Living in Wait: The Learning Lives of High School Students in Addis Ababa

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DEDICATION

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ABSTRACT

This research sought to examine how students in a developing country such as Ethiopia appropriate ICTs in their learning lives and how social contexts influence their ICT use for learning purposes. Working within the tradition of interpretive research, this study employed a multiple case study approach. Four students attending secondary schools in Addis Ababa were participants. Participant interviews were collected and were triangulated with participant observation, student journal entries and ICT curriculum analysis. The data were analyzed using within-case analysis and cross-case analysis. The six stages of inductive thematic analysis proposed by Braun and Clarke (2006) were used during both stages.

Drawing from the learning lives of participants, this dissertation research adds to a growing body of research (Dombrowski, Harmon & Fox, 2016; Maryam & Imran, 2016; Ames, 2016) that focus on low-income communities and that suggest a multitude of interrelated, multi-faceted and complex factors that influence technology appropriation for learning while often amplifying existing inequalities and exclusions. These influential factors include differential access to ICTs, teacher absenteeism, standardized high-stakes exams, as well as cultural, religious and social norms.

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CHAPTER ONE

Introduction

Background

The 2014 International Telecommunication Union's (ITU) Information Communication Technologies (ICT)[1] development index report, which is based on data collected annually from participating countries on ICT access, use, and skills, shows that the majority of African countries, including Ethiopia, remain at the bottom of its list.

In addition, the dominating and unrelenting narrative about Africa in Western media frequently fuses messy truths into oversimplified bits of generalizations thereby reducing lives and life in Africa to a caricature of their most uninformed consumers' narrow conceptions of the continent and the people that live in it. This, in turn, perpetuates the idea that Africa and its inhabitants live in a state of perpetual need. Persistent misconceptions such as these negatively impact how people around the world think about life in the African continent. Consequently, these misrepresentations and narratives of absence in all aspects of life, including education, often lead to interventions and educational ICT projects that fail to consider citizens of non-Western countries as "fully realized human beings with agency, cognitive powers, and multi-faceted aspirations" (Burrell, 2008, p. 8).

Ethiopia, a country located in the Horn of Africa, is not an exception in this regard. Much of the literature on educational ICTs in Ethiopia, for example, comes

[1] ICT is an overarching term that refers to technological devices and services used for communication (e.g., radio, television, the internet, cell phones, computers); however, its use in this study will be limited to describe internet connected mobile devices and personal computers.

from interventions and studies sanctioned by aid organizations (Mangiatordi & Pischetola, 2010; Wagner, 2009; Hollow 2009; Hare, 2007). To date, these studies have, in large part, focused on school-based interventions that seek to understand the impact of educational ICTs in classroom contexts using devices supplied by non-profit organizations such as One Laptop Per Child and Computer Aid International. The resulting publications and reports of such studies have provided considerable insights into how individual, low-cost and school-based computers can impact learning.

Hollow (2009), for example, studied the One Laptop Per Child (OLPC) initiative in Ethiopia. The OLPC laptops were distributed in two schools in Addis Ababa, the capital city of Ethiopia. Although OLPC's objective has been to allow students to take their laptop home, Hollow (2010) reported that students were disallowed from taking them home. In addition, he observed a deficit in strategic planning for how to integrate the laptops within the existing curriculum and societal and school norms. He recommended more intensive teacher training, strategic planning for technology integration in the classrooms, and parent/guardian or community engagement. Hollow's (2009) study focuses on a short-lived project that had little to no buy-in from parents/guardians and teachers. My study, on the other hand, seeks to address these shortcomings by looking at how technologies that the users own and know how to use influence their learning lives. Learning lives is a concept proposed by Erstad (2013) and attempts to unify formal and informal learning rather than privileging formal learning in the classroom. Learning

lives will be discussed in greater detail theoretically in chapter three and methodologically in chapter four.

Hatrel's 2008 report, which focused on OLPC laptops disseminated in the same schools that Hollow (2009) studied, reached similar conclusions. Hatrel (2008) described two critical changes that needed to be made at the classroom level in order to effectively integrate OLPC laptops in the classroom:

1. A class of 40 students in one of the schools and 60 students in the second were split into two equal parts, i.e. 20 and 30 students respectively, and
2. The teaching periods where laptops were integrated in the classroom were reduced to two hours per day.

These changes were necessary to implement the pilot project, but in doing so the natural state of the classrooms was altered. This is not to say the changes were unjustified or unjustifiable. The modifications seem critical in making the pilot study more successful. Considering the fact that the objective of the pilot study was to provide recommendations to the Ethiopian Ministry of Education (MoE) regarding future educational technology investment in the classroom, seeking to find the right mix of students, teachers, and laptops per classroom can be a worthwhile and justifiable effort. However, modifying the natural state and environment of the phenomena being studied makes it impossible to study an aspect of school norms, classroom practices, and student behavior as they naturally occur.

