, with a few shaking their heads in awe.

“Have you all finished?” Maratino broke the silence. “Yes!” the students shouted in chorus with some feeble voices saying “no” from the back of the class. Maratino asked them to share their thoughts about the article in pairs upon which the students turned to each other and began discussing the article.
The noise levels went up as students engaged each other in very lively discussions. Maratino then asked the students to share their thoughts with the rest of the class. There was a consensus about the issues raised in the article, particularly the fact that the bulk of the Uganda population had no access to clean water and that lack of access to clean water was a major cause of death in many communities across the country.

After adequate discussion on the newspaper article the discussions then shifted on the substances that contaminate water. Maratino specifically asked the students to identify the substances that contaminate water sources in the local environment. When students began to give generic answers like industrial waste and sewerage, Maratino decided to show them a video clip that he himself took the previous day in a nearby valley showing rainwater loaded with all sorts of garbage including plastics, mud, rags, leaves, dead animals, waste food, used condoms, and worst of all human waste - the site of which made students scream spontaneously in irritation before bursting into laughter as flies hovered over the feces.

It was interesting to note that although the stream where Maratino recorded that video was just near the college, students and staff had not paid much attention to what goes on there and how it relates not only to the PTC curriculum topics but also their own health. But through the use of the video Maratino was able to make a connection between what students were learning in class and what went on in the local community and how it impacts on their lives. From the video you could see evidence of poor waste management in the community and the potential health risks it poses to the community.

After skillfully using the video to highlight the consequences of poor waste management and the importance of drinking clean water, Maratino then asked students to watch yet another video that he recorded at the water processing plant in Arua town and encouraged them to take notes as they watched the video. In that video Maratino asked the water engineer to take him through the process through which the piped water from the National Water and Sewerage Corporation is purified before it is
supplied to households for consumption. The engineer’s description of the process of water purification and the images that accompanied his explanations were so informative and comprehensive that at some point I was more of a student in the class than a researcher. The information the engineer was providing in the video was as new to me as it was to the students. Even though I have been drinking piped water for many years, I had no idea how the water was processed, yet the processing plant was only about a kilometer away from my place of residence.

The engineer highlighted five important stages in the purification of water, namely (a) the intake or abstraction stage; (b) the aeration stage; (c) the chlorification stage; (d) the filtration stage, and (e) the disinfection stage. He explained that during the abstraction stage water is cleared of all the floating objects by passing it through a fork screen which gets rid of bigger objects and a fine screen which clears it of smaller objects before it is send to the abstraction pipes that take it to the aeration stage where water is exposed to the air to remove the smell and taste arising from the gases like hydrogen sulphide and ammonia, and iron from the remains of dead animals, plant and human wastes, which dissolve into the water upstream. By exposing the water to the air the gases are oxidized and released into the atmosphere. In the process the taste and smell oozing from the water is removed while iron is removed by the process of oxidizing iron (III) oxide into iron (II) oxide. In the chlorification stage, raw water is allowed to flow into a chamber where it is dozed with aluminum sulphate solution to remove the color and the turbidity caused by suspended matter in the water. At this point, the suspended particles settle at the bottom of the chlorifier and clear water comes on top which is then channelled into the filtration stage where suspended particles that could not be removed during the chlorification stage are physically strained by the filters (sand and gravel) to allow clear water to pass to the final stage. At the final stage (disinfection stage) water is dozed with chlorine solution for thirty minutes to kill all the pathogens (disease causing organism) before the clean and safe water is pumped to the reservoir on top of Arua Hill from where it is supplied for domestic consumption.
use of the video Maratino made it possible for the water engineer to explain to the college students, in
greater detail, how safe water is processed and delivered for domestic consumption.

At the end of the video clip Maratino was so excited that he shook the engineer’s hand several
times in appreciation and said, “You have completed my lesson! Thank you very much!” which indeed
marked the end of the lesson. The students, Maratino, and I all came out of the lesson with a sense of
happiness. The lesson really made me realize the critical role that technology and digital literacy can
play in bridging the gap between the college and local community by capturing what goes on in the
community in video and transporting it from the community sites into the classroom for pedagogical
purposes. It also encourages tutors to be more innovative in their professional practice. Through the use
of technology Maratino was able to use the taken for granted knowledge such as that of rain water and
the expert knowledge such as that of the water engineer to explain the curriculum topic on water and
sanitation in such a way that students were able to relate academic concepts with real life experiences.

Reports from the teachers of Obizea and Aramua Primary schools who participated in the study
also suggest that the use of digital technologies is indeed improving the school community
relationships and reducing the alienation of schools from the local communities. For example, when
asked to make a comment on how the community views the use of digital technologies to transport
cultural resources into the classroom to improve teaching and learning in schools one of the
participants who used to go and take video clips for their topics in the community markets, and
churches made the following remarks: “They feel happy that the information they give and the
activities they engage in can also help the children learn better. It [technology] brings the community
into the classroom. They feel they are also part of the class, part of the education system.” (Abazoa,
focus group interview, May 30, 2012)
Lugbara cultural leaders also share the view that the use of digital technologies can promote school – community relationships as echoed in one of the cultural leaders’ comments during a focus group discussion.

I think it is very possible. I think that in as far as the teachers can go, and do video footage in the community and bring it to the classroom, they can also take the class out to the community and say look am taking you to see our Local Council III meeting and the students will go there and bring or take that footage also you bring it home, and then the people in the LC council will say oh so our students are interested in what we are doing, so it reinforces both sides such that the sense of belonging now becomes stronger. I really think it can help to bridge the gap (Dick Nyai, focus group interview, May 19, 2012).

The cultural leader recognises the role that digital technology can play in bridging the gap between the schools and the local community when teachers go out into the community to record community practices and bring those community practices into the classroom digitally. However, he suggests that it should not only be the teachers top go out into the community to record the local practices to improve teaching. Students too should be encouraged and supported to use the technologies to document local practices to demonstrate their interest in the local practices so that the community can see the usefulness of the kind of education that their children are getting. This will make people develop further interest in the school activities.

4.7 Integrating the Local with the Global

The findings from the study also suggest that the use of modern technology as pedagogical tool was promoting the integration of local knowledge with the global, thereby making teaching and learning more exciting for both the students and tutors. To illustrate how tutors are using digital technologies to integrate local knowledge with the global to explain concepts, I make reference to Bilha
Angualiru’s lesson on volcanicity and physical features associated with volcanic activities. The lesson was presented on April 16, 2012 at the main hall.

After setting up the equipment, the rest of the tutors who had accompanied their colleague to the class took their seats on the sides. The tutor in charge of the lesson (Ms. Bilha Angualiru), who was about 8 months pregnant, walked carefully, calculating every step she took, to the front. Without saying a word, she threw a quick wink at the machines and looked at the students with a suggestive smile that threw the already excited students into a prolonged laughter. As the students burst into laughter, the tutor could not hold her own laughter. She too burst into a hearty laughter. This made student choke with more laughter. It was hilarious! I also found myself laughing. The tutor seemed popular among the students. In a moment the tutor cleared her voice and said, “Good morning,” and the students roared, “Good morning, madam!” “How are you today?” the tutor went on to ask. “We are very well, thank you! How are you, teacher?” the students shouted at the top of their voices. “I am just as you can see me,” the tutor responded with calmness and calculated smile that left people in the room smiling and murmuring.

The tutor began by telling students that her lesson of the day was going to center on the formation of volcanic features. She gave an outline of her lesson, which included a discussion on the common myths about the formation of mountains, definition of volcanism or volcanic eruption, a video on how enyasa (a kind of local food) is made, a video on volcanic eruption, features of violent volcanism, features of mild volcanism, and a class discussion. She drew closer to the tutor’s table next to her on top of which was a laptop. She clicked a button on the laptop and within seconds, a slide appeared on the wall with an outline of the lesson. “Wow!” a student shouted involuntarily from the back triggering a spontaneous round of laughter among students.

The tutor asked the students if they knew any mountains in Arua District. The response was electric. Nearly every student put up their hand to be selected to name the mountains they knew within
Arua District. The tutor picked on a few hands and asked the students to name the mountains they knew. The mountains students mentioned included: Wati, Liru, Lukuluku, Oci, Odraa, Arua Hill, and Ojukua Hill, which the tutor underlined. The tutor wrote names of the mountains on a flip chart as students mentioned them. She asked any student who was ready to share with the rest of the class the cultural beliefs people in their villages hold about the formation of these mountains. Students gave very interesting accounts of what the local communities believed about the formation of these mountains. One student said people in their village believed that the mountains “just happened” when the earth came into existence. Another one said the mountains were spat out by a dragon in anger. Another one said the mountains were created by the god of war to protect the Lubgara tribe from its enemies. The tutor wrote the responses on a portable blackboard hung loosely on the wall. The tutor thanked the students for their answers.

When the tutor was about to go to her next slide, a student seated at the back of the class put up her hand to draw the tutor’s attention. The tutor called her by name and asked her whether she had a question or comment. The student said she wanted to narrate a story about how one particular mountain was believed to have migrated from some else and settled where it was, according to a Lubgara legend. “Which particular mountain is that?” the tutor asked. “Ojukua Hill” the student answered back. “Great! Go ahead and tell us that story,” the tutor said, as if that was what she had been expecting all along.

“Once upon a time,” the girl began her story, “there was a mountain called Ojukua, who lived in Rhino Camp, at the banks of River Nile.” When the student used the word “lived” for a mountain the class burst into a prolonged laughter. The student had a great sense of humour. She never laughed much but she occasionally wiped her upper lip with her tongue and made facial expressions that made students to continue laughing. “While in Rhino Camp,” the student continued after the laughter had subsided, “Ojukua produced very fertile soils at the slopes.” Again, the class broke into more laughter when she used the word “produce” in reference to a mountain. She paused for a moment, cleared her
throat, and continued with her story as some students could be seen wiping away tear from the edges of their eyes caused by too much laughter.

She narrated that Ojukua had thick forests that provided habitats for wild animals and birds that preyed on peoples’ crops like groundnuts, cassava, potatoes, millet, maize, and sorghum. People would send their children to scare away the birds and animals. The children would make scarecrows, effigies and masks and place them in different corners of the fields to scare away the birds and animals. They would hit metal pieces and drums hard to chase the birds and animals. They would sing songs blaming the birds of Ojukua for preying on their crops. Every morning, the cacophony of the blame songs and the drumbeats, and the banging of metal pieces would fill the air to the chagrin of the spirits of Ojukua. The spirits of Ojukua became concerned. They began to worry about their safety in that village. Stress soon began to take its toll on the hill. The thick vegetation that used to cover its head [top] began to disappear and the hill began to develop a bold head. In the evenings, tears would be seen rolling along Ojukua’s chins. As the harvest from the gardens began to decline, people started dying of hunger and starvation. The girl narrated that as the hunger intensified one of the eldest and most respected men in that village died of a hunger related disease and the entire village was shaken to the core. People blamed Ojukua and its birds and animals for the death. The spirits of Ojukua got fed up with those endless blames, curses and condemnations levelled against them. In the middle of the night before the burial of the old man, the village experienced an earthquake unknown in the entire history of the village. Amidst devastating tremors and a life-threatening storm, Ojukua took off in anger to go into exile in Zaire, presently The Democratic Republic of Congo. She flew along the valleys of river Enyau. When it reached near mountain Wati, the spirits of Wati asked Ojukua what the matter was and why it was moving at such a dangerous hour of the night. After narrating its ordeal, the spirits of Wati sympathized with Ojukua and asked it to settle where stood presently, along the Terego and Maracha
border. Both students and staff enjoyed the humour and narrative techniques with which the girl narrated the myth concerning the formation of Ojukua Hill.

A recently taken photograph of Ojukua was flashed on the wall for students to see. This triggered more excitement among students. A student asked the tutor to request me (researcher) to show for them the location of our home in the photo and to confirm if the story the other student had just told the class about Ojukua was a true story since I had earlier on introduced myself during student assembly as someone who grew up in Inia village along the Eastern slopes of Ojukua Hill (Andema, 2009). I showed to the class our home in the photograph to the excitement of the entire class. I also confirmed that the story the girl had told the class was a true story, which has been passed on from generation to generation. However, according to another school of thought the purported migration of Ojukua Hill might have been a result of some confusion about the meaning of the Lugbara word “enga,” which has two possible meanings. The word “enga” may mean “to germinate from the soil” or “to migrate from another place”. A long time ago people who lived in that village never used to see a hill where Ojukua stands today. Then after some time, a rock began to emerge from the soil. With each rain season, the rock grew bigger like a mushroom and the story started circulating about the “germination” of a hill in the village. The problem came when some people from the village many of whom used to be hunters went to hunt wild animals in Rhino Camp along the banks of River Nile, where they found a huge hole. When they saw the hole they thought it was the hole left by Ojukua when it “migrated.” As time passed the original story of Ojukua’s “germination” from the soil was lost and the later version of its “migration” from Rhino Camp gained popularity and it became more dominant. This scenario is reminiscent of a common Lugbara proverb that states, “Anya pa dri ki dri o’doo ujo kala ii ru siri ajoku, ‘ba dori bi piri nga ndenia ujo jo I dru,” which loosely translated as, “Until animals start telling their own stories, the hunter will always have the best part of the story.”
The tutor used the myth surrounding the formation of Ojukua hill to provide a scientific explanation of the way mountains, particularly volcanic mountains are formed. She explained that the earth is spherical and that at the core of the earth has a hot and constantly boiling liquid called magma formed as a result of excessive pressure from the surface of the earth. When a crack develops along the earth’s crust the larva forces itself through the crack. The magma may solidify under the surface of the earth or it might come out to solidify into a rocky mountain. Those that form under the surface of the earth might eventually emerge to the surface due to soil erosion leading to the formation of residual mountains like Ojukua. In order to simplify the concept further, she played a video she had recorded of a village woman while cooking Lugbara traditional food commonly known as enyasa. In the video the woman was asked to explain why she sprinkles cassava flour on top of hot water before mingling the food. She explained that cassava flour is sprinkled on top of the water to stop water vapour from evaporating and to let pressure build underneath in order to make the water boil faster. As soon as the water boils, more flour is poured into the source pan. Within two minutes, the boiling water underneath forces its way through the flour which will then be mingled and poured into a plate like a mountain. Students watched the video amidst intermittent laughter and excitement with others constantly nodding their heads in approval.

The tutor then went on to show a video clip on a real volcanic eruption that she had downloaded from the Internet. The video showed how red-hot magma erupts violently from underneath the earth, spewing molten magma into the air, rolling over the land surface consuming plans, animals and human beings along the way before piling into a heap of cocks. The effect of the video on the students was amazing. There was total silence as the video went on. All eyes were fixed on the wall. Some students buried their chins in their hands as they watched in awe the devastation caused by the volcano while others sat on the edges of their seats.
After the lesson I had an opportunity to interview the tutor about what must have prompted her to come up with such innovative ideas and this is how our conversation went.

Sam (I): You used or you brought in cultural resources … I remember you brought in a video of how water for cooking food begins to boil, how the steam begins to shoot into the air before the real boiling of the water starts et cetera to explain the concept of volcanic eruption, how the process start etc. How did you come up with these ideas? What prompted you to come up with these ideas?

Tutor: What prompted me to bring in this example was the fact that when we look at the real volcanic eruption itself, it’s a bit far from our local vicinity. We don’t have volcanic activities commonly taking place here. But I thought what was more practical to our setting was to bring an example of how we prepare our local food locally called enyasa. I thought the process of heating water to the boiling point, pouring the cassava flour into it and waiting for it to erupt before the food is mingled into a heap that is later on poured onto a plate would be similar to that of volcanic eruption. For example, once you put water on fire, especially our local way of cooking using fire wood where we put three stones and push in a lot of fire wood that produces a lot of heat energy so that the water that is boiling gets a lot of pressure underneath and later on you would see the water beginning to boil. And what we normally do is before the water boils we get some bit of cassava flour and we sprinkle it on top of the water so that all the water vapour is accumulated within the water itself and once it reaches its boiling point it will not withhold the heat. This heat will burst and erupt. And then finally when you have finished mingling food, the end result, what you see on the plate looks almost like a mountain. The enyasa looks like a mountain on a plate. So I thought bringing this as an example would give the students a clear picture and it would give me an opportunity to
explain to them because it’s nearer, though not exact, it’s nearer to the process of volcanism.

One could see clearly from the students’ reactions to the digital resources in this lesson that technology was indeed a powerful tool for effective teaching and learning. However, what made this lesson exceptionally effective from my perspective was not only the use of the video that the tutor downloaded from the Internet, but it was the range of resources both local and global that the tutors was able to integrate to make the lesson very effective and successful. She began by establishing a rapport with the students through informal interactions and then went on to give an outline of her presentation. She started the lesson by drawing on students’ local cultural knowledge and innovatively used the myth surrounding the formation of a local hill and the process of making local food to explain the concept of volcanic eruptions. She then ended the lesson with a video of volcanic eruption where in the background an expert kept explaining to the students various aspects of the video, which made them to understand the concept in a way that they may not easily forget. It was interesting to note that despite her use of the digital resources the tutor didn’t completely abandon her traditional technologies of chalk and blackboard. She even went further to use flip charts to write on during the discussions. In this lesson the tutor managed to demonstrate that the digital technologies and the traditional technologies are not necessarily mutually exclusive. Traditional technologies and digital resources can complement each very well to achieve meaningful educational change.

4.8 Inspiring Teacher and Student Resourcefulness

One of the persistent concerns some scholars have raised about the system of education in Africa broadly and Ugandan education more specifically is that it is theoretical and it does not prepare its recipients to be creative and innovative (p’Bitek, 1986; Ssekamwa, 2000; Tiberondwa, 1998). Ugandan teachers are further accused for not being resourceful enough to improve teaching and learning. However, as we can see from the sample lessons presented in this chapter and those presented
in chapter five, participants’ use of digital resources is encouraging them to begin thinking outside the box. Our participants have come up with all sorts of innovative ways of making the teaching and learning experience very exciting and memorable. Some tutors have produced their own books and others are seriously considering producing their own books for use in schools and colleges as revealed by Owini who said:

One thing that has struck me is the realization that if I gain more expertise on using the technology, I intend to write my own books to be used in teacher training and others to be used in primary schools. I am going to get a lot of information using these gadgets, using the Internet. I can also get some pictures which I can take myself… And then, I begin selling these books which I think is really going to be of great benefit to the colleges, students and myself. (A. A. Owini, personal communication, March 20, 2012)

Owini’s experience with the use of digital resources has made him discover the possibility of him earning additional income by using his knowledge and experience to produce resources for sale in schools and colleges. Engagement with technology has enabled Owini to recognize his potential to become a producer of knowledge that can be of great benefit to teacher education. Drawing on experiences from some colleagues he went on to explain

I have seen a colleague with whom we studied at Kyambogo University who is now supplying all these colleges in Uganda with his own books. And the man is getting well over one hundred million Ugandan shillings [approx. $50,000], can you imagine! Yes, it has challenged me very much. But with the help of these technologies it is now very easy. I will type my work. I will edit it. In fact, it is now only a matter of knowing more about using modern technologies. (A. A. Owini, personal communication, March 20, 2012)
As Owini plans to start producing books one of our research participants (Okuvua Mudea) at the college has already produced his own book that is being used as a reference text for teaching physical education. He is already selling books to the students of Wati CPTC and other colleges. Tutors are not the only people that the use of digital resources at the college has inspired to become innovative and resourceful. Even students have also been inspired to become innovative and resourceful. For example, a student (Vincent Ayiko) was inspired to compose a song on HIV and AIDS. His music has been video recorded and posted on YouTube® (http://www.youtube.com/watch?v=uv7bpe1eXUw). This is the first time Wati CPTC has appeared on YouTube®. It is this kind of innovation and resourcefulness that has been lacking in Ugandan education. Students and staff are beginning to realize that they have been sitting on very useful talents which if put to good use, have the potential to transform their lives and the lives of other.