Other studies focused on the most prominent ICT project in Ethiopia: the "Plasma Television" satellite program. This program put one plasma television in

every high school classroom to deliver lectures via satellite transmissions. Many of the studies agreed on the following three points: 1) Plasma teachers used English that was too advanced for the students, 2) The pace of instruction was too fast, and 3) Plasma Television deskilled teachers and reduced their function to television operators (Bitew, 2008; World Bank, 2013; Abera, 2013; Dahlstorm & Lemma, 2007; Melesse, Teshome, Simachew & Eshete, 2012).

These studies differ in focus and emphasis. While they are concerned with events and student learning that occurs in the classroom, my research takes a holistic approach to learning by taking into account learning that occurs inside and outside of classroom walls.

Statement of the Problem

In order to understand the role ICT plays in Ethiopian education and how social contexts influence how Ethiopian students use ICTs in their learning lives, we must move beyond studying short-lived programs instigated by international bodies and non-profit organizations. We must also consider additional contexts in which learning naturally occurs. A more holistic inquiry into all forms of learning through the use of ICTs that explores and considers all means by which learners are naturally learning, including computers and mobile devices both inside and outside of the classroom, is necessary in order to better understand the role of ICT in Ethiopian education and how Ethiopian students use ICTs.

In addition to de-emphasizing short-term and pilot studies as a way to understand how students use ICTs in their learning lives, it should be noted that numerous years have elapsed between this dissertation research presented here and the most recent studies conducted on this topic. Prior studies were conducted as

mobile phones were starting to become more ubiquitous and in many cases were becoming the primary or only computing device for people living in sub-Saharan Africa (International Telecommunication Union, 2011, 2012, 2013 & 2014).

A survey conducted by infoDev in 2007, the latest report of its kind, found that only 40% of schools in Ethiopia have computers, most of which are concentrated in the capital city of Addis Ababa. In addition, the devices have limited or no internet connectivity and are mostly used by administrators to send and receive emails. At the individual level, computer ownership in Ethiopia is one of the lowest among sub-Saharan African countries. The report also shows that the number of Ethiopians with mobile phone subscription is rapidly increasing (23.7%); however, data is not available to determine how many of these subscribers have internet access on these phones. Interestingly, the infoDev report found that the percentage of youth between the ages of 15 and 24 that use ICTs is higher than the rest of the population.

Wagner (2009) observed that at a time when globalization is changing the political, social and economic landscape "there is no social and economic domain where one feels a greater pressure of rapid change than that of technology. And, there is no domain where it appears that the gap between rich and poor seems to be laid bare so starkly" (p.368). As a result, learning opportunities, new pedagogies and educational practices that make use of new generations of technological innovations in ICTs remain increasingly restricted to affluent communities.

The most recent ITU annual report on ICT development index confirms Wagner's assertions. The ITU observed that "countries at the bottom (including …

Ethiopia) are failing to keep pace both regionally and globally" (p. 55). Although the figures are grim and future prospects bleak, major expansions of ICT infrastructure are underway to increase access to ICTs in Ethiopia (MoE, 2010).

Purpose of the Study

The purpose of this study is to offer an intimate, multidimensional and nuanced account of how a purposefully selected group of students use ICTs for learning. Furthermore, given the path the Ethiopian government has chosen to pursue integrating ICTs in the classroom, it is critically important that we understand how ICT integration in the classroom informs and is infused within the learning lives of Ethiopian students. Furthermore, studies focused on real-life uses of ICTs for learning outside the classroom could potentially identify opportunities as well as challenges, shed light on current practices, and provide the basis for subsequent research efforts. It is also important to note here that the focus of this dissertation is less on how learning occurs and more on how learners select specific features of ICTs and what forces influence their decisions. The focus of this dissertation, therefore, will be to address how a small sample of students in Ethiopia use ICTs in their learning lives and also to investigate how social contexts shape students' ICT use in their learning lives.

To examine these issues, I pose the following research questions:

1. How do secondary school students in Ethiopia use ICTs in their learning lives?
2. In what ways do social contexts influence Ethiopian students' ICT use within personal, social and educational spaces?

Overview of Chapters

The next chapter will provide a brief historical background and overview of the Ethiopian educational system. It will also provide the reasons behind the decision to begin to integrate ICTs into the classroom. Then, it discusses criticisms leveled against the manner in which ICTs, and more specifically the Plasma Television project, were implemented in Ethiopian classrooms. Finally, it will provide a summary of ICT curriculum for Grade 11 to show how the curricular choices and vision compare to actual practices of students inside and outside the classroom.

Chapter three will discuss the theoretical frameworks informing this study and will introduce concepts such as *learning lives approach, amplification theory* and *technology appropriation theory*. The chapter will begin by introducing the concept of learning lives and addressing the need for a holistic approach to studying students' learning efforts inside and outside of classroom walls. Then in *Chapter four* I will discuss the rationale for my methodological choices as well as why I chose to conduct an interpretive case study in order to examine these issues.

Chapters five, *six*, *seven* and *eight* will present each of the four profiles for each of the participants in this case study in separate chapters. Each chapter will provide a detailed description and analysis of the participants' learning priorities, their views on the perceived benefits of ICTs in their learning lives, and the influence of internal and external social forces such as parental, community and schools on the choices participants make. Furthermore, I will discuss how I constructed these participant profiles based on my own classroom and social group observations, participants' week-long journal entries, document reviews as well as

participant and parent or guardian interviews. I interviewed key figures such as school administrators and teachers as their importance and relevance to the study emerged during the period in which data was being collected. Participants' descriptions and life-events included in each profile are presented multi-dimensionally with no single narrative of the ultimate "truth" about participants or events.

Finally, in *Chapter nine* I will present overall conclusions, implications and limitations of the study.

CHAPTER TWO

History and Current State of the Ethiopian Education System

This chapter presents a brief history of the Ethiopian Education system followed by a discussion of the genesis of ICTs in the Ethiopian classroom. The evolution of Plasma Television programs in the classroom as well as the role of more modern technologies such as computers and mobile technologies in the classroom will be addressed. Finally, the ICT curriculum will be presented to give the reader a complete picture of the curricular expectations and realities.

Traditional Approaches to Education

The traditional approach to education in Ethiopia can be traced back to the establishment of the Ethiopian Church in about 327 AD (Pankhurst, 1955). From then until 1947, the year when a Provincial Education Tax was established, all educational efforts in Ethiopia were inextricably tied to the Ethiopian Orthodox Church. According to Pankhurst (1955):

> From early Christian times every village had its Church, and every Church its school, generally with in the outer wall of the church enclosure. Before he [sic] caught a first glimpse of the school building, or of the teacher and his pupils at work in the shade of some great tree, the traveler became aware of the proximity of a collage by the sound of children's voices repeating their lessons in unison, for in Ethiopia, as was long the case, also elsewhere, memorizing predominated in the instruction of the children. p. 233

The Church provided basic education in an effort to teach religious values, beliefs and the structure of the church to the wider public. "The schools were essential alike to

its continuance and to its function as the main propagator of the national culture, the guardian of its script, the principal creator of its literature" (Pankhurst, 1955, p.233). Church schools were exclusive clubs that accepted only boys whose families could afford to send them to school. Furthermore, because the system sought to indoctrinate school attendants to the Church's ideologies and Ethiopian Orthodox folklore, non-Ethiopian Orthodox Christians did not have a place in the traditional educational system. The church schools, which to date remain in operation in some parts of Ethiopia, are locally known as *yekes temehert bet.* The term translates to *priest's school.* The name comes from the fact that these schools were led by a single priest. Priestesses were notably absent in the teaching work force, because the church did not produce any priestesses.

Scholars like Milkias and Kebede (2010) have likened the traditional Ethiopian system with the three stages of schooling in Western educational systems, i.e. Elementary, Secondary and Higher Education. It is tempting to propagate the idea that the traditional Ethiopian system and the modern educational systems in Western societies are similar in their various stages, and approaches to forward progression. However, the two systems do not map onto one another so easily. Wodajo (1959) and Pankhurst (1955), for example, classify the Ethiopian education system into two major stages, which are then sub-divided into multiple sub-stages. The two major stages are: Elementary School of the Church and Higher Studies. Such a classification lends itself well to understanding how the traditional system worked, because it clearly demarcates the separation point among those individuals who will move on to join the higher echelons of the liturgy and those who will not.

According to Wodajo (1959) and Pankhurst (1959), elementary school was comprised four sub-stages. During the first sub-stage or *Fidel Kotera*, students recited and mastered the entire Ethiopian syllabary, a lettering system composed of approximately 269 characters. During the second sub-stage, called *Fidel Hawaria*, students were made to commit the First Epistle General of St. John to memory. They would also begin to practice writing during this stage. The third sub-stage is *Gebre Hawaria.* At this stage, students study the Acts of the Apostles in tandem with selected prayers, which are expected to be memorized. In the final sub-stage, called *Dawit,* students studied Psalms of David. Successfully reaching this final sub-stage was considered a significant achievement.

Yekes temehert bet can be transient in nature. The priest was a central figure without which the schools could not exist. The schools remained open so long as the priests willed to keep them running. Most of the teaching, as Pankhurst (1955) notes, took place under a tree so as to shield students and the priest from direct sunlight. Even then, *Yekes temehert bet* were out of the reach of many children, because most of the villagers could not send their boys to the priest. They could not afford to pay tuition. According to Pankhurst (1955), it was expected for a boy's family to give a cow or an equivalent amount of money to be paid at the end of the boy's education—a cost too high to meet for many Ethiopian families, who themselves were peasants. It was a common sentiment among parents/guardians of school-aged boys to say, "Not even for myself and for my boy have I enough money. How then can I enter him into the house of a teacher?" (Walker, 1933, p. 12), so the boy would be left uneducated for life.