4.9 Promoting Sharing and Sustainable Use of Educational Resources

In resource-constrained schools the use of digital technologies is promoting the sharing and sustainable use of the scarce resources. Where a school lacks some equipment it can borrow facilities from the neighboring institutions. We have also learnt that working collaboratively with research participants and community is beneficial in promoting digital literacy practices to improve teaching and learning. This can be illustrated by a comment from Dorcus, one of my research participants during a focus group discussion that Bonny, one of my supervisors and I had with our teacher research participants at Aramua Primary School on May 30, 2012:

This is really different from where people brought us things, they have done it all by themselves and they have gone, like we were in a secondary school and that’s what the head teacher was expressing when we went with these teachers to have our lesson from there when we experienced a technical problem with our equipment. As soon as our teachers entered the ICT lab at the secondary school, they found the computers were covered; they quickly removed all
the covers. They sat at the computers and began checking the wiring, looking for the buttons, switching them on, typing and the head teacher was amazed and said: We have been here all this time, my teachers don’t use these things [computers], these teacher from the primary schools are already using the computers confidently. He held his chin with the left hand and shook his head in disbelief. And when our teachers presented their lessons all the teachers at the secondary school came in and sat at back curiously observing the lessons. Afterwards the head teacher said we needed to come back to train his teachers too. And that these primary school teachers we were working with could help his teachers on how to use the tools to present lessons. He said the computers had been lying there for such a long time without being used. They have a very powerful solar panel and batteries but they have only used them for lighting. They don’t use the computers because some people came from somewhere and fixed the equipment and left. And so there is no impact at all. (D. Abiko, personal communication, May 30, 2012)

What was striking about this incident that Dorcus has reported above was that while the secondary school had the equipment in form of a computer lab with solar panels, they could not put the equipment to good use because the teachers at the school lacked the necessary skills to use the equipment. On the other hand, while the teachers from the primary schools who went to use the equipment at the secondary school had the skills to use the equipment, their schools did not have the equipment they needed to put their skills to use, except the few resources that we provided for the purpose of this research. It was therefore necessary for them to rely on one another for mutual benefit. This does not only augur well for collaboration and partnership but it also encourages sustainable use of scarce resources.

It was also very striking to see the head teacher from the secondary school inviting the teachers from the primary schools to come and train his teachers on how to use digital technology to improve
teaching and learning. In the Ugandan context, it would ordinarily be unimaginable to see primary school teachers who are usually recruited to join primary teachers’ colleges from secondary schools and who only hold certificates in education; teaching secondary school teachers who join national teacher’s college after completing high school and who hold diplomas and degrees in education. On the contrary the secondary school teachers would be expected to teach the teachers in primary schools. Even more interesting to note was the fact that the most active teachers from the primary school who were being invited to come and train the teachers at the secondary school were women. The head teacher at the secondary school was a man, and majority of his teachers were men who would normally have less respect for women in the local cultural context. The fact that the head teacher from the secondary school could invite the teachers from the primary schools the most active of them being women to come and teach his secondary school teachers most of who were men further highlights the potential digital literacy holds to enhance professional identities and transform socially constructed power relations explained in chapter 4.1 under the role of digital literacy in enhancing teacher identity and investment.

4.10 Chapter Summary

My first research question sought to examine the role that digital technology and digital literacy can play in improving teacher education in a rural Ugandan primary school. My findings reveal that digital technology and digital literacy can indeed play a significant role in improving teacher education in a rural Ugandan primary teachers’ college. Most important of all is the role that digital literacy plays in enhancing the participants’ identities and making them feel more empowered which in turn increases their investment (Norton, 2010) in digital literacy and ultimately in their professional practice as reported by Betina, Bilha, Nelly, and Owini. Another important role that the participants’ use of the digital resources is playing is that of transforming the dynamics of classroom interactions. It is making teaching and learning more interactive and learner centered. When video clips and photos are used in
class presentation the method of teaching shifts from unidirectional lectures to interactive discussions, where the tutors and the students all become learners. The interactive nature of the digital literacy lessons has not only been seen to increase students’ interest in learning but it has also increased the tutors’ interest in teaching. Students from other classes have been seen joining the digital literacy lessons because of the exciting nature of the lessons. Tutors as well as college administrators have not only attended these digital literacy lessons but they have also taken active part in the class discussions leading to team teaching – a phenomenon that is very rare in Ugandan education. Further, the use of digital resources is facilitating and validating the use of local cultural practices in formal education. This is helping to bridge the gap between college and the local community. In the next chapter, I examine how the ICT policy has impacted curriculum development and classroom practice in rural Ugandan primary schools.
Chapter 5: How ICT Policy Has Impacted Curriculum Development in Ugandan Education and Classroom Practice in Two Rural Ugandan Primary Schools

5.1 Introduction

NLS scholars (Barton & Hamilton, 2000, Gee 1991; Street 1984) assert that literacy is a social practice that is best studied in the historical social and cultural context in which a particular literacy practice is performed. Barton (2000) specifically argues that literacy practices are purposeful and embedded in broader social goals and cultural practices. To understand a particular literacy practice, he asserts, it is important to examine the purposes and social goals driving the literacy practice. The question then arises what are the social goals driving Uganda’s pursuit of ICT and digital literacy. Uganda’s main purpose and social goal for promoting digital technology and digital literacy as articulated in the current ICT policy which is not any different from the draft policy that has guided ICT and digital literacy integration in Uganda for many years is to transform the country into, “A knowledge-based economy where national development and governance are effectively enhanced by harnessing and adopting information and communication technology to achieve fundamental economic transformation” (Republic of Uganda 2012, p. 4).

This chapter addresses my second research question: “How has ICT policy impacted curriculum development in Ugandan education and classroom practice in two rural Ugandan schools?” The chapter is divided into five sections. The first section describes the ICT landscape in Uganda, drawing on personal observation, documentary analysis and interviews from national experts. The second section examines the ICT policy and the major curriculum reforms that Uganda has undertaken to promote ICT and digital literacy integration in Ugandan education. The third section discusses the major challenges facing ICT integration in Ugandan education while the fourth section analyses the impacts of digital literacy on classroom practices in the two rural primary schools and the local community. The fifth section is a summary of the chapter.
5.2 The ICT Integration in Uganda

Mutonyi and Norton (2007) identify five issues as being crucially important for curriculum planning and policy development in Uganda. These include the need to collect empirical data on ICT access and use; the importance of recognizing local differences across rural and urban communities, male and female students; the need to promote professional development of teachers to make effective use of ICT in classrooms; the importance of integrating in and out-of-school digital literacy practices; and the need to consider how global software can best be adapted for local use. Bearing these issues in mind, this section takes a closer look at the ICT landscape in Uganda to help the reader understand how ICT policy has impacted curriculum development and classroom practice.

To begin with, I wish to recognize the fact that in the last decade or so, Uganda has made considerable progress in prioritizing ICT as a cornerstone in its development agenda. One of the major steps that the government of Uganda has taken to promote ICT integration for national development has been the establishment of the Ministry of ICT in 2005 with a clear mandate to

- Provide strategic and technical leadership, overall coordination, support and advocacy on all matters of policy, laws, regulations and strategy for the ICT Sector; sustainable, effective, and efficient development, harnessing and utilization of ICTs in all spheres of life to enable the country to achieve its development goals. (Ministry of Works, Housing, and Communications, n.d.)

In line with its mandate, the Ministry of ICT has formulated a national ICT policy, which has provided a favourable policy environment for the rapid growth and expansion of ICT to contribute to the growth of the national economy. For example, in his ministerial statement to the Ugandan Parliament for the 2012/2013 financial year, Rugunda (n.d.) reported that the telecommunication and postal subsector’s contribution to the economic growth in terms of share of GDP had doubled by the
end of the 2010/11 financial year from 3.1 per cent to 6.2 per cent. According to the minister this growth in contribution was driven by increasing the sector’s contribution to employment and attraction of foreign direct investment and taxes with 200 billion shillings (approx. $100 million) collected in form of value added tax, excise duty and pay as you earn from the six telecommunications service providers in the 2010/11 financial year.

Indeed, anyone who has been away from Uganda for a while will not take long to recognize the expansion of ICT infrastructure in the country when they come back to the country. For instance, when I travelled back to Uganda in September 2011, one year into my doctoral education program, I was astonished to see the developments that had taken place in relation to the expansion of ICT infrastructure within that short period of my stay away. Upon arrival at Entebbe International Airport, I was struck by the spectacular display of publicity material by mobile telephone companies like Airtel®, MTN®, Orange®, Uganda Telecom®, and Warid® on the airport facilities. Carefully worded and very impressive posters belonging to the various telephone companies hung at very strategic locations right from the immigrations section of the airport to the taxi park. As we drove out of the airport, the image of Uganda as a country in which ICT infrastructure is steadily expanding became even clearer as highlighted in my reflections on the journey to the city:

On our way from Entebbe International Airport to Kampala, there were visible signs of ICT integration in the Ugandan society. Masts and boosters for several telephone companies were visible on top of all the major hills along the way to the city. Huge billboards with colorful pictures and carefully worded texts stood strategically on either side of the road to Kampala. Several shops along the way had posters, signposts and adverts for telecommunication services. Nearly every trading center that we passed along the way to the city had a secretarial bureau and an Internet café. When we reached Kitubulu Market near Nkumba University, I saw several venders sitting under huge umbrella shades pitched along the roads and in front of shops, selling
mobile telephones, air time, SIM-cards and other accessories. At Kajansi trading center, there was a heavy traffic jam during which vendors sold airtime and SIM-cards to passengers through car windows. As we approached Kampala, at the Entebbe Road round about, I saw a truck that was loaded with very big loud speakers also advertising cellular phones, SIM-cards for Uganda Telecom (UTL). Young women dressed in miniskirts and blue T-shirts danced to the tune of the music oozing from the loud speakers, to lure people into buying company products. (Andema, field notes, September, 5, 2011)

In addition to relying on personal observation like this and examination of policy documents to have sense of the state of the physical infrastructure in the country, I also held interviews with national experts at the level of ministers, permanent secretaries, directors, commissioners, and registrars. Several national experts I interviewed spoke confidently about the expansion of the ICT infrastructure and the future of ICT in Uganda. They strongly believe that technology has the potential to transform the country from a poor agricultural country into an information based modern economy. In that regard, they argued, investment in ICT infrastructure has become a key priority of the government in Uganda. When I asked the minister of ICT, Dr. Rukahana Rugunda, to comment on the future of ICT in Uganda and the practical steps his ministry has taken to promote ICT integration in the country, he made the following comment:

I think the future is bright. And I think the country, Uganda, and Africa are going to greatly benefit from closing the digital gap so that we are able to compete with actors in the rest of the world, in Europe, America and Asia because the Internet has cut the distances and we now have the fibre optic cables, sea cables from Mombasa where there are several of them already. We are planning to link up with another cable through Dar es Salaam, and we also plan to have a third route to link up with 8 cables which are in Egypt. We want to link up through Egypt.
Therefore the future of ICT and ICT enabled services like creation of jobs, through BPO [Business process outsourcing], we think that is going to help the country and we think that learning is going to be accelerated and improved through electronic learning … so the future of Uganda and the future of Africa is clearly getting brighter because of ICT. (R. Rugunda, personal communication, October 4, 2011)

The minister also talked confidently and enthusiastically about the efforts that the government is making to develop ICT infrastructure internally to bring different parts of the country onto the national grid and to make Internet access readily available to the local population, emphasizing that

We also want to ensure that there is accessibility to ICT services by the population not only in Kampala, Jinja, or Masaka and big cities but people in distant places like Kisoro, Koboko, Amudat, Hoima and indeed all parts of Uganda have easy access, and this important resource will bring equality of opportunities for all Ugandans. We have now about 1600km of cable and within the next one year we should have increased to even a much larger figure. Ultimately the idea is to increase accessibility, [through] affordable and rapid Internet access. (R. Rugunda, personal communication, October 4, 2011)

The minister’s explanation of government’s commitment and political will to promote ICT as an engine of growth and the prime mover of socioeconomic transformation was further echoed by the permanent secretary at the Ministry of ICT who further explained that Information and Communication Technology (ICT) is a global revolution in the era of knowledge economy that we are living in, and that Uganda could not afford to lag behind, adding that

It is against that background that ICT was prioritized as one of the primary growth sectors in the national development plan. Consequently it was also prioritized by the current government, the
The permanent secretary spent considerable time on highlighting to me how the National Resistance Movement which is the ruling party in Uganda pledged to the Ugandan population during the 2011 national elections among others things, that ICT would be one of its top priorities of investment to spur rapid socio-economic transformation and accelerated development of the country by acting as an enabler to other sectors to perform and deliver services effectively and efficiently. The permanent secretary went further to explain that

One of the primary targeted sectors is the sector of education because if you want to spur socio-economic transformation then you must create awareness and make the people educated so that they become the engine of growth and transformation. It is for that reason that the education sector is working closely with the ICT sector to improve: 1) the delivery of teaching in schools, and 2) to be able to access relevant and up to date teaching and learning materials and also other educational materials, not only nationally but also globally, 3) to make communication very easy and very fast through, for example - video teleconferencing, and e-learning in general. So, basically ICT is of very high priority to the government in general and to the education sector in particular (J. P. Saamanya, personal communication, January 18, 2012).

The question then arises what has the Uganda government done to demonstrate its commitment to prioritize ICT integration in Ugandan education? At this juncture I now wish to take a closer look at the steps being taken to promote ICT integration in Ugandan education more specifically. But before I examine the specific steps being taken to promote ICT integration in Ugandan education, I wish to make a comment on the growth of the ICT infrastructure in Uganda broadly. Much as the national
experts whom I interviewed spoke highly about the prioritization of ICT and much as Uganda has unarguably made considerable progress in the development of ICT infrastructure in the country, a major concern about the approach is that it is anchored on a new liberal economic policy which emphasizes private investment as the main engine of economic growth and leaves investment decisions almost entirely to the vagaries of the market forces which may not necessarily always be in line with the needs and aspirations of the ordinary people (Stiglitz, 2003). This approach has in fact led to a lopsided development of ICT infrastructure in the country with most of the infrastructure being concentrated in major cities and urban centers. Yet most of the Ugandan children go to schools in rural areas. The national experts need to take into consideration Mutonyi and Norton’s (2007) suggestion on the importance of recognizing local differences across rural and urban communities. According to Mutonyi and Norton (2007)

Most policies and curriculum materials in Uganda view educational communities as homogeneous groups and do not take into consideration the social and political histories of different local settings, particularly with respect to discrepancies between rural and urban settings (p. 267).

Deliberate policy initiatives may have to be taken to address the structural imbalance between rural and urban communities if the rights of those children living in rural communities, to access quality education, greatly enhanced by digital technology, are to be realised. Having made that comment, I now wish to return to the discussion on what is being done to promote ICT and digital literacy integration in Ugandan education specifically.

5.3 ICT Policy and Curriculum Development in Ugandan Education

One of the most commendable things that Uganda has done in addition to having a national ICT policy framework has been to put in place a more specific ICT policy in education to streamline ICT
integration in Ugandan education as reported by the director of basic and secondary education, who reported that

As far as the education sector is concerned we have come up with a policy on ICT in education. Now the policy is in place for the essence of the policy is to see how our education system can be transformed in light of the ICT, how we can now review the curriculum, the curriculum reforms in light of the current ICT policy. I may also wish to mention that there are also efforts to review the curriculum again to match our education system with current trends of ICT and the knowledge based economy and society. (Y. K. Nsubuga, personal communication, January 16, 2012)

The ICT policy in the education sector impresses has three major areas of strength. In the first place the document recognizes the fact that as e-governance and e-commerce take root and the country moves towards an information society, ICT skills will be a necessary prerequisite for full participation in society (Republic of Uganda, 2005). Against that background it seeks to promote ICT as a tool for social justice and community empowerment, which is indeed commendable. Secondly, the policy views ICT as a form of literacy and therefore a universal human right which government is obliged to fulfill in the interest of democracy and accountability. Thirdly, the policy seeks to mainstream ICT integration through a range of approaches including legislation and curriculum reforms which enhances the legitimacy and credibility of ICT initiatives and earns acceptance among the different stake holders (learners, parents, teachers, employers and the general public).

In terms of legislation it can be argued a significant progress has been made to infuse ICT integration into the five years National Development Plan from 2010/2011 to 2014/2015, which underscores the importance of ICT for transformation of Ugandan education (Republic of Uganda, 2010). Incorporating ICT integration into the five years national strategic plan seemed to be a wise
decision because it has the potential to not only help increase its visibility and recognition in the national development agenda but it can also potentially help MoES to seek budgetary and other forms of support to facilitate ICT integration in Ugandan education. Equally worth noting is the fact that the five years National Development Plan does not only recognize ICT integration as an important aspect of its development strategy but it goes further to spell out the national objective as to adopt ICT in the “delivery of education and sports” (Republic of Uganda, 2010, p. 233) which emphasizes the use of ICT as a pedagogical tool compared to the rather broad goal of “mainstreaming of ICT in the education sector” stated in the ICT in Education Policy (The Republic of Uganda, 2005, p. 14).

ICT integration in Ugandan schools and educational institutions has benefited from curriculum reforms particularly in secondary schools where deliberate efforts have been made to reorganize the curriculum subjects to give prominence to ICT in subject combinations that students can take at Advanced level (A-level; upper secondary). When I asked the permanent secretary at the Ministry of ICT to explain to me what steps the government has taken to integrate ICT in Ugandan education specifically, he was quick to report that

Number one, ICT has been introduced as an examinable subject at least in the Ordinary Level, secondary school and Advanced Level. In fact at Advanced Level, ICT has been made a compulsory subsidiary subject. First of all one can take ICT as a subject in its own right. But starting this year, every A-level student must either take ICT or mathematics as a subsidiary subject in addition to the core subjects they take. So the teaching of ICT at O-level has been introduced and it has been made compulsory at A-levels. (J. P. Saamanya, personal communication, Ministry of ICT, January 18, 2012)

The review of the Ugandan secondary school curriculum and the reorganization of the syllabus have been long overdue. For decades there has been a public outcry over the irrelevance of the
Ugandan education (Munene, 2009; Republic of Uganda, 1989; Tiberondwa, 1998), with several scholars and leaders making compelling cases for the need to review the school curriculum (Kasente, 2010; Nsibambi, 2000; Ssekamwa, 2000; Republic of Uganda, 1992; UNEB, 2009). The need to integrate ICT into the curriculum has therefore provided an excellent opportunity to address some of the concerns that have been raised over the quality and irrelevance of the Ugandan education. As Mutonyi and Norton (2007) have noted, the ongoing curriculum reforms and the desire to infuse ICT into the Ugandan education provides a need to have “detailed empirical case studies that can inform policy and curriculum development” (p. 266).