Student progress from one stage to the next in the traditional education system heavily relied on subjective assessments by the priest. Students' academic progress depended on at least two factors: 1) how strictly the priest conducted the lessons, and 2) how good the student was at rote memorization.

The traditional schools described thus far largely excludes educational practices and traditions in Ethiopia's Muslim population. Muslim Ethiopians were, due to the Christianization of Ethiopian education, excluded from them. However, Ethiopian Muslims operated their own schools in mosques and thus, according to (Wodajo, 1959), these schools did not have any influence on the national stage.

Modern Education

In 1908, while the traditional education was operating regularly in most villages, the seeds of modern education were being sown in some of Ethiopia's major cities. Emperor Menelik II established modern, western-styled educational institutions in Addis Ababa and several other major towns. He recognized the need to modernize the country, and transforming Ethiopian education was a critical part of his modernization efforts. The emperor established the first school, the first hospital, the first water pipes, the first railroad, the Ethiopian post office, the first Ethiopian telegram, telephone line and the first printing press (Pankhurst, 1955). The Emperor recognized the benefit of technology and innovations. He began sending Ethiopian students to countries that appeared to have no interest in establishing colonies in Africa. "Earlier, with Ilg's help, Menilek had despatched three youngsters in 1894 for study in Switzerland. Others were later sent to Russia, which was selected because it was an Orthodox Christian country, like Ethiopia, with strong monarchical traditions" (Pankhurst, p. 199). Students who were considered

the best of the best were sent to Russia and Switzerland to obtain modern education that focused in technology.

Later, when Emperor Haile Selassie took the throne he built on what Emperor Menelik had started, and constructed more modern schools. He expanded the study abroad program and sent more Ethiopian students to the U.S.A. and Europe.

The Ethiopian Orthodox church leaders unsurprisingly opposed the Emperor's efforts to modernize Ethiopia's education system. They viewed the emperor's efforts as a threat to their livelihood and power. As a result, the transition from traditional education to modern education was complex. To make matters worse, the Italian occupation of Ethiopia for about 6 years crippled the fledgling modern education system. The little progress that was made to modernize Ethiopia's education system was rolled back. During its short-lived occupation, Mussolini-appointed military officials wiped out more than three-fourths of educated Ethiopians. As Kebede (2010) noted, "according to the estimate of one [historical] author, 'about 75 percent of those who had some modern education were wiped out' during the years of occupation" (p.1).

After liberation, Emperor Haile Selassie made significant efforts to reform and rebuild the Ethiopian education system that was completely decimated by the occupying Italian forces. To jumpstart the educational system, foreign experts were employed. The foreign experts brought with them pedagogies that worked in their respective countries. The result was an alien educational system that failed to serve the country's pressing needs.

The modern system gave trivial consideration for Ethiopian culture, tradition, existing injustices and values. Kebede, (2010) noted, "appointed foreign advisers

[tended] to think what had proved successful in their countries would also benefit Ethiopia" (p.31). The "experts" not only lacked understanding of the context in which they were operating, but they also possessed little or no background in pedagogical approaches to teaching and learning (Kebede, 2010). Another glaring challenge was that the modern education system became a privilege reserved to a small number of regions that were favored by the ruling class. This unfair distribution resulted in low enrollments in rural parts of Ethiopia (Kebede (2010).

Emperor Haile Selassie's efforts could not bring about monumental changes in the education system. The socialist dictator Mengistu Hailemariam, who forcibly overthrew the emperor, deployed university and high school students on a nationwide literacy and socialism indoctrination mission dubbed *Edget Behebret Zemecha* or Development through Cooperation Campaign. Students were embedded in remote villages all over Ethiopia so that they could explain the socialist agenda and also teach basic literacy skills (Adejumobi, 2007).

Significant progress in education began to materialize after the current government assumed power in 1991. Three years after taking power, the Federal Democratic Republic of Ethiopia introduced "Education and Training Policy," the modern foundations of Ethiopian education. In it, the government echoed what Wodajo (1959) observed as early as the 1950s. Wodajo had concluded:

> The most conspicuous limitation of the present educational system is its inadequacy. The school system has to be greatly expanded to qualify as even rudimentary. In a population estimated to be about fifteen million, a little more than a hundred thousand children go to public schools while only five thousand attend private and mission schools. Enrollment

> figures for the Church schools are not available. However, these cannot amount to more than a hundred thousand. This limitation of opportunity for education to the privileged few has the inevitable effects of accentuating class divisions and perpetuating the "ruling class" idea. The ruling class in this case is the educated few.
>
> A second shortcoming of the present school system is that the curriculum tends to be overly academic, too far removed from the practical needs of Ethiopia. This is in a sense to be expected since many of the teachers above fourth grade are foreigners and almost all textbooks are from abroad.
>
> As a result, school children are at times more familiar with the history of Rome and the life of Abraham Lincoln than with the geography of their immediate community or the history of their own native country. (p. 27)

Similarly, in 1994 the transitional government of Ethiopia observed the "country's education [was] entangled with complex problems of relevance, quality, accessibility and equity" (MoE, 1994). The policy intended to disconnect the country from its past. It leveled a pointed and harsh criticism of the lack of awareness and effort by past governments to make tangible progress. It stated:

> Aware of the complex problems the country has plunged in by the previous *dictatorial*, *self-centered* and *vain regimes*, the transitional government of Ethiopia has embarked on charting the right direction of development to break the vicious circle we have been entangled in (p. 2) [emphasis added].

More notably, the document enumerated the challenges Ethiopia faced in educating its people to assert that the problems were deeply rooted in past injustices and poor investment in education. It noted:

> Inadequate facilities, insufficient training of teachers, overcrowded classes, shortage of books and other teaching materials, all indicate the low quality of education provided … the disparity among regions is high. [I]lliteracy is an overall problem of the society. Opportunities for high school education and technical and vocational training are limited to big towns (pp. 2–3).

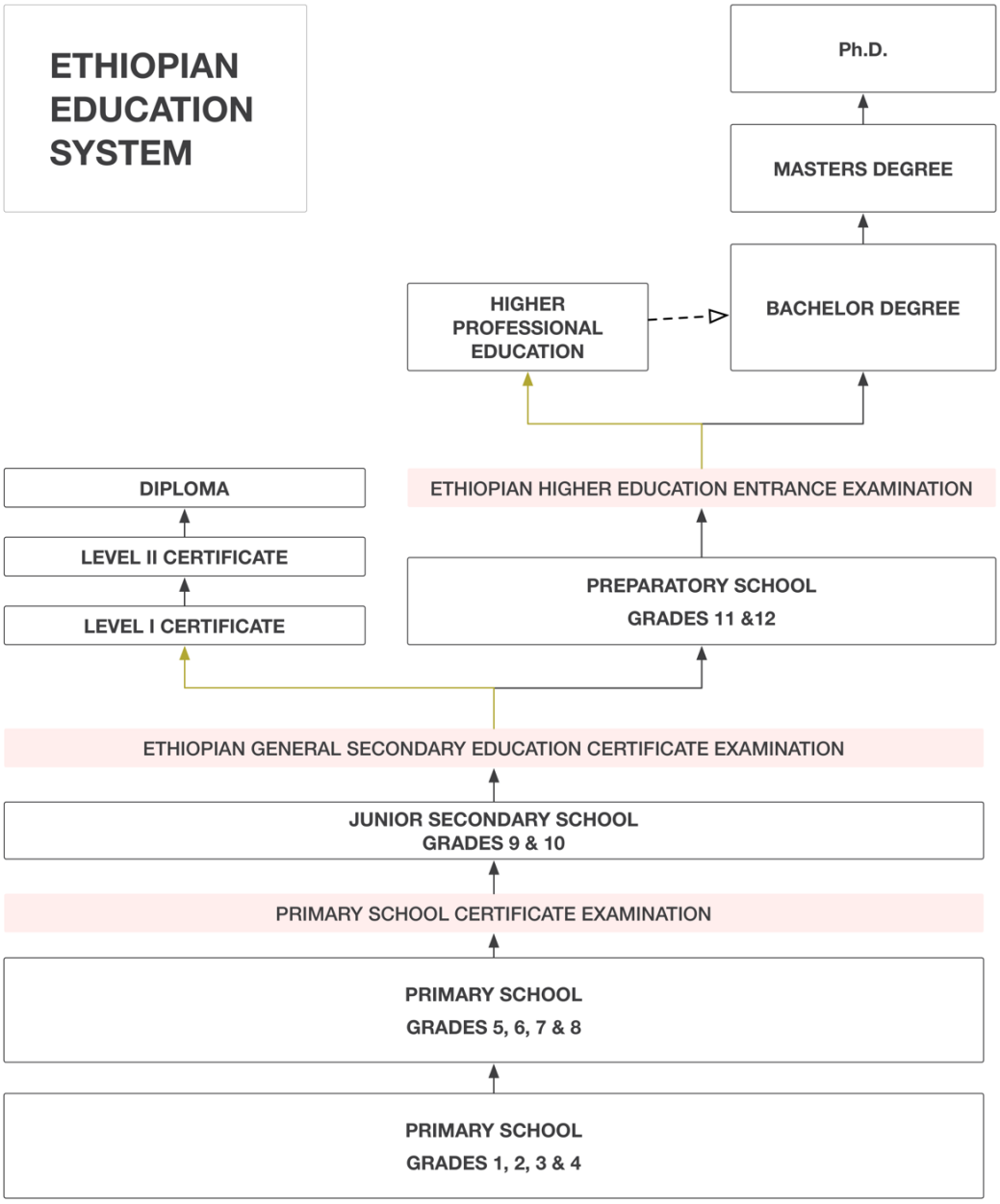

Figure 1. A flow chart of the Ethiopian education system.