The developers of the A-level subsidiary ICT teaching syllabus tried did well to try to align the syllabus to the current situation in the country. For example, while framing the syllabus they took into consideration: the low levels of ICT literacy in the country; the high demand for ICT skills as a major requirement for employment; the unequal access to basic ICT training; and the need to reduce the digital divide (The Republic of Uganda, 2013 which are very important considerations in view of the current local and global trends. However, a critical examination of the ICT syllabus reveals that it tends to be geared more towards making students know about ICT and use it mainly to access information than equipping them with the practical skills that they need to become producers of knowledge as well. The objectives of the syllabus are

1. helping the learner develop and consolidate his/her knowledge of ICT and be aware of new and emerging technologies
2. encouraging the learner to develop as an independent user
3. encouraging the learner to develop ICT skills to enhance their work in a variety of subject areas
4. equipping the learner with skills for lifelong learning (The Republic of Uganda 2013, pp. 89-90)

Top on the list of the objectives of the syllabus is helping the learner to develop and consolidate his or her knowledge of ICT and being aware of new and emerging technologies. While the knowledge of
ICT and awareness on emerging technologies is important, they are not sufficient to transform the Ugandan education. The second objective seeks to encourage the learner to become an independent user of ICT but it does not go far enough to clarify what kind of user the syllabus hopes to produce, possibly one who can use ICT to access information but not necessarily one who can use it to produce knowledge. The third objective is not significantly different from the first two only that it focusses on the ability to use ICT to access information in a range of curriculum subjects. The last objective shifts the focus on using ICT to facilitate lifelong learning but it does not specify the purpose of that learning to the learner and the community.

In addition to formulating ICT in education policy and reorganizing the curriculum and syllabus for secondary schools some effort has been made to equip schools with digital equipment in form of computers and accessories as highlighted by the permanent secretary during an interview:

We have a program called Rural Communication Fund, which is run by Uganda Communications Communication under the Ministry of ICT. We use that fund to partly help schools to acquire computers. I wish to report that to date, of the slightly over one thousand three hundred government aided secondary schools, so far eight hundred and fifty schools have been supplied with computer labs across the country with number of computers in schools ranging from ten to forty computers per school. Of course in every school the computers are not enough. But at least as a start-up activity that can serve to show people what a computer can do and these computers are usually connected to the Internet. We have also supported tertiary institutions. To date five universities have been supplied with at least eighty computers each. So we have been supporting schools and tertiary institutions across the board. (J. P. Saamanya, personal communication, January 18, 2012)
When I asked the director for basic and secondary education at MoES to explain the practical steps government is taking to promote ICT integration in Ugandan education he also made similar comments to those made by the permanent secretary and said:

First of all we have tried to ensure that we increase access by for example buying computers though it is still a big challenge because the resource envelop is limited but we are trying to ensure that as many [schools] as possible get computers. That is work in progress. Secondly ensuring that in the curriculum, we will be developing the curriculum for ICT so that we use a curriculum approach because a non-curriculum approach may take a long time. Thirdly, we have also taken measures of almost making it compulsory because now the other day we were deliberating on the subjects in A-level … we have now come up with a new policy to say we are cutting those [A-level principal subjects] into three but then saying that the principal subject should be three but they [A-level students] should take in addition to general paper another subsidiary subject which should either be mathematics or ICT. So, considering that mathematics is a bit difficult, chances are that the majority of our learners will go to ICT. (Y. K. Nsubuga, personal communication, January 16, 2012)

Both the permanent secretary and the director seem to be very much aware about the enormity of the challenge the government faces to use the curriculum approach to promote ICT integration in schools and colleges. But they are not afraid to face the challenges. They seem aware of the resource limitation and budgetary constraints, but that does not diminish their resolve to forge ahead with the implementation of the new curriculum. It is this kind of determination and institutional leadership that is needed for ICT integration to succeed in a developing country like Uganda (Warschauer, 2003).

“The role of leadership, vision and local champions” as Warschauer (2003) has noted, “are crucial to the success of ICT projects for social inclusion” (p. 212).
Resources have always been scarce, and they will always remain scarce. In the face of scarcity of resources we cannot fold our hands, and kneel down in a prayer of supplication without making any efforts on our part because that will be putting God to the test for the obvious. The permanent secretary’s comment, “Of course in every school the computers are not enough. But at least as a start-up activity that can serve to show people what a computer can do,” ties in well with that of the director of basic education who said, “The resource envelop is limited but we are trying to ensure that as many [schools] as possible get computers. That is work in progress.”

As the director has noted educational initiatives should be viewed as work in progress and not as finished business. We should not wait for all the resources we need before we can start an initiative. It was in that kind of spirit that while I was still a student at Makerere University and things were going bad at St. Joseph’s College Ombaci (my former school), that my colleagues and I took a bold decision to form St. Joseph’s College Ombaci Old Boys’ Association (SJOCOBA) to have a voice on what was going on at the college. This was the school that used to feature among the best performing students in the country but had been bedevilled by strikes and mismanagement. Under the association we managed to restore order and mobilized ten second hand computers to establish a computer laboratory in the college in a three squares meter room in 2001. To date that initiative has expanded and the college now boasts of one of the most spacious ICT labs in Uganda. The olds students have gone ahead to install very powerful solar panels that provide electricity for use at the whole college. Many other schools in the district have learnt from that example and gone ahead to form old students’ association and established ICT labs and given other forms of support to their former schools.

The point I am making is not that resources do not matter for initiatives to succeed. Of course they do. Neither am I saying that we should not plan before we engage in any educational initiative. My point is that much as resources and planning are important, they are not the only things that matter for any educational initiative to succeed. Decisive leadership, determination, courage and confidence are
very crucial role in facilitating the success of an educational initiative (Warschauer, 2003). In addition to that educational initiative should also recognize the role that teachers play for any meaningful educational program to succeed. The framers of educational programs frequently overlook the role that teachers can play in facilitating the success of educational programs. Instead of investing in the teachers they tend to invest in physical infrastructure, instructional materials and equipment. A typical example was the UPE policy, which has by most accounts led to disastrous consequences on the quality of education in Uganda (Kasente, 2010; Muwanga, Aguti, Mugisha, Ndidde & Siminya, 2007; UNEB, 2010). However, the government seems to have taken good lessons from the UPE policy and wish to avoid the mistakes of the past. This time the teacher’s role has taken a center stage in the implementation of the curriculum approach to ICT integration in schools and colleges, which is possibly one of the best aspects of the new approach.

As highlighted at the beginning of this chapter, Mutonyi and Norton (2007) identify the need to promote professional development of teachers to make effective use of ICT in the classroom as one of the five key issues that are crucially important for curriculum planning and policy development in Uganda. They assert that professional development should be viewed from two perspectives. The first aspect, they argue, should address the need to develop teachers’ competencies with ICT while the second aspect should address the need for critical ICT skills. In that regard, the permanent secretary at the Ministry of ICT explained to me the importance of building the teacher’s capacity for the successful delivery of the new curriculum as follows:

Of course teachers play a central role. We develop policies and programs but we are not the ones going to teach. So the teachers who are the first line of interaction after parents with children, pupils, and students play a crucial role. Therefore one of the programs we have is to teach teachers ICT. It is a deliberate effort. We now take the teachers with the MoES, especially where we have put these computer labs and teach them the basics of computer. We also teach
them through subject specific or tailored programs for example we teach the science teachers to use simulated practical lessons. Even in primary teachers’ colleges ICT is also being taught generally and also specifically to churn out teachers to teach ICT. So even now we would be having teachers or we already have teachers whose core subject is ICT. But we also now want all of them to be exposed to ICT so that they can use ICT in their practice. You remember I said ICT is an enabler for teachers to deliver effectively and efficiently. (J. P. Saamanya, personal communication, January 18, 2012)

By using a multipronged approach to prepare teachers through subject specific programs, in-service programs, and pre-service programs the MoES is likely to win the support of the teachers and their active participation in the program. The permanent secretary makes a valid point to argue that while experts are the people who make programs they are not the ones who implement them. It is teachers who implement these programs. As such they need to make them play a central role in the implementation of educational programs. It is for this reason that the equipment needs to be put in the hands of the teachers so that they are able to use them as pedagogical tools. Otherwise if the teachers are not involved in the ICT and digital literacy initiatives the computers may reach schools and colleges but they may never be effectively used to promote ICT and digital literacy as Ariba (2013) reports in the national newspaper New Vision:

Computers have become part and parcel of everyday operations – from every modern office to the homes. However, a common feature in many schools is that other than in the school laboratories the equipment are mainly used for secretarial jobs with the majority of head teachers hardly deploying them for research, communications and other operations. (¶1–2)
To support the curriculum approach to ICT integration in Ugandan education, NCDC, as Uganda’s national institution in charge of the primary and secondary school curricular, has embarked on materials production to facilitate ICT integration in Ugandan education. When I asked the deputy director of NCDC to explain to me what the center was doing to promote ICT and digital literacy in Uganda education, this is what she had to say:

As NCDC our effort and the effort in which I was personally involved has been in producing materials that teachers would use to teach our [national] curriculum. In fact it was called curriculum-net project because we were integrating technology into the content, developing content that is technology enhanced. It was not e-learning per se but working together with the University of Newfoundland in Canada to produce technology enhanced content for teachers. We did that for geography and mathematics for secondary schools, and social studies and mathematics for primary schools. We also worked just like the ones whose CDs I shared with you, we also worked with Microsoft because they came here they got interested because we were like the first in the whole of Africa to try to do that. They also gave us some funds to do customization of materials they had developed for teachers. I think I also gave you that CD. That was supported by Bill Gates under the Microsoft® program. (G. Baguma, personal communication, February 2, 2012)

It was interesting to note from the deputy director’s comments that International universities, such as the University Of Newfoundland from Canada, and international computer giants like Microsoft were all interested in supporting Uganda’s efforts to promote ICT integration and digital literacy in the Ugandan education. According to Mutonyi and Norton (2007), if ICT are to play their part in the goal of achieving Education for All by 2015, the need for collaborative partnerships at both the local and global level remains an urgent priority. Uganda needs to take advantage of such interests to establish
lasting partnerships and collaboration to be able to draw on the technical expertise and experience of these organizations. Organizations like Microsoft have long history and tradition in software engineering, which they can use to develop tailor made programs to suit the local context. Uganda can also adopt existing technologies with some modifications to make them relevant and functional to the Ugandan educational setting probably at much lower costs than developing new programs. It might also be a good idea to engage some of these international organizations in ongoing pilot projects to explore the possibility of building on some of the projects that seem to be working well. For instance I was amazed to learn from the permanent secretary at the Ministry of ICT of a pilot project they have initiated to help improve the teaching of science in schools. In my discussions with him the permanent secretary told me that

One of the challenges to the delivery of educational content especially for sciences has been the limited facilities like laboratories. Particularly in rural schools - the budgets do not allow them to have fully fledged science laboratories. So we have introduced an innovation in which there are programs or packages that simulate practical lessons and the programs are loaded on computer and the teacher is able to use the recorded videos to deliver science lessons to students and that is a major undertaking. This has been facilitated by Ministry of ICT working together with the Ministry of Education and Sports to supply secondary schools with computers. (J. P. Saamanya, personal communication, January 18, 2012).

Some scholars (Andema, 2009; Mutonyi & Norton, 2007) have stressed the urgent need for the collection of empirical data to understand how ICT and digital literacy can best be pursued in Ugandan education. Even as Uganda pushes for a curriculum approach to ICT integration and digital literacy the small case specific project based pilot approaches should not be entirely abandoned because such pilot projects sometimes offer unique advantages that can be researched into and the lessons learnt can
inform how best to proceed with larger curriculum based program. That is why I was intrigued to learn that some of the national experts that I talked to have participated in some of the pilot projects that seek to better understand how ICT and digital technology can best be promoted in Ugandan schools. A case in point is the deputy director of NCDC who reported:

I was also involved in PanAv Project where we have been collecting data from Ugandan schools to find out how far the schools are making use of technology integration in teaching, and learning. And I have had quite good experiences in some of the schools where they have also continued to offer the subjects. (G. Baguma, personal communication, February 2, 2012)

Such involvements equip the national experts and policy makers with the knowledge of the local dynamics which in turn helps them to make policies and programs that can work in the local contexts as opposed to sitting in their offices and making policies and programs through guess work and imagination without any field experience. By being involved in such pilot projects the policy makers get to know the resources that are available, the challenges teachers face while trying to implement policies and programs. For example, perhaps because of her involvement in the ongoing local pilot projects, the deputy director at the NCDC was able to make this important suggestion when she said:

We can use programs … for example we have the Teacher Development and Management System (TDMS) program, which was started some time ago where we are working with CCTs to help teachers to better understand how to teach. Now we need to tap on that at least for the primary level. We need to train the CCTs on the new methodologies and we need to equip their resource centers at the coordinating centers so that when they have these teacher workshops and programs of improving their methodologies and capacities – what we call continuous
professional development programs which are arranged by CCTs, they should now embed technology (G. Baguma, personal communication, February 2, 2012).

She explained, convincingly, that the coordinating centers and the coordinating center tutors provide the best infrastructure to reach schools and communities with any educational initiative because they are based in the local communities and they work with the different stakeholders (parents, teachers, civic, and political leaders) on daily basis. In the process they understand the situations in schools better than most people. Unlike inspectors of schools who normally go to schools to look for faults with teachers (Munene, 2009), the CCT move to schools in their clusters and talk to teachers individually and in groups to identify potential challenges that the teachers encounter in the course of performing their duties on the basis of which they organize professional development workshops at the coordinating center to provide professional support to in-service teachers. The coordinating centers are normally constructed in a school that is centrally located within a cluster of schools under the center. They normally have a residential quarter for the CCT, an office, a store, and a conference or resource room. According to the deputy director, these centers should be equipped with modern technologies to facilitate and accelerate the training of teachers on digital technologies across the country, which makes a lot of sense considering the fact that the coordinating centers and CCTs exist across the country.

I found out that the passion and enthusiasm for ICT integration does not only exist among national experts and in Kampala, the capital city of Uganda. Even at the local level ICT integration in Ugandan education has received even greater support from district education officials and members of the community who have rallied behind their leaders to promote ICT policy in very innovative ways. For example, when I asked the DEO in Arua District, Nicholas Tembo, to describe for me what was being done to promote ICT integration in schools in Arua District I realized that there was a lot more going on with ICT integration in the district than the people working in the ministry head office even knew. When I met the DEO in his office I asked him to describe for me what was happening with
respect to ICT integration in Arua District and to let me know what the district leadership was doing to promote technology and digital literacy in schools and to reveal to me his thoughts about what the future of technology in education in Arua District he responded:

You see we go by what our Ministry is doing through the NCDC. If you looked at the syllabi, the improved syllabi for primary and the improved syllabi for teacher education, we are now emphasizing the use of technology in teaching across curriculum subjects and I think my ministry has gone ahead to think about one important concept – you go to a secondary school now most of the secondary schools have IT labs. Small as they may appear that is the beginning. Even in our primary schools particularly some of our big primary schools like Arua Public Primary School have big IT labs with fifty computers in there. And we have gone ahead to train some teachers in those schools. My Ministry has plans to continually train those specific teachers who are in charge of those IT labs. The Ministry has even gone ahead to recruit IT teachers in secondary schools. So the situation is clearly changing. (N. Tembo, personal communication, Arua January 16, 2013)

Like the national experts I talked to earlier, the DEO spoke with a lot of confidence about the future of ICT integration in the district. He understands the policy and seems to pay a lot of attention to what the ministry expects them to do as local leaders. My discussions with the DEO inspired me to visit a few schools in the district to ascertain the existence of ICT labs in schools in Arua District. I found many schools had ICT labs with an average of forty computers. Examples of schools that I found with ICT labs included Mvara Secondary School, Arua Public Secondary School, Muni Girls secondary School, St. Joseph’s College Ombaci, Aramura Secondary School, and Ediofe Girls Secondary School. Others included Muni National Teachers’ College, Wati CPTC, Ragem Technical Institute, and Arua Public Primary School. Others, like Arua Hill Primary School, Awindiri Primary
School, and Arua Demonstration School were in the process of establishing their own ICT labs. I was also told by local experts that many private schools in the district had ICT labs that were established through contribution from parents. Unfortunately, I did not have time to visit those schools to confirm the reports.

Arua District Education Department has come up with an innovative approach of promoting ICT integration in schools, particularly among head teachers and deputy head teachers in primary schools over which they have greater authority under the decentralization policy as explained by the DEO:

For primary, we are now requesting all heads of primary schools to ensure that they have knowledge of IT. It is going to become a condition for you to become a head teacher or a deputy head teacher. And we are also asking the head teachers and the heads of departments to ensure that this idea of looking at the lesson plans and schemes of work by looking at a book like this (physically) is discouraged. We are saying that is now outmoded. The head teacher should be in his or her office and be able to view the teachers’ scheme of work electronically. Heads of departments should be able to sit in their offices and be able to look at the schemes of work or lesson plans of all their teachers digitally. So that is how far we are moving but with support from stakeholders from colleagues like you please we are calling upon partners to come to our aid so that we concretize this revolution, this renaissance of IT. (N. Tembo, personal communication, Arua January 16, 2013)

From the DEO’s comments one could clearly see that the district leadership and the local community were keen and very passionate about ICT integration to achieve educational change. They have assumed ownership of the program and they are doing everything possible to make ICT integration take root in schools. For example by linking ICT skills to opportunities for promotion the
district authorities have managed to create an additional incentive for head teachers and deputy head teachers, as well as those aspiring to become head teachers to embrace ICT and seek training opportunities for ICT skills to increase their chances. That possibly explains the reason why many schools in the district have embraced ICT the way they have done and they have gone ahead to establish ICT labs.

Community perception and competition among schools has also become a major driving force for ICT and digital literacy integration in schools in local communities. A school that has a computer lab and offers computer lessons is viewed by most parents and members of the community as being more modern than those that have no computer labs. As such students tend to prefer going to schools with computer labs. For example, when the rural teacher Mr. Ombdraa (pseudonym) started his private school in a very remote location, many people, particularly those heading public schools, despised him and thought the school would never take off. They told him he would never attract students to his school because there was already an established government aided secondary school nearby. But when he managed to install solar panels and establish an ICT lab with the help of a German NGO working that supports projects in Northern Uganda, the student enrolment in his school rose from 80 to 500 while the enrolment in the more established government aided school in the neighbourhood dropped from 600 to less than 130 students.

In response to what Senderela Secondary School had done and for its own survival, the government aided school also decided to install its own solar panels and establish an ICT lab to attract students. Unfortunately, the damage had already been done. It only managed to attract a few students, which helped to increase its student enrolment to 250. This kind of competition was also reported to be taking place among schools in Ayivu county and Arua Municipality. This incidence highlights the desire of local communities to have better education for their children and the price they are prepared to pay to give their children a better future through education. Private schools are generally more
expensive than public schools, but the fact that the parents allowed their children to transfer from the public school where there is minimal fees to the private school where they pay higher fees tells a lot about their determination and the sacrifice they are prepared to make for the good of their children’s education. The incident also highlights the role that private schools are playing to shape educational policy and practice in Uganda. Since the introduction of UPE in Uganda, educational standards in public schools have declined alarmingly (Uwezo, 2011). Private schools are now viewed as offering better quality education in Uganda. That explains why most parents who can afford will prefer to take their children to private schools than public schools, particularly at primary and secondary school levels.

Although ICT integration in Ugandan education has made significant progress, there are still enormous challenges that the policy makers and implementers are still grappling with. In the next section I examine some of the major challenges that impede ICT integration and digital literacy promotion in Uganda.