As Bitew (2008) notes, one of the changes was the transition of the education system from 6+2+4 (primary, junior and secondary), to 4+4+2+2. In this new system the first 8 years of primary education were divided into two cycles. Students attended four years of basic education in the first cycle, followed by additional four years of general education that took place in grades five through eight, where students were required to take the Primary School Certificate Examination to advance to Junior Secondary School. The last four years of education were further divided into two cycles: General or Junior Secondary School and Preparatory School (see Figure 1. *A flow chart of the Ethiopian education system*).

ICTs to the Rescue

In the eyes of the government, the challenges Ethiopia faced required innovative solutions that were unorthodox and unique. Although the policy did not explicitly state the role ICTs should play, there was an expectation and a sense of optimism that technology will play a critical role in achieving its policy goals.

Nearly a decade after the new policy was drawn, the government introduced a one-way satellite broadcasted television program more commonly known as "Plasma Television" to tackle many of the problems that were identified. The satellite broadcast programs set out to address problems of large classes, poorly trained teachers, inequitable distribution of talented teachers around the country, and shortages of teaching and learning materials.

The program mobilized to equip all governmental high schools with Plasma Display Panels (PDPs). The PDPs were then used to transmit subject-specific lessons delivered in English language for a duration of 35 minutes during a class period that

typically lasted 45 minutes. Subjects taught included English, mathematics, chemistry, biology, physics, geography, civics, economics, technical drawing and general business (Takeuchi, 2008). The original plasma program allotted a total of 10 minutes to the in-class teacher. The in-class teacher would use the first 5 minutes to introduce the topic that would be covered during the transmission, and then, when the transmission concludes at the 40th minute, he or she summarized topics and concepts that were covered during the plasma program transmission. Critics saw the Plasma Television initiative as a means to indoctrinate students and tighten the government's control over remote regions of the country (Lemma, 2006).

ICTs in Ethiopian Education

PDPs were not the only classroom technology present in Ethiopian high school classrooms. Televisions and radio have long been used at all levels of classrooms around the country. The Educational Media Agency (EMA) of the MOE produced and delivered educational television programing in Ethiopia for many decades. In fact, the agency was founded in the 1950s to transmit educational radio programs (Tilson & Bekele, 2000).

The implementation of the plasma program was not without its challenges. Mismatches in students' and plasma teachers' English proficiencies led to hopelessness and frustration among students. In addition, the pace of lessons was too fast for many of the students. The lack of interactivity of plasma lessons coupled with the limited time classroom teachers were allotted to interact with students made learning more challenging, and as a result learning became passive (World Bank, 2012).

More recently, in addition to instituting changes designed to mitigate technical and classroom challenges associated with the plasma program, MOE has sought to combine the plasma program with the internet to deliver content. Furthermore, due to

country-wide curricular changes that saw the introduction of ICT as an independent subject, the last ten years have seen a surge of interest in stocking schools with desktop computers.

ICT Curriculum in Secondary Schools

The ICT curriculum in secondary schools covers a range of basic and advanced topics. During the first year of high school in grade nine, the students briefly cover the development of computers and communications technology. Then they study three areas in greater depth: desktop publishing, database application and finally networks and communications. By the end of grade 9 students are expected to use a desktop publishing package to produce a variety of documents such as brochures, "visiting cards" and newsletters. In grade 10 they continue to work on databases and produce reports. In Grade 11 students are introduced to the concepts of information systems and how they are used in everyday life. Then they explore how to use Microsoft Office software. Subsequently, they learn basic hardware troubleshooting techniques, followed by lessons on how to build websites and how to conduct advanced web searches in unit four. The fifth and last unit explores digital image processing. The high school curriculum concludes in grade 12 with a deep dive into the various uses of the internet in all aspects of modern life, software copyright issues, website design, and, finally, image and multimedia editing.

The topics covered in the ICT curriculum are of significant interest to this research because they show curricular expectations and focus. Understanding the curricular choices made in the governmentally mandated textbook presents an opportunity to juxtapose curricular vision with realities of students' learning lives. In the following section I present grade 11 ICT curriculum with an in-depth review of topics

covered in the student textbook. The grade 11 ICT curriculum is emphasized and explained because all four key participants in this case study were in grade 11 during the time that data was collected.

ICT in Grade 11

The five-unit, school-issued textbook is mandated by MOE for use in all high schools in Ethiopia. The textbook addresses various ICT topics ranging from basic concepts of ICTs to how to use specific software programs.

Unit One: Information Systems

The first unit begins by providing definitions of computer, information system, and its relevance in day-to-day life. Information system is taught to be broken down into subsystems depending on how a person might apply it. Through the use of computers or other devices, one can transfer and share information to keep the day-to-day activity smooth. ICTs are used at home, in the office, factories, transportation (especially in airplanes and train stations), communication agencies, health organizations and schools. Education benefits a great deal from ICT, and ICT is playing a larger role in it. The unit explains how the MOE in Ethiopia is planning to use TV and transmit education using TV channels. It also states that some higher education institutions are planning to provide online courses and give students certifications at the end. The unit concludes its introduction to information systems by reminding students that ICT are implemented in the Ethiopian education system and students are taking courses that mainly focus on ICT.

The unit goes on to identify five kinds of information systems and describes each one of them in detail. The first kind of information system is identified as Transaction Processing System, which is used to process routine transactions efficiently and correctly.

The second is Management Information System, which is said to analyze data obtained from the Transaction Processing Systems. The third system is Decision Support Systems, which is used for prediction purposes. The fourth is Executive Support Systems. This system gathers information from internal and external sources such as media organizations, government and other organizations. The fifth and last system is labeled as Office Automation System. It includes various technologies to increase efficiency and decrease human labor. Some of the technologies listed as examples include: the use of fax, voice mail, telephone, copying, e-mail, video conference, software, image processing systems, office management systems and word processing.

In explaining these systems, the textbook offers several case studies to illustrate how information systems work together. One such example encourages students to think about how a fast food restaurant might utilize information systems to operate in Addis Ababa. It is important to note here that to date fast food restaurants do not operate in Addis Ababa. The example becomes significantly less relevant when the authors decide the restaurant's customers come from a university situated approximately 100 kilometers from where the fictional restaurant is said to be located. The content, concepts and case studies in the textbook were initially published in a book by the same authors some years earlier. It appears they borrowed an existing example from their book and attempted to contextualize it to fit the Ethiopian context, wrongfully assuming *Adama University* is in Addis Ababa, and that fast foods were prevalent in Ethiopia.

Next, the unit describes the impact ICTs have in everyday life. The topics are then divided into sub-categories of digital devices. Three examples are given including

computers, mobile phones and satellite broadcasting, which are then analyzed in order to identify the positive and negative impact each device might have.

The unit asserts that *computers* in the work place solve many problems and make the office work efficiently. They increase work opportunities for students, who graduate with the skills and knowledge in how to use and make a difference using computers in the work place. On the contrary, computers have altered how workers get promotions. It used to be that the years of experience an individual worked in one place meant they were able to move up the ladder based on the years of work experience. But now that most offices are equipped with computers, a college graduate without any work experience could get hired and obtain a high paying job with the education he or she has. The authors of the textbook identify this as a negative effect of computers.

Mobile phones are identified as the fastest, easiest, portable and affordable medium of communication. Some mobile phones have a built-in camera and can capture photos. Business are conducted on cell phones and critical information is communicated through mobile phone to make time sensitive decisions. The text makes an erroneous assumption that Ethiopians may reduce the cost of their mobile phone by signing a contractual agreement with their service provider, much like how an individual living in the U.S. might sign a contract with AT&T or Verizon to subsidize their mobile phone purchase. Unfortunately, this is not the case in Ethiopia. There is only one telephone service provider and it does not offer the kinds of subsidies the textbook describes.

Mobile phones have negative impacts as well. For instance, people might use their cellphones while they are on the job. The textbook claims when and how to use personal cell phone in the work place is not clearly understood by the majority. Another negative

impact is mobile use while driving, which may lead to dangerous and life threatening situations. There are also dangers related to mobile phone addiction.

The authors state the *satellite broadcasting* system in Ethiopia has improved over the years. They also discuss the various satellite broadcasting initiatives that are underway in Ethiopia. They argue using satellite communication will increase literacy, decrease poverty and increase knowledge of the public by making Ethiopians better informed and connected with the outside world.

The chapter ends with an introduction to the digital divide. It describes societies that have better and advanced use of ICTs as information rich societies, and those societies where ICT is minimally used or accessed as information poor societies. It concludes by asserting the use of ICT is important in order to compete well with the developed world.

Unit Two: Enhancing the Use of Software

The unit is a tutorial that is focused on how to use Microsoft Office software. It presents step-by-step instruction for how to open Microsoft Word, PowerPoint, Excel, Publisher and Access. It explains how each of these software work. The authors make some attempt to untangle the concepts of word-processing and databases from Microsoft's Software by describing how Microsoft Word is one of many word-processing software that is available.

Unit Three: Basic Troubleshooting

Basics of Preventative Maintenance. This unit offers basic instruction on how to maintain an electronic device, how to safely use it and how to troubleshoot when it is not working. The unit begins by discussing how to store computers to protect them from

overheating. Then it reminds students computers require electrical power to operate. It enumerates the possible outcomes of power outages and electric surges. It emphasizes the importance of backing up. The different options for backing up a computer are listed, including external hard drives, flash drives or USB thumb drives, remote data storage via the internet and CD/DVD-ROM. Reading the manual, installing utility programs and hard drive tune-ups including disk defragmenting as well as disk cleanups are identified as important steps that will extend the computers' lives.