5.4 Challenges that Impede ICT Integration and Digital Literacy Practices

5.4.1 Lack of awareness about the importance of ICT. According to the national experts, the major obstacle to ICT integration and digital literacy is lack of awareness in the population about the importance of modern technology and their reluctance to embrace it to transform their lives. Nearly all the national experts I interviewed in one way or the other alluded to the presumed lack of awareness about the potential that technology holds for socioeconomic transformation. For example when I asked the Minister of ICT, Dr. Rukahana Rugunda, to comment on the institutional practices that impede digital literacy practices in Uganda, he rendered the following opinion:

I think we need to sensitize people about the importance of ICT to know that it is a big enabler and that it can simplify many things, it helps in transformation of societies and the country and then ask policy makers to invest more resources in the sector so that there can be rapid
expansion of the infrastructure and also subsequent usage of this infrastructure for commerce, for government programs, for education and for any other thing that would help society. (R. Rugunda, personal communication, October 4, 2011)

The minister is convinced that majority of the people in Ugandan still do not know much about the potential modern technology has for transformation that is why he emphasizes the need to sensitize people about the importance of ICT as an enabler. The minister also seems to imply that the policy makers too are not aware about the importance of ICT. This could possibly explain why he stresses the need to “ask policy makers to invest more resources in the sector so that there can be rapid expansion of the infrastructure…” Otherwise there would be no need to ask them to do the obvious thing to invest in modern technology. Just like the minister of ICT, the permanent secretary at the Ministry of ICT also holds the view that lack of awareness is still a major impediment to ICT integration in the country. When I asked him for a comment about the impediments to digital literacy in Uganda he did not only state the impediments but he went further to illustrate his point by giving a personal story:

Number one the level of awareness on ICT is still low but it is increasing very rapidly. When I say ICT it is a combination of subsectors: broadcasting, telecommunication like phones, information technologies like the computers. And there is what we call the convergence of technologies now. Some of these technologies have been readily accessible in the past like the phones. When I got my first mobile telephone I was almost thrown out of my house in 1997 because it was viewed by everyone [the family] as an unnecessary luxury. We had important issues of school fees. So, buying a phone was like madness. I had bought it at 250,000 [Ugandan shillings, approx. $125] which at that time was a lot of money. At that time the level of awareness was almost zero. (J. P. Saamanya, personal communication, January 18, 2013)
Grace Baguma, director of NCDC, concurs with the Minister of ICT and the permanent secretary at the Ministry of ICT that lack of awareness is still a major obstacle to ICT integration in Ugandan education. While responding to the questions of the challenges facing ICT integration in the country she argued:

The public is interested but they are not aware. There is some element of ignorance. And when you talk about integrating technology in teaching and learning they get lost because it is really multidimensional in my view that we need to have a combination of resources and issues to be able to achieve it. (G. Baguma, personal communication, February 2, 2012)

While the national experts and policy makers unanimously thought there was lack of awareness among the Ugandan population about the ICT and digital technology, the evidence on ground did not seem to support that view. On the contrary people seem to be excited about the coming in of modern technologies in schools and communities in form of mobile telephones, computers and the Internet. As illustrated by the case of Senderela Secondary School, the local communities are even prepared to sacrifice the little resources that they have to send their children to a school that offer the best opportunity for their children to receive digital literacy. In fact most of the existing ICT labs in schools particularly in Arua District were initiated by members of the local communities who organize themselves under the umbrella of old students’ associations, or parents and teachers’ associations or school management committees, which demonstrates their awareness about the value and importance of digital technologies in education. However that is not to disregard the possibility of some degree of complacency particularly among bureaucrats in the MoES who may on account of their age not be very enthusiastic about using modern technologies.

Inadequate ICT infrastructure features as another major obstacle to ICT integration and digital literacy practices in schools and other institutions of learning. Although the ICT infrastructure in
Uganda has rapidly expanded in the last one or two decades, that expansion has not been evenly distributed across the country. Most of the ICT infrastructure has expanded in the major cities and towns. This has made it difficult for people in many rural areas to receive ICT services which has in turn impeded their ability to meaningfully participate in the promotion of ICT and digital literacy.

While enumerating the impediments to digital literacy practices in Uganda, the permanent secretary at the Ministry of ICT made the following comment in which he ranked inadequate infrastructure as the second major challenge: “We have talked about the level of awareness. I will now summarize other challenges. The second one is inadequate ICT infrastructure. We have talked very well about the value of the Internet but the penetration of Internet infrastructure is still very low” (Permanent Secretary, Ministry of ICT, Interview, January 18, 2013).

The permanent secretary went further to illustrate his point on inadequate ICT infrastructure as being a challenge to digital literacy practices with a practical example:

You are talking and the phone breaks now and then which is again related to the problem of infrastructure. In education I have talked about computer labs … in a school with Universal Secondary Education with classrooms of 100 – 400 students and you have only ten computers or even if it is forty computers … I am an old boy of one of the largest secondary schools in East Africa, we (old students of the school) had a project to establish an ICT lab at the school. I said okay, everything starts at home - so I will ensure that this program takes forty computers there [to that school]. But alas, it was a drop in the ocean because the school has four thousand students. Imagine four thousand students sharing forty computers in a school. So, those are the challenges. The ICT infrastructure is still low in Uganda. (J. P. Saamanya, personal communication, Ministry of ICT, January 18, 2013).
Okaka, who heads the literature department at Kyambogo University, recounted the frustrations Ugandan scholars like him face while attempting to use digital technology in their professional practice thus: “A scholar working in the Ugandan environment has a number of challenges adopting technology because first of all the technologies themselves are not just there, technologies are not available and where technologies are available they are not well maintained” (O. D. Okaka, September 7, 2011).

Okaka raises an important point when he talks about maintenance of equipment. Indeed one of the major concerns that the promoters of ICT and digital literacy should pay attention to if ICT is to sustainably take root in Ugandan education is the issue of maintenance of the existing ICT infrastructure and equipment. In all the ICT labs I visited not much attention is given to maintain the available equipment. More emphasis is being laid to securing new equipment than maintaining what has already been secured. Computers are not regularly serviced to fix any problems at the earliest opportunity. In many cases computers were connected to the Internet without antivirus protection. Computers are left to gather dust on top of tables without any cover on them. Some computer labs have no curtains to stop dust from entering the lab through the windows. People eat food in the ICT labs and the remnants attract rodents and insect, which destroy computers. Others have bare floors with no carpets and lots of dust, which damage the equipment. There is need for those in charge to be trained to protect and preserve the available equipment, particularly in view of the scarcity of resources to buy new equipment.

Okaka’s account of the fragility of the ICT infrastructure in Uganda resonates well with that of Baguma, who makes a compelling argument for the need to expand the ICT infrastructure and digital resources not just in the ICT labs but right into the classroom if teachers are to be encouraged to use modern technologies in their professional practice on regular basis.

Yes, the teachers may come out from the training with methodology, but they need to find the materials that they can use, the equipment, and the actual materials that have been developed,
like you come out you find the text book. So they should come from the college and find the CD-ROM in the subject and then they go to classroom and they find computer there to teach. They should not always go to the computer lab to be able to use computers. For me I have moved away from the computer lab syndrome because if you are going to empower me and it becomes part of my behaviour, I should wake up in the morning and prepare my lesson using a laptop and then I go to school and find a computer in the classroom or a projector and I teach the children and give them an assignment and they go to the lab … but all those elements are still lacking. Therefore the good intentions cannot be achieved in the short run. (G. Baguma, Deputy Director, National Curriculum Center, personal communication, February 2, 2012)

Despite her initial apprehensions about the inadequacy of ICT infrastructure in Ugandan classrooms, Baguma is still hopeful that in the long run this will get better as revealed in her concluding remarks during the interview:

But in the long run government should strengthen the policies and efforts and am glad our government is already making efforts through the rural electrification policies to provide electricity in rural areas, with ICT policies so that we can have a combination of efforts in order to achieve it [the use of digital technology] as a pedagogical tool. (G. Baguma, personal communication, February 2, 2012)

The academic registrar at Kyambogo University, Ann Mugerwa, attributes the apparent lack of progress in ICT integration in teacher education mainly to lack of electricity. She said, “In the PTC’s, there was an attempt to have the core PTC’s get computer labs and the entire core PTCs got computer labs, but then you realize that we have problem of power (electricity) even in the city center, so how much more with the rural areas” (A. Magwera, personal communication, February 6, 2012).
5.4.2 Negative attitudes. Some national experts attribute the low levels of digital literacy in Uganda to a perceived negative attitude among sections of the elite. They argue that some people still have negative attitudes towards modern technology. Such attitudes they argue do not allow those people to adapt to the new changes. According to the national experts such people are very suspicious of what technology can do to their privacy and personal space. Among those who believe that negative attitudes is a major obstacle to ICT integration is the permanent secretary at the ICT Ministry who reports:

Attitudinal change that involves the rate of adoption is very low. I can give you an example it is not directly related to education but about attitude: this is a video phone (points at a video phone on his desk). I can call any of those listed officers and I can talk to them on video but when you call – for example a minister on video, the minister will ask why you want to see my photograph. This is a spying thing. He will switch off. You call many and they will switch off. So, adoption is slow because of negative attitudes. We are used to doing things in a particular way. (J. P. Saamanya, personal communication, Ministry of ICT, January 18, 2013)

On the other hand, according to Okaka, the perceived negative attitude among some sections of the Ugandan elite to embrace digital literacy can be attributed to lack of exposure, particularly among Ugandan scholars. When asked to account for the reluctance among sections of Ugandan elite to embrace technology Okaka explains:

It is lack of exposure ... Interaction with technology really happens more when you move outside this country, especially to South Africa, Europe, North America, and Asia. It is just lack of exposure. Secondly, it is lack of vision. And the other one is, you know, when you are in a little pond, you can be a big fish and everything can seem fine. But when you are thrown out
there into the wider world, you will discover that you really need to survive, and it will challenge you to rise up to the next level. (O. D. Okaka, personal communication, September 7, 2011)

Okaka castigates sections of the Ugandan elite who are still reluctant to embrace modern technology and digital literacy, and went further to attribute Africa’s lack of visibility in global discourses to the reluctance of sections of the Ugandan elite to embrace modern technology, stressing that:

What we need here [in Uganda] are not just Ugandan professors but international professors from Uganda. I mean Ugandans who can stand at par with great thinkers around the world and be able to make their impact felt. It’s not like Africa hasn’t produced seasoned scholars; we have had scholars like Ngũgĩ wa Thiong’o, Ousmane Sembene, Ali Mazrui, Mahmood Mamdani among others, and that is what we need. We need someone who can sit in an office like this exact one where I am sitting but knows what arguments are going on worldwide in the area of his/her specialization and who can make statement that the world can listen and pay attention to, that is what we need, and technology is part of what is going to help us to achieve that. (O. D. Okaka, personal communication, September 7, 2011)

The enthusiasm and energy with which Okaka spoke revealed his interest and passion for ICT and digital literacy. He used voice projections, facial expressions and gestures to emphasize his point. At some point Okaka was so charged that he could not talk while seated. He had to stand up to make his point. He later on realized that his voice level had gone too high. He then lowered his voice and asked me to excuse him for talking very loudly as he resumed his seat. To further explain his point on
the crucial role exposure can play in fostering attitudinal change in favour of ICT and digital literacy integration, Okaka recounted his personal experience thus:

When I first arrived in the US I was traumatized especially when I arrived; then I was a teaching assistant. I was supposed to teach Rhetoric and Composition using electronic portfolio and I had to teach my students web design. So, it was traumatic. First of all I couldn’t register for classes without getting online, I couldn’t get a room for accommodation without going online. I couldn’t do anything without getting on line. So it was like I couldn’t catch up to do anything, to just function alone. It was a real cultural shock! I was thrown into technology just like that without any basic skills. But I had to grow quickly. (O. D. Okaka, personal communication, September 7, 2011)

Under the circumstances Okaka said he had to learn how to do web design within the shortest possible time, and to master it enough to teach university students web design. He said was compelled to learn by necessity. So eventually, his eyes opened and he soon realized how technology makes everything so easy, so smooth and so efficient. He said he basically realized that visual arguments, visual communication is so fascinating and he found out that the average American student was not going to listen to a lecturer for two hours unless there was a video clip or something that was going to help the student to comprehend what the professor was talking about. He recounted:

And I learnt about teaching in those smart classrooms where you are teaching about a novel or for example, Ambrose Bierce’s civil war stories and then you go on the Internet live in class and then you go on a website talking about his works and you show it right there and then-- you put a clip of his movie and then present it and you go on with further discussion. And I said to
myself wow this is how I want to do it when I get back to Uganda. (O. D. Okaka, personal communication, September 7, 2011)

Unfortunately, as soon as he got back to Uganda and resumed teaching at Kyambogo University he could not easily find a room with an electric socket where he could plug in a TV for his students to watch a movie during a lecture. His students would have to move with a TV screen from one room to the next room, looking for a socket to plug in a cable. Each time he taught literature and film that had to happen. Then as soon as they set up the TV and started watching the movie, then the power (electricity) would suddenly go off and they would not be able to watch the movie.

Okaka revealed that he sometimes had to show movies from his laptop with students crowding around him to watch the movie for as long as the battery for the laptop could last. He said since he returned to Kyambogo University more than a year ago, he has been asking for a smart classroom where he could teach his film classes. He said he has been telling the administrators – “you know what, it is not just literature that needs this technology; geography needs it, how are you going to teach remote sensing and mapping and all those other things without a screen” (O. D. Okaka, personal communication, September 7, 2011). Unfortunately, his efforts would not yield much fruit until he became a head of department for the literature department and he started budgeting for the digital technologies within the departmental vote. According to Okaka this has enabled him to buy digital equipment that he desperately needed to teach literature and film. He is now better equipped to teach using digital technologies, which his students have found very exciting.

From Okaka’s account we can see the role that complacence can play in holding back efforts to use digital technologies as pedagogical tools. The reason why Okaka could not use digital technology to teach his literature class was not that Kyambogo University did not have the resources to invest in digital technologies. Apparently it was complacence on the part of the leaders and managers. That is
why, as Warschauer (2003) has noted, leadership is very crucial in guaranteeing the success of ICT and digital literacy integration in local contexts.

While the national experts reported negative attitude as a major impediment to ICT integration in Uganda, the local experts seem to think otherwise. For example, when I asked the DEO of Arua District, Mr. Nicolas Tembo to make a comment on the extent to which negative attitude was an impediment to ICT integration in the district he said, “No, it is no longer attitude now. The attitude challenge has been handled. The problem of the attitude is done with” (N. Tembo, personal communication, January 16, 2013). Even when I tried to reframe the question differently and asked, “If I got you right, are you saying that the attitude towards ICT integration in education in Arua District is now favourable?” he still maintained his position and said:

It is extremely favourable! I think the most serious issues; challenges are these technical challenges of getting manpower, but even manpower… I have told you most of our teachers now know that without IT you are a no body! You are a no body without IT. Let me tell you, at one time I didn’t want to learn the computer. My personal experience is that much as I am the DEO here, at some time, just a few years back I told people I am about to retire and why should I waste my time learning about the computer. But then I came to realize I am writing books. I am busy writing my personal books, but as a writer of books I came to discover that you need to search, you need to consult, and you need to know who has written on this subject in Canada, in America - who did a research on this [this topic]. What did he say, where did he stop. And how do you get across this, it must be through IT. Let me tell you - I changed my attitude completely and I have been learning IT very secretly. And I am now in grip of the critical basics. I am now a converted person in IT. (N. Tembo, personal communication, January 16, 2013)
Clearly, the national experts and the local experts seem to take different positions on the question of negative attitudes as being a major obstacle to digital literacy promotion in Ugandan education. While the national experts think that people still have negative attitudes towards digital technologies, the local experts think otherwise. There might not be easy answers to why the national experts and the local experts have contradictory positions on the question regarding negative attitudes, but I am inclined to speculate that the local experts who are based at the grassroots understand what is going on in the communities a lot more than the national experts who receive limited information about what is going in local communities. However, we cannot completely ignore the views expressed by the national experts because they might have a better sense of the wider national context than the local experts who operate within specific locations. This is again why there is need for further research in some of these grey areas.

5.4.3 Lack of technical expertise. The national experts contend that lack of technical expertise is another major obstacle to ICT integration and digital literacy promotion in Uganda. For example, according to Grace Baguma, the director of NCDC:

One of the things that have challenged NCDC is lack of multimedia developers. For example we wanted to go ahead with the production of CD-ROM materials for teachers to use in schools but we didn’t have the expertise to produce materials that are ICT enhanced because they need a combination of knowledge. For example you need the instructional developers who are the curriculum specialists but you also need the multimedia developers and those combine a lot of skills like sound skills, illustration skills to make those visual materials. It has been a bit challenging. So at the moment we are actually not doing much because of lack of technical capacity (G. Baguma, personal communication, February 2, 2012).
Indeed, as Baguma reported, lack of technical expertise seems to be a major obstacle to ICT integration in Ugandan education at the moment, which makes the production of relevant education resources and their use as pedagogical tools rather difficult for effective integration of ICT and digital literacy to take root in schools. For example, although many of my research participants had begun to use digital resources many of them still lack the basic skills to make effective use of the digital resources. They still face enormous challenges while trying to search resources from the Internet. Others are still learning to type on the computer while others could not connect equipment on their own for their class presentations. However the good thing is that the need to cope with the challenges has made the participants see the need to help one another which has in turn led to the spirit of cooperation and teamwork among them as explained in chapter four above. Nevertheless government should take into consideration the need to invest in the development of technical human resource that can help in development of local content that is relevant to the Ugandan educational context. Teaching, as one of the national experts argued, should “both delight and instruct. If it is going to be entertaining while at the same time being educative you will have to package the instruction in a form that is appealing to the audience [students]” (O. D. Okaka, personal communication, September 7, 2011).

We need to view ICT as an industry with forward and backward linkages to other sectors of the economy and invest in it strategically. Beyond providing schools with digital equipment efforts must be made to invest in technical capacity building for mass production and effective utilization of educational resources as well argued by Okaka, his rather hyperbolic language notwithstanding:

I think the problem with the Ministry of ICT is that they think it’s just about computers; get computers and send them to schools— that is now ICT! But that is a very small part of it. I want to see our cultures embrace technology; I want to see technology move our culture forward. This is where you come into the field of education, it’s not just a matter of give them laptops so that they can type and go on the Internet. The point is how we can influence the thinking of the
world through technology! How can we feed back into the mainstream of dominant cultures and
give them a statement about ourselves, about what we are? This is going to be done though
modeling technology to suit our own interest in education systems. (O. D. Okaka, personal
communication, September 7, 2011)

Okaka’s argument resonates well with the fifth issue that Mutonyi and Norton (2007) have
identified as being crucially important for curriculum planning and policy development in Uganda,
namely; the need to consider how global software can best be adopted for local use. Mutonyi and
Norton further assert that while most of the studies on ICT use in Uganda have pointed out the
advantages of ICT to the local context, they have not said much about Uganda’s contribution to the
global context, except in the realms of business. Okaka makes a valid argument when he says the
policy makers must not only seek to integrate technology into the Ugandan education just to improve
the quality of Ugandan education per se, but they must do so with an eye on the global arena. There is
need to use technology as a tool to strategically position the Ugandan community to benefit from the
全球 educational and cultural markets. This will inevitably require training teachers and young people
in schools, colleges and universities not only to be consumers of global knowledge but also producers
of knowledge for the global information economy. In that regard the steps that the government has
taken to establish a department of ICT in the MoES, and an ICT unit at the National Curriculum
Development Center to provide technical expertise for effective integration of ICT are steps in the right
direction. However, similar steps need to be taken to establish technical units at the grassroots, in the
districts, schools and colleges where the actual implementation of the ICT policy takes place.

5.4.4 Inadequate supply of electricity. A major obstacle to ICT and digital literacy integration
in Uganda broadly, and in West Nile region and Arua District more specifically revolves around
retrogressive colonial policies whose legacies have been perpetuated by successive governments.
Historically, West Nile has always been viewed as a labour reserve where able-bodied men are
recruited to work in sugar cane and coffee plantations in Buganda region in central Uganda and Bunyoro Sub-region, and to serve in the armed forces particularly in the military, police and prison services (Ahluwalia, 1995). Infrastructure development in the region is one of the least in the country. Instead of putting West Nile on the national grid for electricity from Owen Falls Dam or Bujagali Power Dam, the region has been left to survive on unreliable thermal electricity as best captured in the following newspaper article:

The West Nile Rural Electrification Company (WENRECO) has 25 days to defend its concession to supply electricity to North Western Uganda or risk losing its license. WENRECO, a company owned by the Aga Khan Group, has a 20-year concession for the supply of power to the West Nile. Although it is expected to supply 12 hours of power every day, supplies have never been on for more than eight hours a day. In the past twelve months they dwindled from eight to only three hours a day. Since March, the supply of power from the WENRECO thermal plant has been switched off and the entire region has no electricity at all (Uganda Radio Network, 2013).

This article summarizes the crisis of electricity in West Nile region, which clearly frustrates the efforts to promote ICT and digital literacy integration in the whole of West Nile region. People are generally very unhappy with the government over lack of reliable electricity in the region. They feel government has a deliberate agenda to hold back socioeconomic development in the region (Leopold, 2005). In the absence of reliable electricity Wati CPTC has been operating a generator to provide electricity for running the computers in the ICT lab but the cost of buying fuel for the generator has become unsustainable. The college has also tried to install solar but the solar system can only function when the sky is clear and the sun is shining brightly as the batteries have long expired. The moment clouds pass in the sky, there will be an interruption of electricity flow. This made us cancel a number of
planned lessons during the study. This is how one of my research participants expressed his frustration over the unreliable electricity:

I organized my notes in form of PowerPoint® ready for presentation. However at the time of the presentation there was no power (electricity) at the college. As if that was not enough even the sun too was against me on that day as the solar power that I had hoped to connect to the lecture hall as an alternative source of electricity was very unstable on this fateful day since the weather was not favourable and the sunshine was not strong enough to generate electricity. The batteries for the solar panels had run down for some time now, such that solar power is used directly from the panels. When the sunshine is bright we would receive electricity but the moment clouds cross the sky electricity would go out instantly. (Nelly Cadria, journal reflection, March 4, 2012)

Such frustrations do not augur well for the future of ICT and digital literacy integration in the Ugandan education. Government needs to step up its efforts to put up the necessary infrastructure to evenly distribute electricity to all regions of Uganda to make electricity readily available for ICT integration in schools. Without access to electricity schools will find it rather difficult to promote ICT integration. However in the meantime, alternative sources of energy like solar energy could be explored but only as a short-term measure. If Uganda can export electricity to the neighbouring countries like Kenya, Tanzania, Rwanda and the Democratic Republic of Congo, there can be no excuse for putting all regions of the country on the national grid if government is serious about ICT and digital literacy integration in the Ugandan education for socioeconomic transformation.

However while the responsibility to provide electricity in schools and colleges should fall squarely at the feet of government, members of the local community should also avoid making a bad situation worse through irresponsible behaviour and causing damage to public property. For example
there was a time when I was supposed to observe a lesson by one of my research participants but the
lesson failed because someone tethered his goat on the electric cable connecting to the main switch.
The goat got entangled on the electric cable and pulled the cable leading to short circuit, which nearly
burnt the whole college. Although an electrician was called from Arua Town to come and defuse the
electricity within an hour or so, it took weeks for the college to fix the problems that were caused by
that short circuit.

Although such occurrences are not the norm, they still need to be avoided through deliberate
sensitization of the local community on the potential risks and dangers of such actions. However, such
sensitization programs need to be diplomatically handled to avoid causing tensions between institutions
and the local community that should play an active role in ICT and digital literacy integration.

5.4.5 Limited access to the Internet and digital content. The ICT policy recognizes lack of
Internet and the high cost of Internet connectivity in schools and colleges as a major obstacle and
pledges that to address that challenge the MoES will negotiate with the Uganda Communication
Commission to seek to develop low cost rate of access to the Internet for schools (Republic of Uganda,
2003). Yet on ground no progress has been made in that regard and lack of connectivity has still
remained a major obstacle to ICT integration in schools and colleges particularly in the rural
communities. For instance, during the fifteen months of my stay at the college while doing my
fieldwork, the ICT lab had Internet running for only three months. One of the American Peace Corps
volunteers at the college, Nelly and I had to avail our small wireless modems for the tutors to access the
Internet from our laptops. Under such circumstances expecting tutors to access digital content from the
Internet would be asking for too much. Government needs to do more to address the problem of lack of
Internet connectivity in schools and colleges if ICT integration and digital literacy is to sustainably take
root in Ugandan education.
However, despite the challenges facing ICT integration discussed above, we must not throw our hands in the air and say there is nothing else that we can do because the benefits of using ICT and digital literacy to achieve educational change are too great to ignore. In the next section I examine the extent to which the use of digital technologies as pedagogical tool has impacted classroom practice in two Ugandan rural schools.

5.5 ICT, Digital Literacy and Classroom Practice in Rural Ugandan Classrooms

5.5.1 The context. In line with the national ICT policy context discussed in the previous section, this section now examines how the ICT policy has impacted classroom practices, focusing on the experiences of four teachers in the two rural Ugandan primary schools of Obizea and Aramua. But before I present the findings I would like to briefly describe the local contexts in order to facilitate the reader’s understanding of the research findings.

The two schools are situated in very rural locations. They are approximately two kilometers apart. Like many rural public schools in Uganda (Abiria, 2011, Abiria, Early, Kendrick, 2013), Obizea and Aramua operate under considerable resource constraints (Abiria, 2011). In one of the classes (Obizea Primary School) children had a few desks to sit at while in the other there was no furniture at all, and children sat on bare floor. The teachers had no access to digital resources except the ones that were provided for the purpose of this project, which the teachers shared among themselves and those they accessed during ICT training workshops that we organized for the purpose of the research project at Wati CPTC. The teachers were provided two digital cameras and two audio recorders, a small generator, and a speaker that had an in-built battery that could last for approximately five hours. They were also provided with a small video camera that had an in-built digital projector to present images on the classroom wall. This was after an LCD projector that was initially provided was blown up by the generator. I also provided them with a laptop for their class presentation.
The classrooms had no window shutters. The rooms were very bright and the teachers had to use mats and blankets to close the windows so that the classrooms were dark enough for the pictures and videos to appear on the wall. Despite those difficult conditions, the teachers did not relent. They went ahead to use digital technologies to present their lesson. The findings from the study suggest that the teachers’ use of digital resources impacted classroom practices in multiple ways, including: increasing children’s interest and engagement in classroom activities; reducing the number of children dropping out of school; making teaching simpler and easier for teachers to execute; enhancing the teachers’ professional identity and standing in the local community; increasing teacher innovation and resourcefulness, and; promoting community involvement and ownership of education as presented below.

5.5.1 Increasing children’s interest and engagement in class activities. One of the things that I noted when the teachers used digital resources for their class presentations was that the use of digital resources did not only make the children very keen but it also encouraged them to play an active role in the teaching and learning process. For example whenever digital technology was used for class presentations, the children would sit on the edges of their seats or squatting strategically. They would pay full attention to what the teacher does or says. They would respond to the teacher’s questions spontaneously, particularly when the question was based on a video clip or a picture that they had just watched. They would watch the video clips that the teacher shows keenly and spontaneously react to the video clips and images by giggling, pinching each other, laughing or saying wow! The teachers themselves also noted the use of digital resources had increased the children’s interest and participation in the learning process. For instance when Nanaru Bingararu was asked to share her experience with the use of digital technology during a focus group interview she reported that,

“Concerning using technology or applying it in classroom, what I have come to know of my learners is that they are really interested in it … Since they were introduced to the use of digital
technology in the classroom they want me to use it all the time” (Nanaru, focus group interview, May 30, 2012).

Nanaru further explains that the use of digital resources had not only increased children interest in learning but it had also increased their participation and engagement in class, stressing that “they are very excited; they put much interest in learning … and they are able to tell or express themselves in the learning process” (N. Bingararu, exit questionnaire, August 30, 2012). Nanaru’s explanation was echoed by Betina, who further explained that

In our classes, when we were undergoing the training to become teachers, they told us that for you to make the lesson interesting you should have the teaching aids live so that children will learn from real situations. So when [I] am using technology some of the teachings, learning aids, which used not to be brought to class live are now being brought to the classes live. For example I take photos and videos from the community sites and bring them live to come and show the learners in class. Through this, they are able to see real things. Now they are learning not from the abstract but from the real things they can observe ... The children are able to listen to animal sounds and voices of some parents who are at home - and for them to see those who are supposed to be at home being brought into the classroom via technology makes the class very interesting! (Betina, focus group interview, May 30, 2012).

Betina attributes the renewed interest that children have during her digital resources lessons to the affordance that technology holds to import local community practices in form of video clips and photographs into the classroom to make what the children learn less abstract. According to Betina the use of digital technology makes it easy for children to relate the animals that they watch and the people they see in the videos with the concepts being taught in class, which makes learning more real and interesting to them.
Towards the end of the study when I asked the teachers to briefly describe how the use of digital resources had impacted their classroom practice they consistently noted that the use of digital technology had increased the children’s interest and participation in class activities. For example, according to Abazoa

The use of digital technology has made teaching and learning real and exciting since most children are in position to see what took place in daily life. It has increased children’s interest in learning since lesson presentation is real and live where children participate actively in learning process. (Abazoa, exit questionnaire, August 30, 2012)

He adds, “There is active participation of learners in the teaching and learning process” (Abazoa, exit questionnaire, August 30, 2013). Abiriamazo holds a similar view to that of Abazoa when he states, “digital technology has made teaching and learning more real and effective. It has reduced boredom in class” (Abiriamazo, exit questionnaire, August 30, 2013). Betina re-echoed this same view when she reports that “they [the children] are very happy and attentive in class … whenever I come to class, they are all active” (Betina, exit questionnaire, August 30, 2012).

The teachers’ comments are consistent with the views that the local experts expressed about the potential impact of digital technology on the children’s learning. The local experts believe that digital technology can potentially transform the dynamics of the classroom and make learning less teacher-fronted and more exciting to children, a view well-summarised by Tempo, the District Education Officer, Arua District

You see what has been happening in this country has been handling education using only one medium. Teaching, learning has been depending on teacher centeredness where the teacher dominates the teaching and learning process. Children have been hearing from the teacher. But
today using technology, we are talking about the multimedia approach to teaching. If the child is tired of listening what else can the child do? The child should be able to manipulate gadgets, the child should be able to see pictures, and the child should be able to see real objects. The child should be able to touch, to listen, and to see … This is what has been lacking in our education system. So you can see technology plays an important role in enhancing teaching and learning. (N. Tembo, personal communication, Arua, January 16, 2013)

5.5.2 Improving class attendance and reducing number of children dropping out of school.

The use of digital technology has not only increased children’s interest and participation in the learning process but it has also been found to improved class attendance and reduced the number of children dropping out of school. From the teachers’ narrative accounts it emerged that the use of videos in the classroom has made children become more interested in school than before. Children come to school expecting to watch videos and see pictures, which they would not be able to watch if they remained at home. According to the teachers, children no longer want to miss school as they used to do because they do not want to miss the opportunity to watch videos and see pictures. For instance according to Abiriamazo:

Since this project started, children do not miss school. They are expecting that anytime we shall be using technology, so when they don’t come to school they know they will miss a lot. So they have to come to school so that they can watch/see the pictures and watch videos. The children were even telling me that they used to pay money to watch film at Ocodri [trading center] but now they are watching videos in class free of charge. (R. Abiriamazo, focus group interview, May 30, 2012)
From Abiriamazo’s comment above we see that the use of digital technology in the classroom has created an extra incentive for children to attend school. The absence of digital technology in the classroom was a missing link in the system of education, which they tried to fill by going to watch movies in the makeshift halls mushrooming in the local trading center. The fact that the children were even paying a fee to watch those videos is telling. It highlights the extent to which digital technologies appeal to them and the price they are prepared to pay to have access to digital technologies. It explains why they now find it difficult to miss school when the videos that they used watch at a fee in the trading center has been brought into the classroom to be watched free of charge— a point Nanaru echoed in the exit questionnaire that she filled where she also reported, “pupils were so excited that they compared digital technology to the videos that they used to sneak to go and watch in the trading center (Nanaru, exit questionnaire, August 30, 2013). She further explains that

The use of digital technology has attracted many children to come to school and it has made the number of children attending school be [remain] high … I now have many children in my class and children learn effectively … My teaching is real as I use digital technology and it enables me to prepare my lessons orderly. (Nanaru, exit questionnaire, August 30, 2013)

As Nanaru has explained it is not only the mere presence of the digital technologies that has made the children develop more interest in school but also the innovative ways through which the teachers are using the digital resources to arouse and sustain their interest that is making the difference and encouraging children not to miss school.

5.5.3 Making teaching easy and simple for teachers. The evidence from multiple sources revealed that one of the ways through which the use of digital technology was impacting classroom practice was that it had made teaching and learning relatively simpler for teachers to execute. Teachers gave a range of reasons to explain how the use of digital technology had simplified their work. Many of
them explained that using digital technology simplified their work by making them talk less during the lessons. For example when asked to comment on her experience with the use of digital technology Betina stated “It has simplified my teaching, and I talk less in the class these days (Betina, exit questionnaire, August 30, 2013). Betina’s statement was also echoed by Nanaru who reported, “As a teacher it has made me talk less in the classroom and teaching has become easy (Nanaru, exit questionnaire August 30, 2012). A similar view was expressed by Abiriamazo who said, “It has imparted a lot of knowledge in me and teaching has generally become easy since what learners see is what the teacher has to say (Abiriamazo, exit Questionnaire, August 30 2012).

As Abiriamazo has noted in his comment above, one of the reasons why the teachers feel that the use of digital technology is making their work easy is because it encourages teachers to make lessons less teacher fronted and more learner-fronted. The use of digital technology creates space for teachers to engage the learners in the discussion of the digital content presented through technology in contrast with the traditional teacher fronted style where the teacher does most of the talking and children only listen and take notes. It has also made the teachers’ work easy by facilitating their ability to prepare appropriate teaching and learning aids through the use of videos and photographs, a point that Betina summed up during a focus group meeting.

In my professional practice I am supposed to prepare my teaching materials before I enter class. The digital resources have simplified my preparation. The photographs are real! For example, when you are poor in drawing like me, you could end up drawing a dog instead of a goat. But the use of digital technology has saved me from that challenge. (Betina, focus group interview, August 30, 2013)

The National Assessment of Progress in Education Report (2010) noted that the achievement of primary school pupils in Uganda in numeracy and literacy was poor, among other reasons, because
pupils could not read pictures and other forms of drawings. According to the report teachers tend to avoid teaching drawing pictures and shapes. Betina’s comment that “when you are poor in drawing like me, you could end up drawing a dog instead of a goat” makes sense. She ably summarizes this point in a focus group when she said:

Some of the teaching aids used not to be easily obtained but this time through the use of technology they can now be easily got and brought to the classroom … For example - the small ants, I am able to bring the pictures/videos and the children are able to see them moving in the video clips. Digital technology has really aided my teaching. It is now very easy for me to teach. (Betina, focus group interview, May 30, 2012)

Like Betina, Abiriamazo also spoke favourably about the role that technology plays in helping him to transport community resources into the classroom to facilitate teaching and learning

What I have noticed with technology is that it has got positive impact on me as a teacher, the community and the pupils themselves. On me as a teacher, the impact on me is technology makes me to bring what is outside into the classroom and it makes me to talk less because what children see, and what they hear is what is already familiar to them - from home then to the classroom. Then it reduces boredom in me. (R. Abiriamazo, personal communication, May 30, 2012)

However while the use of digital technology facilitates the teachers’ lesson preparations and simplifies teaching and learning, it can potentially make some teachers over rely on the digital content at the expense of teaching reading and writing, as highlighted in the following conversation in a focus group interview:
Betina: I used to write a lot but the use of technology has made my work very easy. I only use the materials in the camera to teach. I no longer write a lot of notes on the chalkboard. I used to talk and write on the chalkboard using chalk which used to be tiresome for me, but now I can talk without having to write. Sometimes they [the children] see pictures and I ask questions that they answer easily.

Bonny: Do you think though that if you are not writing much that affects the children’s writing?

When you write on the board, children are seeing print, they are seeing letters, and they are seeing alphabets. So, do you think that there is something they might be losing with the images?

Betina: No! I write the things which the lesson necessarily needs.

Bonny: So, the video gives more content but the writing does the central ideas?

Betina: Yes. (Focus group interview, May 30, 2012).

It is might therefore important for the teachers to continue to write on the chalkboard to facilitate children’s literacy development. The use of digital technology should not necessarily be a substitute to exposing children to print or writing on the chalkboard. Digital technology and print should complement each other through a delicate balancing act by the teachers. How that can best be done could be another subject for further investigation.

5.5.4 Improved teachers’ professional identity and standing in the community. From our interactions with teachers, we found out that teachers felt that the use of digital technology has not only improved their teaching and learning in class but it has also improved their image and standing among their professional colleagues and in the local community. This was how Abazoa expressed how the use of digital technology has transformed his professional identity and standing in the community.

Teaching using technology has really made me improve in some areas. First, when we had training on using technology, I was worried. Touching those unique cameras was difficult for
me. I was worried that I might spoil [damage] the camera. As time went on, I managed to
familiarize myself with the digital camera and recorder to the extent that I can now take photos
and carry out video recording with confidence. Now even if I move to the communities, seeing
me move with these cameras alone, which are of course unique … let me tell you [shakes his
head in amazement], I feel I am now somebody also [an important person]. Normally while
preparing resources for teaching, we move in communities, villages and so forth. Even the
communities themselves admire us, especially when I move with the digital cameras to take

From Abazo’s perspective the use of technology has considerably impacted on his identity and
social standing. It has enable him to gain recognition in the community which makes him feel he is
“somebody also” implying that he has become a recognizable and a respectable person in the
community. Abazo was not the only participant who felt a sense of recognition and improved social
standing with the use of digital technology. Nanaru also reported an improvement in her professional
standing because of the use of digital technology when she said, “I feel important and proud when
using digital technology in my classroom” adding, “when I am teaching, some teachers and children
from other classes also join in my lesson” (Nanaru Bingaru, exit questionnaire, May 30, 2012). Some
teachers reported that their engagement with digital technology has not only earned them recognition
locally, but it has also made them to be viewed as teachers with global connection. A case in point is
Betina who said her engagement with digital literacies has earned her recognition among his colleagues
as a person with global connections. This has enhanced her self-esteem and professional identity.

5.5.5 Increased teacher innovation and resourcefulness

5.5.5.1 Lesson 4: Abiriamazo’s lesson on May 30, 2012, P. 2 at Aramua Primary School.

This lesson was very interesting in many aspects. However what was most striking about this
lesson was the teacher’s resourcefulness in integrating digital technology and local cultural resources to
make learning very exciting. The teacher began the lesson by reviewing the previous lesson with children. He reminded them that the previous day they had looked at how animals and birds protect themselves against their enemies. He then informed them that the day’s lesson would be on animals and birds. However instead of him just talking about animals and birds arbitrarily, the teacher asked the children to all stand up to sing a multilingual song in which the Lugbara names of some animal are given with the corresponding English name:

<table>
<thead>
<tr>
<th>Song</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ti kawu</td>
<td><em>Ti</em> is a cow</td>
</tr>
<tr>
<td>Indri goti</td>
<td><em>Ndri</em> is a goat</td>
</tr>
<tr>
<td>Odrogo rati</td>
<td><em>Odrogo</em> is a rat</td>
</tr>
<tr>
<td>Busu kati</td>
<td><em>Busu</em> is a cat</td>
</tr>
<tr>
<td>Dowa kaati</td>
<td>A door is <em>kaati</em></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Lizadi olokoto</td>
<td>A lizard is <em>olokoto</em></td>
</tr>
<tr>
<td>Sineki do galaa ni</td>
<td>A snake is <em>gala</em></td>
</tr>
<tr>
<td>Iyi do wota</td>
<td><em>Iyi</em> is water</td>
</tr>
</tbody>
</table>

The teacher’s strategy of using a song at this stage to was particularly striking because through it the teacher was able to arouse the learners’ interest, achieve class control, and solicit children active involvement and participation in class activities and stamp out boredom. Through the song they were mentioning the different types of animals, which the teacher was going to present using digital technology.

After singing the first song the teacher said, “Wiii!” and the class shouted, “Waa!” in a chorus after which they all kept quiet and waited for the teacher to speak. I found this strategy of pausing in moment of silence to draw the attention of the children to be a very powerful tool for class control,
particularly in a UPE class where the numbers are so huge and class control is a big challenge for many teachers. The teacher then introduced another song:

<table>
<thead>
<tr>
<th>Song</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indre odru acara itu olosi you, ma adri la!</td>
<td>Look! The buffalo is coming, climb the mahogany tree, my brother</td>
</tr>
<tr>
<td>Indre odru acara itu olosi you, ma amvi la!</td>
<td>Look! The buffalo is coming, climb the mahogany tree, my sister!</td>
</tr>
</tbody>
</table>

As the teacher was singing, he would make facial expressions and gestures that made him look like a furious buffalo ready to crush into the children which would regularly make the children laugh while singing. You could see that the children were really enjoying the singing and dramatization from excitement that they exhibited and the manner in which they continued to laugh during the singing. Through this approach, the teacher was able to appeal to the children’s imagination and make them respond to their own imagination, which was a very powerful strategy to make children learn while having fun. It kept the children’s morale high and made them pay attention to the teacher and to follow his instructions keenly.

After the singing and dancing, but before presenting the digital content, the teacher used a story on the animal kingdom as a pedagogical tool to further facilitate teaching and learning which worked very well. The story was about an animal king whose kingdom was hit by a severe draught. To address the water problem in the palace, the king ordered all the animals in his kingdom to come to the palace for a meeting. During the meeting the king told the animals that if anyone of them could hit the soil very hard with its hooves until water springs up at the spot, he [the king] would give his beautiful daughter to that animal for marriage. Nearly all the animals tried and failed until chameleon that all the other animals despised because of its small size and very weak legs came forward, amidst lots of cynical laughter and ridicule from other animals, and unexpectedly managed to hit the soil until water
sprung up in large quantity. The king had no choice but to surrender his beautiful daughter to little chameleon as other animals including big elephant and lion watched in disbelief.

One of the things that made the story very effective was the narrative techniques that the teacher used to narrate the story which made the children pay attention keenly to him as he narrates the story. The teacher was very dramatic while narrating his story and he used body movements, facial expressions, eye contacts, lip movements, and vocal qualities to make children enjoy the story. He would imitate the way each animal that took part in the competition would walk to the stage and attempt to hit the ground. Each time the teacher demonstrated how various animals walked to the stage and unsuccessfully hit the ground, you would see some of the children unconsciously moving their bodies the same way as the teacher was doing. Others would laugh as the teacher narrated his story while at the same time imitating the way a particular animal walks or the sound the animal makes which made the story all the more exciting for the children.

In order to test their comprehension the teacher asked children to name the animals in the story. Children named the animals with ease. For example when he asked which animal hit the ground to make water spring up. Many children put up their hands to tell answer. The teacher called a child by his name, who said it was a chameleon that hit the ground with water. Similarly, when the teacher asked why the rest of the animals had undermined chameleon at first. Very many children showed interest in answering the question. A child answered that because of his small size. Another child said because he looked weak. Another child said it’s because the chameleon shakes a lot when it is walking, which made some children laugh. Even when the teacher asked the children to explain the moral lesson in the story their responses showed that the children had keenly followed the story and drawn lessons from it. For example, a child said one of the lessons to be learnt from the story was that “We should not underestimate someone because of his or her size.” Another child said, “Don’t despise anybody.” Another child said, “Water is important and we should not waste it.”
The story was very useful in many aspects. It was relevant to the topic of the lesson, which centered on animals. It enabled the teacher to draw on the children’s cultural knowledge to improve teaching and learning. It made the children pay attention to the teacher and follow his instructions. The story gave the children opportunity to actively participate in the teaching and learning process. They actively participated in singing, dancing and discussing. It made the children have fun while learning which makes their learning experience exciting and memorable. It was also striking to note that the teacher was not simply using this story to entertain the children and make them laugh and have fun. He used this story not only to develop the children’s listening and speaking skills but also that of critical thinking. He was also able to instantly test the children’s understanding by asking the children to discuss the morale lesson that they drew from the story through which he could establish whether or not the children understood the story.

The teacher used video clips in which he recorded different types of animals from the community to teach vocabulary and spelling. He would begin by showing the children a bit of the video. Each time an animal appeared in the video children would become visibly excited with some whispering to their friends, others smiling, others laughing and others shaking their heads in amazement. The teacher would pause and ask the children to identify the animal and children would start competing by putting up their hands and asking the teacher to select them to give the right answer. The teacher would then select one child to identify the animal in the video and ask the rest to imitate its distinctive sound. Children would start mewing like cats, barking like dogs and mooing like cows, which would make the lesson hilarious. The teacher would allow the video to continue until the animal made its distinctive sound, which would spark another round of imitation and laughter from the children leading to very exciting scenes in class.

The teacher would spell the names of the animals as the children repeated the spelling of the words after him orally several times which meant the teacher recognizes the importance of orality in
literacy instruction. He also seemed to be aware of the fact that children learn a lot through repetition and imitation. He would then randomly pick one child to spell the word while others listened. For example a child was asked to orally spell the word “ndri” (goat) which the child spelt correctly. The teacher then asked a group of six children to voluntarily come in front of the class. He gave each one of them a piece of chalk and asked them to spell the word “ndri” (goat) on the chalkboard while the rest of the children watched. Three children spelt the work correctly while the other three misspelt the word. The teacher asked the class to reward those who got it right with a thunderous clap which made them feel nice as they proudly went to sit down. He invited three other children to come and correct the misspelt words while those who had misspelt the word watched. Through this approach the teacher was able to use children to teach their colleagues under his supervision, which can be a source of encouragement for the rest of the class to learn so that they too will be able to teach others at some point. This child-to-child approach to teaching can potentially give children additional incentive to learn because of peer influence.

During the lesson the teacher made sure he provided some context to the words whose spelling he was teaching by asking children to talk about the importance of the animals in the video. For example, in one of the videos he showed them a cow and asked them to discuss the importance of the cow at home, which made the children offer very interesting perspectives. For instance, a child said the cow is used to pay dowry. Another one said cows are used to provide meat. Another said the cow is used to pay school fees. Another child said the cow could be sold to get money. Another child says the cow is slaughtered to feed people at a funeral. By asking children to discuss the importance of a cow at home before he could introduce the word “Ti” (Cow) and its spelling, he managed to provide a social context to the word. Through this approach he was able to tap into the children’s knowledge and make it easy for them to relate the knowledge they are receiving in class to real life experiences. The teacher also held a flash card and asked the children to read the word “Ti” written on it. He asked a student to
volunteer to orally spell the word “Ti” while facing the back of the class. A child did that and the teacher asked the rest of the class to reward her with a clap. Children rewarded the child with a thunderous clap. The teacher kept on integrating the video clips with related traditional texts like the proverb and tongue twister, the rhyme, and songs which made him build in a range of literacy skills during the lesson.

Another striking aspect of the lesson was when the teacher innovatively recorded part of his lesson in the previous evening and used it to teach the children. The children were pleasantly surprised to see their own teacher appearing in the video and asking them questions through the video. The teacher’s presence in the video generated more excitement among the children and it made them respond to the teacher’s questions coming from the video clip with renewed interest and they answered the questions with lots of excitement and at the top of their voices. It was really an amazing sight for the teacher to watch himself teaching the children through the mediation of digital technology and the children enjoying the lesson as they did.

5.5.6 Promoted community involvement and ownership of education. The research participants gave us very intriguing accounts of the manner in which the use of digital technology was making the local community get interested and involved in school activities. They reported that the use of digital technology for documenting local practices and transporting those practices into the classroom to improve teaching and learning was being much appreciated by members of the community who feel that their experiences and practices were being valued and honoured. For example one of my focal research participants gave us this account.

In one of was it Nanaru or Betina’s lesson, they moved into the community and found a reverend pastor in the local community church at Obizea Primary school who is a farmer with lots of animals. Betina was going to talk about animal habitats in the class. So she visited him [the farmer] and took photos, asked him questions and after giving Betina all the information
she wanted, he was asked if he had any comments about Betina’s coming to take his photos and the photos of his animals to improve teaching and learning, and he talked a lot about what had happened … He said he himself had never been to an agricultural school as such but had learnt his practical skills of animal rearing from the church and from NAADS [National Agricultural Advisory Services] organization and they have trained him on how to keep the animals and this [willingness to learn practical skills] is what the children in the classrooms in Uganda lack. They are blocked by the four classroom walls from the real world but now it is important for them to see what is outside through the use of modern technology. They can see that a person like him who has not gone into any agricultural school can also be useful to teach in schools and that there are practical skills a person can also learn outside the classroom. And he thought that it had also given him a chance to go into the class and talk to the children without physically being there. And he also felt honoured to be recorded for purposes of teaching and learning. He was happy that his voice had been valued and his experience had value … And I think that was to emphasize the point that he was feeling valued and he wanted just to confirm that the school had valued him and his practices. (D. Abiko, personal communication, May 30, 2012)

From Dorcus’s account we can see that the farmer recognizes the gaps in the Ugandan system of education and he laments over the negative impacts of those gaps on the children. Other people share his comment that Ugandan children are blocked from the real world by the four classroom walls. For example, during a focus group meeting one of the cultural leaders decried the erosion of cultural values by formal education in Uganda, and said, “Songs told our history. They were used for teaching. Proverbs were used for teaching. These resources are being lost. The whites [colonial masters] told us these were bad when they brought their four classroom blocks” (J. Gogo, personal communication, June 2010). Such sentiments reveal how strongly people, particularly the older generation, feel about the local cultural practices, and about the failure of formal education to embrace the local practices into
the school system. They appreciate the role that digital technology can play to bring community practices into the classroom to improve teaching and learning. It explains why the farmer was happy that his practices were being digitally transported into the classroom to improve teaching and learning.

Dorcus’s account of the extent to which the community had appreciated the use of digital technology to bring community practices into the classroom to improve teaching and learning was echoed by the other participants. For instance, according to Abazoa, “They [the community] feel happy that the information they give and the activities they engage in can also help the children learn better” (Abazoa, focus group interview, May 30, 2012). Abazoa explains that the community feels it is part of the education system, a point that was also made by Abiriamazo who reported that the members of the community “are saying, since there is now transformation in teaching and learning, they have to send their children to school (R. Abiriamazo, focus group interview, May 30, 2012). To illustrate his point, Abiriamazo further reported

And in the … lesson we conducted in Aramura Secondary School lab, some parents were coming to see, they were standing near the doors and windows. They were wondering how these things were being done … Even some parents wanted to come yesterday to see lessons. So on the community the use of modern technology has got impact. (R. Abiriamazo, focus group interview, May 30, 2012)

Abiriamazo echoed the same point in his exit questionnaire:

The project has generally increased the number of children in the school and while presenting lessons, parents also come to attend lessons. Hence school-parent relationship has greatly improved. (R. Abiriamazo, exit questionnaire, August 30, 2013)
According to Dorcus, a center coordinating tutor one of whose core responsibilities is to encourage parents to send children to school, some parents used to be less supportive of the education of their children before the introduction of digital technology in the schools. But the use of digital technology has made such parents become more supportive of their children’s education.

And they would tell you that as a CCT my role is to educate the parents … We would tell them please bring your children to school, education is important, do all these, but really it was a hard thing to do. We would organize meetings to tell parents to visit school. They would in most cases not care. But now without telling them they are coming on their own (Dorcus, focus group interview, May 30, 2012).

These accounts suggest that the impact of the use of digital technology reaches beyond the school. Digital technology is bridging the gap between the school and the community. It is adding value to people’s practices, valuing those practices as authentic material for formal education as in the case of the farmer whose practices were being video recorded for classroom instruction. It is making parents to become more supportive of the education of their children without being told to do so. Children are reporting what is going on at school to their parents. The parents are coming in to see how technology works, how their children are enjoying learning through the use of digital technology. They are also curious to learn and to take part in the education of their children. This makes education much more broad, not like confining children in the four walled classrooms, as John noted. It makes education inclusive and more democratic as it has the potential to make education appeal to the different stakeholders, teachers, children, parents, administrators, and members of the community. Here we see education flowing from the community into the classroom and from the classroom back into the community, making people embrace education for social transformation. One of my supervisors, who had the opportunity to observe some of the lessons taught and also had discussions with the teachers,
had this to say during a focus group meeting, summing up her impression of the way the teachers were using digital technology as follows:

What I think is very interesting about the way you have integrated technology here is that because you have gone into the community you have not created a division between the schools and the community… the community doesn’t feel inferior or doesn’t feel that we don’t know what’s going on in the school or may be these are strange foreign practices that have gone into the schools. You are keeping the community as a key stake holder in the teaching and that is very important so that everybody has a stake and investment in what is happening in the school and I think what you are doing is a lesson we can learn in North America because in some cases there is a division between the community and the school, you know. And the schools don’t always go into the community to get the information to get advice to bring the community into the school. So I think we can learn from you in the way you have done this and I think you should be really congratulated on how you have done this so respectfully, you know. Going into the community so respectfully and bringing those [resources] inside, so I appreciate it so much.

(Bonny, focus group interview, May 30, 2012)

5.6 Chapter Summary

My main goal in this chapter has been to examine the extent to which ICT policy has impacted on curriculum development and classroom practice in rural Ugandan primary schools. To achieve that goal the path I have chosen has been to begin by first examining the state of the ICT infrastructure in Uganda, then looking at the ICT policy and curriculum reforms that have been undertaken in Uganda in the recent past, before highlighting some of the major challenges that impede ICT integration in Ugandan education. I have gone further to examine the impact of the use of digital technologies as
pedagogical tools on classroom practice based on the experience of four teachers in two rural Ugandan primary schools. I have ended with a summary, which distils the major findings.

In a nutshell, the findings from the study suggest that in the last decade the ICT infrastructure in Uganda has registered significant growth and development with the ICT sector making considerable contribution to the growth of the national economy. However, the growth in the ICT infrastructure has tended to be lopsided, with much of the infrastructure growth taking place mainly in big cities and urban centers leaving rural areas where most of the schools are located without access to ICT infrastructure.

The study has also revealed that Uganda has made tremendous progress in promoting ICT integration through legislation and curriculum reforms. In that regard it has privatized the telecommunication sector, which has attracted direct foreign investment into the telephone and communication sector. This has in turn stimulated the growth and expansion of ICT infrastructure in many parts of the country. Uganda has also established a national ICT policy to guide the growth and development of the ICT sector with a vision to transform the country into a knowledge-based economy where national development and governance are effectively and efficiently delivered through ICT application. Further, Uganda has established an ICT policy in education to specifically mainstream ICT integration and digital literacy to transform the Ugandan education to achieve socioeconomic transformation. In addition to that it has carried out major curriculum reforms and integrated ICT and digital literacy into the national curriculum for secondary and tertiary education.

Despite the progress that the country has made in the promotion of ICT and digital literacy, the study has found out that there are still significant challenges that must be addressed if ICT and digital literacy is to sustainably take root in the Ugandan education for it to realize the national vision of wanting to become a knowledge and information-based society. The major challenges that must be
addressed include: lack of electricity particularly in the rural countryside; lack of access to the Internet and digital content, and lack of requisite skills to make meaningful use of digital resources.

However, these challenges notwithstanding, I have argued that educational managers should not fold their arms and say that there is nothing that they can do to promote ICT and digital literacy in Ugandan schools and colleges because ICT has enormous potential to transform Uganda education. I have based my argument on data drawn from multiple sources including the experiences of four teachers who have innovatively and very successfully used digital technology to transport community resources into their classrooms to improve teaching and learning. In the next chapter I summarise the major findings of the study and discuss their implication for policy, theory, and practice.
Chapter 6: Summary of Findings and Implications

6.1 Introduction

This study sought to explore the role that digital technology and digital literacy can play in achieving educational change in a rural Ugandan educational context. Through the use of qualitative case study approach, the study examined teacher educators’ digital literacy practices to try to understand the role that digital technology can play in improving teacher education, and how ICT policy has impacted curriculum development and classroom practice in two rural Ugandan primary schools. The specific research questions that guided the study were: (1) What role can digital technology and digital literacy play in improving teacher education in a rural Ugandan primary teachers’ college? (2) How has ICT policy impacted curriculum development in Ugandan education and classroom practice in two rural Ugandan primary schools? In this chapter, I now present a summary of key findings to these questions, highlighting their implications for practice, policy, and theory. First the six key findings relating to question 1 are discussed under the main heading: The role of digital literacy in improving teacher education. The six sub-headings relating to the finding are: 1) Promotion of tutor resourcefulness; 2) identity enhancement; 3) validation of local knowledge and cultural practices for formal education; 4) integrating the local with the global; 5) fostering teamwork and cooperation among staff; and 6) the enhancement of the college and community relationships. For each of these six findings, implications for practice, policy, and theory are highlighted. This is followed with a discussion of the findings regarding research question 2. These are discussed under the sole heading: The impact of ICT policy on curriculum and classroom practice. Once again, implications for practice, policy, research and theory are considered.

6.2 The Role of Digital Literacy in Improving Teacher Education

6.2.1 Promotion of tutor resourcefulness. The findings of this study suggest that digital literacy has a major role to play in improving teacher education in rural Ugandan primary teachers’
college. Most importantly, digital literacy has been found to promote tutor resourcefulness and innovation in lesson preparation and presentation. Tutors in the study used digital cameras and recorders to go out into the communities to document a range of community practices that they brought into the classroom to enrich teaching and learning. A case in point was Sally Angucia’s lesson on the importance of children’s games for early childhood education (chapter four, subsection 4.3.1.1). In that lesson, Sally used video clips in which she recorded local children playing their favourite games - some in home setting and another in school setting. During the lesson, she asked her students to watch those videos and discuss what they thought were the benefits of those games to the children’s growth and development. The use of the video led to very lively class discussion on the importance of children’s plays and games for their normal development and growth. The use of digital technology for class presentations as Sally did in her lesson was found to increase the students’ interest in learning and making them become more attentive and engaged in class activities. Further, digital literacy was found to make learning become less teacher-fronted and more learner fronted as learning becomes more interactive and learners play active role in the learning process.

However, a major challenge that many tutors faced while using digital technologies was that as learning becomes more interesting and as the learners become more engaged in the learning process, the tutors’ ability to manage time tends to diminish. This frequently resulted in the lessons where digital technology was used taking longer time than the time allotted for the classes on the timetable. The tutors also expressed concerns over the time required to look for digital content in the local community. They noted that generating digital content from community practices was very cumbersome and time consuming. It involves moving into the communities, talking to people and convincing them to allow the tutors to record the community practices, coming back to the college to sort the material before it can be edited and eventually uploaded onto the computers for class presentations.
**6.2.1.1 Implications for practice.** The tutors need to be further supported in lesson preparation and presentations, particularly with respect to time management. They need to develop the skills for effective time management during lesson preparation and class discussions. This will require them to limit the time each person takes to contribute during discussions so that everyone has a fair chance to participate during class discussions. They will also need to ensure that discussions remain focussed on the topic of presentation. The tutors will also need to consider reducing the content that they can present in each lesson to make it fit within the available time. This will require the tutors to learn to select the most appropriate photos and videos clips that best highlight the points they would like to make in their presentations. The tutors should be encouraged to always move with their digital tools in their bags so that they can use them to record the relevant materials during their free time instead of only doing the recording when they are going to have lesson. Putting digital resource in the hands of the tutors and allowing them to use the resources in their private lives enhances their ability to use the resources for professional purposes.

**6.2.1.2 Implications for policy.** The 40 minutes allocated for each class at the primary teachers’ colleges has generally proved inadequate for the tutors to integrate the use of digital technologies for their lesson presentation. In almost all the lessons that I observed there was not a single lesson that ended on time. In some cases some lessons that would normally last for 40 minutes last more than one hour. The colleges should consider reviewing the timetable to have double lessons of 80 minutes instead of the mainly single lessons of 40 minutes per subject that are spread across the timetable. The teaching timetable should be made in such a way that each tutor teaches only two or three times in a week. They should use the rest of the days of the week to prepare digital content and to do assessment work. Colleges should consider putting equipment like digital cameras and digital recorders in the hands of the tutors and encourage them to use the equipment in their private lives so that they can transfer that knowledge and experience into their professional lives.
6.2.1.3 Implications for theory and research. The role that digital literacy plays in promoting teacher resourcefulness among the research participants is consistent with and it affirms the relevance of Cope and Kalantzis’ (2000) conceptualization of modes of meaning like language and digital technologies as dynamic representational resources that are constantly being remade by their users to achieve their own goals. From Cope and Kalantzis’ perspective people are active transformers and designers of representational resources including digital resources. This view is supported by the New London Group (1996) who posits that meaning making is an active process that can be equated to the process of designing. Meaning making, they argue, involves the transformation of available designs, or making new use of old material through which a new design is created and made available for further designing by the designer. Through the process of design, the New London Group (2000) argue, meaning-makers remake themselves, reconstruct and renegotiate their identities. That is what has happened to the tutors with respect to their use of the digital resources.

From the New London Group’s (2000) perspective, the digital resources can be viewed as old material that the tutors have made available through adoption and adaptation to improve their pedagogical practices. The use of digital resources has in turn not only transformed the tutors’ pedagogical practices but it has also transformed their professional identities and made them become resourceful tutors who are appreciated by their classes and the local community as further explained under 6.1.2 (Identity enhancement) and 6.1.5 (Enhancement of college and community relationships) below. This study contributes to our understanding of digital technologies as dynamic representational resources in resource-constrained educational contexts like that of Uganda.

6.2.2 Identity enhancement. The findings of the study also suggest that digital literacy plays an important role of enhancing the tutors’ professional identities and empowering them to feel more confident of themselves as competent tutors. Several participants in the study reported that their engagement with digital technology had impacted positively on their professional identities and
practices. For example in teacher Betina’s case as reported in chapter four under 4.2 above, prior to her engagement with digital technology she used to feel inadequate but after engaging with digital technology Betina says “I now feel more confident of myself” (p. 90). Nelly Cadria, who took the lead in presenting a lesson through the use of digital technology, also spoke positively about the empowering impact of digital technology on his professional identity. He reports that upon using digital technology to present his lesson he felt “great” and “elevated” (See 4.2, p. 91 above). Bilha, a newly recruited tutor at the college who has been very enthusiastic about the use of digital technology spoke positively about her engagement with digital technology, explaining “I know that [digital literacy] will … improve my profession as a teacher and I know I will be creating more impact in the learners” (see 4.2, p. 92 above). The identity enhancement that the tutors have experienced through engagement with digital technology has implications for practice, policy, and theory.

6.2.2.1 Implications for practice. Digital technologies and digital literacies are useful tools to enhance the tutors’ professional identities and to improve their resourcefulness. The feelings of confidence, elevation, and empowerment that the tutors have reported in this study all point to the fact that digital literacy has an empowering impact on their professional identities and practices. Tutors in Ugandan educational contexts should embrace digital literacy to expand their knowledge base and improve their standing in schools and communities. In the 1960s and 1970s the teaching profession used to be highly regarded by the Ugandan community (Tiberondwa, 19978). The tutors were viewed as the custodians of knowledge and they were highly respected by most people (Republic of Uganda, 1992). Many people viewed tutors as role model whose lifestyle they would very much wish to immolate (Ssekamwa, 1997). However since 1990s, the image of the teaching profession has been tainted with incompetence, and lack of knowledge among tutors (The Republic of Uganda, 1992). If digital literacy can transform the tutors’ professional identities, improve their image and standing in the community, then all the tutors should embrace digital technology to salvage the image of the
profession. Tutors who do not embrace digital technology risk being alienated and looked down upon by those who are digitally literate. This may create a gap between tutors who are digitally literacy and those who are not digitally literate which may lead to unnecessary tensions. Students and members of the community too may also lose confidence in those tutors who do not embrace modern technologies.

### 6.2.2.2 Implications for policy

Government did good to establish ICT labs in all the core primary teachers’ colleges in Uganda. However, it was greatly insufficient not to establish ICT labs in the coordinating centers where the coordinating center tutors who work in the outreach program are based. The ICT labs at the core primary teachers colleges are mainly serving the interest of the tutors who are based in the colleges and who teach under the pre-service program. Tutors in the outreach programs have no access to digital technologies. Government needs to come up with a strategy for promoting digital literacy among all categories of tutors regardless of the program under which they work. Government needs to seriously consider establishing ICT labs in all the coordinating centers throughout the country and make digital literacy as a core component of continuous professional development in all the coordinating centers. This will help bring digital literacy services closer to the majority of teacher teachers in primary schools.

Kyambogo University, the national institution for teacher education has done well to include ICT as a course for primary teachers’ colleges under the subject of professional studies. However, to make ICT more visible, and to ensure that students studying teacher education graduate from the collages as well as the university with digital literacy the university has to make ICT a core subject for all students to take. This will help to create the critical mass necessary to roll out ICT and digital literacy to schools and colleges.

### 6.2.2.3 Implications for theory and research

The findings of the study regarding the role that digital literacy plays in enhancing the tutors’/teachers’ identities are consistent with Norton’s (2013) conceptualization of power and identity as closely linked concepts. Writing in the context of language
education, Norton (2013) posits that language teaching and by extension literacy learning is not a neutral practice “but a highly political one” (p. 47) in which power relations play a central role. She uses the term power to reference the socially constructed relations among individuals, institutions and communities through which symbolic resources including language and literacy; and material resources such as capital goods and money are produced, distributed and validated. While identity, according to Norton, references a person’s desire such as the desire for recognition, the desire for affiliation, and the desire for safety and security. These desires from Norton’s perspective cannot be separated from the manner in which material resources are distributed in a society because access to resources determines access to power and privilege, which will in turn influence how people understand their relationship to the world and their possibilities for the future.

In that regard, the tutors’ engagement with digital literacy in this study has accorded them the symbolic power that is normally associated with digital technology (Warschauer, 2003). It has also enabled some of them to achieve their desires for justice and equality. For instance in chapter four under theme 4.2 Betina says prior to her engagement with digital literacy she used to feel less powerful compared to men but after engaging with digital literacy, she now feels as powerful as a man. Digital literacy has earned her more respect from her husband who offers to switch roles with her to keep their home and look after their children while Betina is allowed to travel for an ICT and digital literacy workshop at Wati CPTC. Digital literacy has also earned Betina respect from her colleagues at her workplace. It has also improved her standing in the community considerably. Consequently, she has become more invested in digital literacy practices which have in turn widened her possibilities for the future. Norton’s notion of identity in language education is therefore very relevant for examining digital literacy practices in a less developed country like Uganda where injustices based on ethnicity, age and gender abound (Mutonyi & Norton, 2007). However, further studies need to be carried out to specifically examine the impact of digital literacy on gender relations in both urban and rural Ugandan
educational contexts. Such a study should also focus on the impacts, both positive and negative, of digital literacy on cultural practices.

**6.2.3 Validation of local knowledge and cultural practices for formal education.** Several scholars (Browning-Aiken, 2005; Buck & Sylvester, 2005; González, Moll, et al., 2005; González, Andrade, et al., 2005; Messing, 2005; Moll 2005) recognize the crucial role that local knowledge and local practices can play in improving education. González, Moll, and Amanti (2005) view the historically accumulated and culturally developed bodies of knowledge and skills upon which households and communities depend for their daily survival from generation to generation as “funds of knowledge” (p. 133), with great potential for educational transformation. Yet in many African educational contexts local knowledge and cultural practices are not normally valued as useful resources for educational improvement (Prah, 2002; wa Thiong’o, 1986). Several African scholars and scholars on Africa (Abiria, 2010; Achen & Openjuru, 2012; Andema, Kendrick, & Norton, 2010, 2013; Kendrick & Jones, 2008; Kendrick, Jones, Mutonyi, & Norton, 2006) hold the view that the use of cultural and digital resources as pedagogical tools would improve teaching and learning in African educational contexts. A key finding of this study is that the digital technology can indeed play a major role in the integration and validation of local cultural practices for use in the formal system of education in Uganda and other similar African educational contexts.

Owini’s lesson (see Lesson 4, under Section 4.1.4) highlights the role that digital technology can play in transporting local cultural knowledge from the community site into the classroom to improve teaching and learning. In that lesson the tutor went into the local community and recorded an elder to help him explain the origin of numbers and counting among the Lugbara community. Owini is not a Lugbara by tribe. He comes from another language community. He does not know Lugbara language. Neither does he know much about the history of numbers and counting in the Lugbara community. To address his knowledge gap and to make his lesson more exciting, the tutor took his
camera and went out to record a Lugbara elder who was highly regarded as very knowledgeable about the history of numbers and counting among the Lugbara. He used the elder as a local expert to teach his lesson through the mediation of technology, which made students pay special attention to the elder’s account of the origin of numbers and counting.

Through the use of the traditional media of storytelling, the elder was able to trace the history of counting among the Lugbara and to explain to the class how each number came into existence. As we noted earlier this kind of knowledge could not be easily obtained from books. Through the innovative use of digital technology, the tutor was able to document that cultural knowledge and bring it to the classroom to demystify mathematical concepts, and make students enjoy learning mathematics technoculturally. Owini’s use of the elder’s cultural knowledge to explain mathematical concepts to the students through the mediation of modern technology finds support from Mushengyezi (2003) who posits that in any African community

> It is the elders, men and women, who hold most information in memory through songs, poetry, and other forms of recitation. Logistically, therefore, in the absence of written records, it is the elders who have always acted as the custodians of knowledge. These person-centered media are thus an integral part of the people’s culture and, in the eyes of development agencies, a cheap way to communicate (p. 1008).

The manner in which students watched the elder talk in the video and the attention they paid to his account of the origin of number and counting among the Lugbara showed that they regarded him as a custodian of knowledge who was providing reliable information and listened to him with respect. They were all very attentive while listening to the video. Others took notes as the elder spoke. Where the elder used humour they responded with instant laughter. Culturally, as we noted in chapter two under 2.6 elders constitute a special category in the traditional set of the Lugbara. Their word is taken
seriously by most people in the community because they were known for speaking the truth and it is widely believed that in their word lied the power of life and death (Obetia). When an elder speaks people pay a lot of attention to every word coming out of the elders mouth so that they get his message clearly. It was therefore not a surprise that students paid a lot of attention to the elder’s account of the origin of numbers among the Lugbara which made it easy for them to understand the concept of place values.

6.2.3.1 Implications for practice. Several studies (Ugandan National Examinations Board 2009, 2010, 2011, 2012; Uwezo, 2011, 2012) have revealed that the quality of education in Uganda has deteriorated considerably in the last two decades. A study done by Uganda National Examinations Board (2011) revealed that in 2011 less than 50 per cent of the grade three pupils in Uganda could be rated proficient in literacy and numeracy. Another study done by Uwezo (2012) found out that most children in lower primary lacked the required competencies in basic literacy and numeracy that was expected of them despite the existing policy that emphasizes literacy and numeracy in lower grades. According to Uwezo (2012) only 10 per cent of pupils in grade three could read a grade two level story correctly and solve a grade two level numeracy question. Both studies attribute the poor performance to ineffective methods of teaching in schools. In order to address the poor performance in schools, Uganda National Examination Board (2011) proposes that teachers should be trained to relate what they teach in class to real life situations.

One of the ways through which teachers can relate what they teach to real life situations is through the use of digital technology as the research participants have demonstrated in this study. Teachers should be encouraged to use digital technology to transport community resources from the community sites into the classroom to make teaching and learning less abstract. They should be encouraged to use videos and pictures to improve their pedagogical practices and make students enjoy learning. They should tap into the wealth of cultural knowledge that the members of the local
community like the elders have and use these elders as resource persons to improve teaching and learning. They should be encouraged to add value to local knowledge by converting it into digital content for class presentation. Local knowledge, as we have seen in Owini’s lesson and other lessons presented earlier, has the potential to improve classroom practices considerably through the mediation of digital technologies.

6.2.3.2 Implications for policy. Digital literacy should become a requirement for teacher education. In a country like Uganda with over 56 local languages, the possibility of posting a tutor or a teacher to teach in a school or college outside their own language community is very high. Under such circumstances a tutor who does not know the local language and who is unable to use digital technology might find it rather difficult to draw on the local community resources to improve their pedagogical practices. To address such concerns the Ministry of Education and Sports may have to consider a policy of making digital literacy a core course in teacher education programs at all levels so that tutors can be posted to teach in any part of the country with less difficulty.

In 2006 Uganda launched the Thematic Curriculum, which emphasises the use of local language as a medium of communication. The curriculum also encourages the use of local cultural resources like stories, songs, riddles, songs and proverbs as pedagogical tools to improve teaching. But, the curriculum does not show how teachers in our predominantly oral communities where those resources are not written down can use those cultural resources to improve teaching and learning (Abiria, 2009). Therefore one of the ways through which the curriculum goal can be achieved is by emphasizing the use of digital technologies to document and transport the cultural resources from their sites of performance in homes and communities into the classroom to improve pedagogical practice. The tutors need to be trained to use the digital resources to transport the community resources from the community sites into their own classrooms before they can be expected to train their students to use the same digital resources to improve teaching and learning.
6.2.3.3 Implications for theory and research. Several scholars, notably Herman (2008), Kasozi (2000), Prah (2002) and wa Thion’o (1993) have consistently argued that the African linguistic and cultural resources hold great educational value and that using them as pedagogical tools would improve teaching and learning in schools and colleges. The findings of this study confirm the relevance of the arguments in favour of the use of African linguistic and cultural resources as invaluable resources to improve teaching and learning in African education. It further highlights the usefulness of the funds of knowledge theoretical frame for examining the literacy practices in Non-Western educational contexts such as that of Uganda.

6.2.4 Integrating the local with the global. The findings from the study also suggest that another important role that the use of digital technology could play in improving teacher education in a rural Ugandan primary teachers’ college was that of promoting the integration of local knowledge with global knowledge. A good example of this was in Bilha’s lesson (lesson 6, under 6.1.6 Integration of the local with the global). In that lesson the tutor began by exploring with the students the myths people hold about the formation of the mountains in the locality. She went on to use a video that she recorded of a woman who was preparing local food to explain the process of volcanic eruption. Through this approach the tutor was able to make an unfamiliar concept familiar by relating it to a process that is familiar to all the students. After sufficient discussions the tutor then went on to show the students a YouTube video of an actual volcanic eruption that she downloaded from the Internet. In that video there was an expert explaining the process that was taking at the background. Through this approach the tutor was able to provide students access to global knowledge, which the students could use to compare and contrast the local knowledge with which they are already familiar.

The tutor’s approach of integrating the local with the global to explain volcanic eruption finds support from scholars like Mushengyezi (2003) who advocate for the integration of the local with the global to strike a balance between globalization and the preservation of local cultural resources to
achieve effective communication in local communities. Mushengyezi argues that while there is need to
develop and keep abreast with new technology in order to communicate effectively we should not
completely discard traditional media like storytelling, which have successfully served local
communities in Africa for generation. Mushengyezi (2003) posits that the best way to cope with
globalization is through *indiginization*, which according to him “is akin to hybridization, but
emphasizes the attempt to localize the foreign, mainly western, conventions and make them our own”
(p. 116). This is what Owini, the tutor, succeeded in doing in that lesson, adopting and adapting global
knowledge and blending it with local knowledge to provide students with rich hybrid knowledge that
they were able to enjoy through the mediation of digital technology.

**6.2.4.1 Implications for practice.** Tutors should embrace the integration of the local with the
global as an effective strategy to improve their pedagogical practices. This will necessitate tutors to not
only learn to document local cultural practices in form of videos and photographs but also to have the
necessary knowledge and skills to access digital resources from the Internet. As Warschauer (2003) has
noted “the ability to access, adapt, and create new knowledge using new information and
communication technology is critical to social inclusion in today’s era” (p. 9).

Tutors will also need to start developing positive attitudes towards local cultural practices and
begin to value the local practices as useful educational resources because those indigenous technologies
have special appeal to the rural population in Africa. Indigenous modes of communication as
Mushengyezi (2003) has noted, make them still an essential mode of communication in Ugandan
communities and Africa as a whole. The tutors need not to underestimate the value of the African
cultural heritage simply because they are local practices. They should seek to integrate the local with
the global in order to produce hybrid content to improve teaching and learning. They should take note
of Mushengyezi’s (2003) advice that “even as African governments continue to usher their population
more and more into the cyber world and cyber space, the pumpkin in the old homestead should not be uprooted” (p. 117) because it could save us from unexpected famine.

6.2.4.2 Implications for policy. As government continues to pursue its policy of promoting ICT and digital literacy it should not do so at the expense of the local cultural heritage. ICT and digital literacy should be promoted hand in hand with the local cultural and linguistic resources because the two are not necessarily incompatible. Instead digital literacy and local linguistic and cultural practices like storytelling, proverbs, and riddles, singing and dancing can complement each other to achieve important national educational goals as was the case during the fight against HIV/AIDS where traditional media and modern technologies were successfully used to reduce HIV/AIDS prevalence rate in the country (Mushengyezi 2003).

6.2.4.3 Implications for theory and research. Scholars who have contributed to the funds of knowledge theoretical frame (Browning-Aiken, 2005; Buck & Sylvester, 2005; González, Moll, & Amanti, 2005; González, Andrade, Civil, & Moll 2005, Messing, 2005; Moll, 2005) have mainly based their studies in Western educational contexts and they have mainly focused on understanding how the children’s funds of knowledge can be used to transform educational practices. The studies have not paid adequate attention to how the teachers’, tutors’ and other members of the community’s funds of knowledge can be used to transform educational practices. While recognising the potential that children’s lived experiences and household knowledge can play in transforming educational practices, this study has gone further to highlight the potential that the teachers’ and other members’ particularly elders’ funds of knowledge hold for educational transformation in less-resourced educational contexts like that of Uganda. This provides opportunity for more case specific qualitative studies to gain deeper insights into how not only the children’s funds of knowledge but also the teachers’ and parents’ funds of knowledge can meaningfully be integrated through the use of digital technology to improve teaching and learning, particularly in less-resourced educational contexts.
6.2.5 Fostering teamwork and cooperation among staff. Along with the improvement in relationships among staff and with students has also evolved a spirit of teamwork and cooperation. As we noted in Lesson 4, under subtheme 3.1.3, the use of digital technology has increased tutors’ interest and investment in teaching to the extent that whenever they are not busy they voluntarily join their colleagues who are teaching lessons. Once they enter those classes they also join in the discussions, making complementary comments, and responding to students’ questions. For example in Maratino’s lesson on sources of energy Nelly made students enjoy the lesson the more when he made a complementary comment “As he [Maratino] was saying we are wasting our dung here in the toilets. If there was a place where we could compress that dung instead of throwing it away we would not have to buy firewood to cook food. You are here already; which means we would not have to look for fuel for cooking.” By linking his explanation through students’ waste material Nelly was able to drive his point home in such a humorous way that he made some students laugh until they had tears on the edges of their eyes because of over laughing.

It was also interesting to note that college administrators who would normally be preoccupied with their administrative work in their offices would leave their offices to regularly attend those classes and even actively participate in the class discussions. This further illustrated the extent to which the use of digital technology as pedagogical tool had altered power relations and made it possible for students, staff, and administrators to interact freely and treat each other as professional colleagues. The promotion of teamwork and collegial relationship was not only important in enriching the quality of class discussions but it was also important in creating the necessary environment and support network that the tutors could draw on to meet their professional challenges. Warschauer (2003) sums up the importance of such local support networks and positive behavioural change for the successful implementation of ICT initiatives as follows
Rather than just foisting technologies haphazardly on people, a better solution is to foster the long term nurturing of behaviours intrinsically motivated to engage with such technologies with the goal of achieving an innovating rather than borrowing strategy … as a means to reduce technological disparities (p. 211).

As Warschauer (2003) further explains, when technologies are introduced in an institutional setting, they do not exist apart from institutions, exercising an external impact, but they become part and parcel of the institution. In the process of coexisting “the institution shapes the workings of the technology while the technology shapes the working of the institution” (Warschauer, 2003, p. 208). It was therefore not a surprise that the introduction of digital technologies as pedagogical tools was changing existing relationships and making the different stakeholders operate as a team. Kavagi (2010) supports this kind of innovation, which comes from within, and explains that “innovation that seems to originate from within … is more likely to be accepted than if the change is perceived to be coming from above” (p. 16).

New Literacy scholars (Barton, Hamilton, & Ivanič, 2000; Gee, 1996; Street, 1984) posit that literacy is a social practice and that to understand a given literacy practice one has to examine that particular literacy practice in its historical, social and cultural context. In that regard the team spirit that the tutors have adopted could be explained in terms of the Lugbara cultural practice of sharing and interdependence. As explained in chapter two (see Section 2.5.1; the traditional Lugbara sociocultural practices) above, the Lugbara are very relational and they have a strong sense of community life (Middleton, 1965; Obetia, 2008). Although they recognize God as the giver of life, they strongly believe that relationships with other people play crucial role for the sustenance of life. Interdependence and teamwork are common cultural practices among the Lugbara who are fond of organizing oya (communal ploughing comprising ten to fifty people working together) to clear large pieces of land for planting crops during busy planting season as discussed in chapter two. Further, the Lugbara are also
fond of engaging in a kind of team work called *adati* (rotational help) in which people team up to plough each other’s field in rotation to be able do all the planting in the right season. The tutors seem to have been drawing on the Lugbara concepts of *oya* and *adati* to take care of the skill gaps that they individually have in trying to use digital technology for their classes.

**6.2.5.1 Implications for practice.** The Lugbara cultural concepts of *‘ba aa ‘ba si* (we live because of others), *adati* (rotational help) and *oya* offer useful lessons for ICT integration to take root among teacher educators. For digital literacy to take root in teacher education tutors will need to practice the Lugbara concepts of *‘ba aa ‘ba si, adati, and oya*. The tutors will need to start to depend on one another, practice rotational help and work as a team to address the challenges involved in ICT as a pedagogical as a team. Working together as team will help the tutors to draw on the skill sets that each member brings to the team which will make them more effective than if they had worked individually. They will also need to widen their support network through social media like Facebook, and LinkedIn from where they can see help from colleagues globally.

**6.2.5.2 Implications for policy.** Government will need to expand ICT infrastructure through a deliberate affirmative action that seeks to give incentives to attract companies to invest in ICT infrastructure development in rural schools and colleges and ensure that the schools and colleges have reliable internet connectivity for teachers and tutors to build stronger professional networks locally and globally through social media. Colleges will have to use part of the $15 they charge on each student for ICT to provide Internet services to the college community. Access to the Internet will enable the tutors to expand on their support network through social media like Facebook and LinkedIn. Tutors need a community of practice (Wenger, 1998) to sustain their interest and investment in digital literacy. Government will also need to deliberately promote the integration of local cultural practices that emphasize interdependence, rotational help, and team work into the teacher education curriculum so
that students who graduate in teacher education understand the value of such cultural practices in their professional practices.

6.2.5.3 Implications for theory and research. Further research needs to be carried out into the role that cultural practices can play in promoting sustainable digital literacy for educational transformation in Ugandan education and other similar contexts. Specific cultural norms and practices should be examined to get deeper understanding into the roles that community practices could play in facilitating digital literacy integration in local communities. For example there is need to find out what role the Lugbara cultural practice of “'ba aa ‘basi” (we live because of others), “adati” (rotational help) and “oya” (communal help) can play in promoting digital literacy integration to transform Ugandan education. Such context specific studies will help us to gain a more nuanced understanding of the role that local cultural practices can play in promoting digital literacy to achieve meaningful educational change.

6.2.6 The enhancement of the college and community relationships. The gap between educational institutions and the local communities in Africa has been a major concern among scholars (Andema, Kendrick, & Norton, 2010, 2013; Ssekamwa, 2000; wa Thion’o, 1986). A key finding of this study was that the use of digital technology was found to play an important role in bridging the gap between the educational institutions and the local communities.

The use of digital technology to transport community practices from the community sites into the classroom for formal instruction has made the community appreciate the value of education that their children are learning. They feel their cultural knowledge and practices have been valued. It has made them relate with what is going on at the schools and colleges. Members of the community have demonstrated their willingness to allow their daily activities to be recorded for teaching and learning purposes. Others have followed their children to school and stood by the doors and windows to watch their children being taught through the use of digital technologies.
6.2.6.1 Implications for practice. Tutors and teachers need to continue to view members of the community as stakeholders who have a role to play in the implementation of any educational program. They should regard themselves as part of the community and seek to establish cordial relationships with members of the local community to continue to support schools initiatives. Tutors and teachers should participate in community events such as cultural performances, parties, funeral, marriage ceremonies, and make the community feel that they appreciate local cultural practices. This will help to consolidate the relationship between the college and the wider community, which will in turn make it easy for the tutors to draw on the community resources to improve their pedagogical practices.

6.2.6.2 Implications for policy. Government has done well to establish structures such as Board of Governors (BOGs), School Management Community (SMCs), and Parents and Teachers Associations (PTAs) through which members of the community have been involved in the management of schools. The policy governing the establishment of BOGs, SMCs and PTAs may need to be reviewed to provide for the inclusion of cultural leaders to represent the interests of local cultural institutions in the management organs of schools and colleges to promote the cultural agenda in Ugandan education.

6.2.6.3 Implications for theory and research. The role that the local cultural resources and community practices can play in promoting ICT integration in education has not been adequately researched in Uganda. Most of the decisions regarding the role of the community in ICT integration is mainly based on studies done elsewhere. There is need to carry out situated studies to gain further insights into how the local communities can best be involved in ICT integration for meaningful educational change. The next section summarises the major findings relating to the impact of ICT policy on classroom practice as a subtheme under which the implications for practice, policy and theory are presented.
6.3 The Impact of ICT Policy on Curriculum and Classroom Practice

The study found out that ICT policy had greatly impacted curriculum development in Ugandan education and classroom practice in the two rural Ugandan primary schools that served as complementary sites for this study. The teachers in the study consistently reported that their engagement with digital technology had greatly impacted on their professional identities and transformed their classroom practices. Specifically, the teachers reported that the use of digital technology as pedagogical tool had: (1) considerably enhanced their professional identities and standing in the community, (2) improved their effectiveness and performance in class, (3) remarkably simplified teaching and learning, (4) increased children’s interest and engagement in class activities, (5) improved class attendance and reduced the number of children dropping out of school, and (6) promoted parents’ and community involvement in school programs and improved school/community relationships. These findings have considerable implications for practice, policy, theory and research.

6.3.1 Implications for practice. Ugandan teachers, particularly those living in rural villages have every reason to embrace digital literacy to address the endemic problems of low self-esteem among teachers, high dropout rates among school children, and lack of community involvement which characterize rural schools. Digital literacy has the potential to enhance their professional identities and standing in the community. It will also attract the children who have dropped out of school to come back to school as classes will become more exciting to the students. The positive changes taking place in schools will increase parents’ interest and involvement in school activities. Teacher should be encouraged to embrace digital technology to transform their professional identities, improve their standing in communities, and transform classroom practices.

6.3.2 Implications for policy. The government of Uganda should pursue a policy of rural electrification to ensure that schools in rural areas have access to reliable electricity. It should also provide schools including those in rural villages with computers and the Internet to establish functional
ICT labs. Teachers should be equipped with digital cameras, audio recorders that they can use at their convenience to document local practices to be used as pedagogical tools. Portable equipment like digital cameras, digital recorder and laptops should be put in the hands of the teachers instead of putting them all in the ICT where the teachers may not have regular access to them. Putting the equipment in the hands of the teachers encourages them to learn to use the resources for their own personal reasons and eventually for professional reasons.

6.3.3 Implications for theory and research. Teacher identity enhancement and the transformation of the dynamics of classroom interactions have emerged as the major ways through which the ICT policy has impacted classroom practices in the two rural Ugandan primary schools. The findings from the study tends to suggest that teachers in this study were invested those digital literacy practices mainly because they believe that their engagement with digital literacies had positively impacted their professional identities and increased their opportunities. Some potential questions for future study could be:

1. What are the teachers’ investments in digital literacies in Ugandan rural educational contexts?

2. How can the ICT policy and teacher education curriculum be reformed to enhance the professional identities of teachers in rural Ugandan primary schools?

3. What funds of knowledge can the teachers bring into the classroom while using digital literacies as pedagogical tools?

4. How can the funds of knowledge that the teachers bring to the classroom be used to improve classroom practices in rural educational contexts like that of Uganda?

All the efforts to promote ICT and digital literacy in schools will need to be led by scientific research. Sufficient budgetary allocations should be geared towards research activities. Researchers should examine ongoing digital literacy projects and collect reliable data to guide national educational policy and curriculum implementation.
6.4 Chapter Summary

This chapter summarizes the major findings of the study. It began with a reminder on the central questions guiding this study and went further to highlight the major findings of the study regarding the role that digital literacy can play in promoting teacher education in one rural Ugandan primary teachers’ college and two rural Ugandan primary schools. It also discusses implications of each finding for practice, policy, theory and research and ends with a general conclusion.

Based on the evidence presented in the preceding chapters, the chapter concludes that digital technology and digital literacy have a major role to play in promoting teacher education in a rural Ugandan educational context. Specifically digital literacy can improve Ugandan education by enhancing the tutor/teacher’s professional identities and practices. Digital literacy was found to have an empowering impact on the tutor/teacher’s professional identity and increasing the tutor/teacher’s investment in teaching and learning. Digital literacy was also found to have considerable potential to transform the dynamics of the classroom context and to change the teacher and student relationship by making classrooms more interactive and student-centred. Further, digital literacy was found to facilitate the integration of local knowledge with global knowledge to enrich students’ understanding of concepts. It was found to promote teamwork and cooperation among tutors and teachers.

These roles that digital literacy can play in promoting Ugandan education have implications for practice, policy, theory and research. Teachers should be encouraged to embrace digital literacy to improve their professional practices. The Government of Uganda should provide the necessary infrastructure to facilitate ICT integration in schools and colleges. Teacher education programs should emphasize digital literacy in all teacher education programs at all levels. Continuous professional development programs should all emphasize digital literacy to equip in-service teachers with digital literacy.
References


Appendix A: Interview guide for the principal

Name: ________________________________________________________________
Date: _____________________________ Years of teaching experience____________________

1. To what extent do the teacher educators at the college use ICT in their classes?
2. How do the teacher educators view the use of ICT in their professional practice?
3. What institutional structures has the college administration put in place to promote the integration of ICT in teacher training at the college?
4. What are the institutional norms and practices at the college that enhance or hinder the use of ICT as pedagogical tools?
5. What challenges does the college face in promoting the use of ICT to enhance teaching and learning?
6. How does the college administration plan to address these challenges?
7. Can pre-service students and in-service teachers use ICT to integrate cultural resources to promote multilingualism?
8. In what ways does the local community benefit from the ICT lab at the college?
9. Do you have any documents comments, questions or concerns to share with us?
Appendix B: Interview guide for national experts

1. To what extent has the government of Uganda achieved its goal of transforming Uganda into knowledge and information based society through the promotion of ICT?
2. What institutional structures has the Ministry of Education/Ministry of Communication and ICT/Kyambogo University/National Curriculum Development Centre (NCDC) put in place to promote the integration of ICT in schools and colleges?
3. What are the institutional practices that enhance or hinder the use of ICT as pedagogical tool in schools and colleges in Uganda? Please provide relevant examples.
4. How are these challenges being addressed?
5. To what extent can the teachers and teacher educators use ICT and digital resources to promote the use of cultural resources for pedagogical reasons?
6. How do you think digital resources can promote multilingualism?
7. What do you see as the future of ICT in education?
8. Do you have any other comments, questions, or concerns to share with us?
Appendix C: Interview guide for community/cultural leaders

1. What is your understanding of culture and what role culture can play in education, especially teacher education?

2. What are the community practices that enhance or hinder the use of cultural resources in schools and colleges in the local community?

3. How does the local community view the use of modern technology in schools and communities?

4. Based on your local knowledge, to what extent do you agree that Uganda should be transformed into a digitally advanced society?

5. Do you think digital technology could promote the use of cultural resources as pedagogical tools in the classroom? Please provide examples.

6. To what extent do you think digital resources can promote multilingualism in the mother tongue and English?

7. Do you think that digital technology can be used to strengthen the relationship between schools and communities? Please explain.

8. Do you have any other comments, questions or concerns to share with us?
Appendix D: Tutors’ questionnaire 1

1. Name: ___________________________________________________ Date: ______________________
2. Age (Optional): ______________
3. Gender (please circle): Male ____________________ Female ____________________
4. Role at PTC (please circle): Pre-service Tutor In-service Tutor ICT Instructor
5. Years of teaching/experience ____________________
6. Education: (please provide a summary of your educational training beginning with the highest)
______________________________________________________________________________
______________________________________________________________________________
7. Have you received any training in the Thematic Curriculum? If yes, what was the focus of the training?
______________________________________________________________________________
______________________________________________________________________________
8. Have received any formal ICT training, such as Connect-Ed? Please explain.
______________________________________________________________________________
______________________________________________________________________________
9. Do you have regular access to a computer? YES NO (Please circle)
If yes, please explain where you access it, how often you use it, and for what purposes
______________________________________________________________________________
______________________________________________________________________________
10. Do you have regular access to a digital camera? YES NO (Please circle)
If yes, how often you use it, and for what purposes
______________________________________________________________________________
______________________________________________________________________________
11. Have you ever used a digital audio recorder? YES NO (Please circle)
If yes, how often do you use it, and for what purposes?
______________________________________________________________________________
______________________________________________________________________________
12. Do you have regular access to the internet? YES NO (Please circle)
If yes, please explain where you access it, how often you use it, and for what purposes.
______________________________________________________________________________
______________________________________________________________________________
13. Do you make use of the ICT lab at the PTC? YES NO (Please circle)
If yes, please explain how often you use it and for what purposes.
______________________________________________________________________________
______________________________________________________________________________
14. Do you invite community members into your classroom? YES NO (Please circle)
If yes, please explain who these community members are, how often they participate in your classes, and what contribution they make.
______________________________________________________________________________
______________________________________________________________________________
15. Do you have any questions or comments for the researchers?

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Appendix E: Tutors’ questionnaire 2

1. Name: __________________________________________ Date: __________________

2. As a result of your participation in this project, what have you learnt (if anything) about the digital resources used in the study i.e. computers, internet, cameras, audio recorders, eGranary?

   Computers: __________________________________________________________________________
   _________________________________________________________________________________________________________________________________________
   Internet _____________________________________________________________________________
   _____________________________________________________________________________________
   digital cameras ______________________________________________________________________
   _____________________________________________________________________________________
   audio recorders ______________________________________________________________________
   eGranary _____________________________________________________________________________

3. Do you think you will use these digital resources in your classroom practice in the future? If yes, please provide examples. If no, please provide an explanation.

   _____________________________________________________________________________________
   _____________________________________________________________________________________

4. How do you think digital resources could be used to promote multilingualism, as recommended in the Thematic Curriculum? Please provide examples.

   _____________________________________________________________________________________
   _____________________________________________________________________________________
   _____________________________________________________________________________________

5. How do you think digital technology could help make more effective use of community resources?

   _____________________________________________________________________________________
   _____________________________________________________________________________________

6. Do you think you will make more regular use of the ICT lab in the future? If yes, please explain how you would use it and for what purposes.

   _____________________________________________________________________________________
   _____________________________________________________________________________________

7. Please offer suggestions for how the ICT lab could be improved.

   _____________________________________________________________________________________

8. How has your engagement with digital technology impacted your profession identity and practice?

   _____________________________________________________________________________________
   _____________________________________________________________________________________

9. Do you have any further comments for the researchers?
Appendix F: Interview guide for tutors/teachers focus group discussion

1. What has been your experience with the use of digital technology to incorporate community resources for classroom instruction?

2. Describe to us one of your most exciting experiences with the use of digital technology and cultural resources.

3. Describe to us one of your less successful experiences with the use of digital technology and cultural resources. How might you improve on this experience in the future?

4. Which digital resources have you found most useful and why?

5. How have students in your classes responded to your use of digital technology and cultural resources since the project started?

6. How do you plan to continue to use digital technology and cultural resources in your professional practice in the future?

7. What challenges do you envisage for the continued use of technology and cultural resources and how do you plan to address these challenges?

8. How has your participation in this research project benefited you and your school/college?

9. Do you have any questions, comments or concerns to share with the researchers?