Basic Safety Issues. This section gives detailed information about how one can use a personal computer safely. It discusses and shows the correct body posture for a person in a sitting position. An image of a "correct sitting posture" is shown. Another safety issue concerns electro Static Discharge (ESD). The section discusses how ESD can occur. It offers advice on preventative measures to avoid or minimize ESD.

Hardware Maintenance Basics. This section reminds students that they must make sure peripherals are compatible with each other before attaching them to the computer. This advice may not be clear to students, as it does not go on to explain what is meant by this. The section goes on to emphasize the need to connect the computer monitor and system unit with a cable. It suggests the same with the keyboard, mouse, and speakers. If some things go wrong while attempting to attach peripherals, the authors suggest the first step of troubleshooting should be checking the cables and making sure they are plugged correctly and that connection is not loose. Then it is advised to check if the computer power button is on, if the computer is plugged in to a power outlet, and to be sure the computer is not overheating. And finally, a step-by-step instruction of how to install and uninstall Microsoft Office Enterprise 2007 is included in this unit.

Unit Four: Exploiting the Internet

Advanced Searching. The basics of web search are offered in grade nine and ten. In this textbook used in grade 11, students learn about advanced search. The lesson covers the mechanics of conducting the advanced search. At no point in the lesson do the authors discuss how to determine the trustworthiness of search results.

Using Wikis, Blogs and Podcasts. This section is devoted to web 2.0. It describes Wikis as "webpages that can be viewed and modified by anyone with a web browser and internet." Some of the advantages suggested for Wikis are the fact that they can be modified by anyone and they are easy to use. According to the textbook, the disadvantage of Wikis is that since more than one person can work on a page, it could become confusing.

Next, the advantage and disadvantages of blogs are presented. The textbook claims the advantages of blogs are their simplicity for creating a blog site. It suggests by keeping a blog, students can improve their writing skills. Blogging is also said to increase students' skills in expressing beliefs and opinions in writing. As far as disadvantages of blogging are concerned, they are said to take time away from other duties, because new posts and entries need to be made. Furthermore, the authors of the textbook claim, the more students write on blogs the more they tend to use abbreviations and slangs, which may form unfavorable writing habits and style. Finally, blogs are said to encourage unhealthy student competition, which may lead to posting entries with no substance.

Podcasts are described in the textbook as a kind of radio broadcast that can be downloaded from the internet on to portable devices. Advantages of podcasts include availability and ease of access. Because podcasts are a form of audio transmission of information, students can listen to the information while doing other activities such as running or walking. The most significant disadvantages that are offered for podcasts are that they are big in file size, and they need to be downloaded; hearing impaired individuals cannot benefit from them; communication is one way and therefore students cannot actively participate in the broadcast since the transmission is not live; and finally there are "Intellectual property issues" students are advised to be mindful of. Neither the student book nor the teacher's guide explain what "Intellectual property issues" mean.

The most significant and glaring omission in describing these internet services and technologies is that the curriculum fails to address the internet's most problematic feature: abundance of subjective information that is not always in sync with reality and facts. This omission has serious consequences for how students perceive and use information gleaned from these sources.

Social Networking. Social networking websites like Facebook, Twitter, Netlog, Hi5, Orkut, and others are listed in the textbook as examples for how people can create a social group online and communicate and share their experiences. Even though joining a social network might be a positive experience and advantageous, there are some disadvantages and risks users must consider when using social networks as well. One major disadvantage is that since students will post personal information on the social networks, their private and personal information may be stolen, which may pose security threats. Furthermore, some users may post abusive content. Students are encouraged to

report this to the service provider. They are also warned against people who may create fake profiles. The authors suggest that students report fake profiles to the service provider.

The last section in the unit discusses producing a webpage using simple web-design software. A tutorial describes how students can design a website using Microsoft Publisher. Then the chapter provides a tutorial on how students can upload a website they built to www.0catch.com, which the authors claim offers a free server. 0catch.com does indeed offer limited free webhosting services.

Unit Five: Image Processing and Multimedia Systems

Overview of Image Processing. The unit defines the following concepts: image enhancement, image restoration, color image processing, compression, morphological processing, segmentation and recognition. Adobe Photoshop, an image processing software, is used to show students how to edit photos and remove unwanted elements in images. The section lists numerous other software that are used for image editing. Some of the software include: Dox Optics Pro, MS-Paint, Capture one Pro, Photo Styler, Photo Explosion, Photoshop, Picture Project and Photo Editor.

Basics of Image Processing. Students are introduced to various kinds of image file formats, such as BMP, JPEG, TIFF, GIF, PNG and WMF. These files can be edited using Adobe Photoshop. The text then presents step-by-step instruction on how to use Adobe Photoshop CS5.

Basic Image Editing. The last section in this unit explains basic image editing. Step-by-step direction is given on how to change tonality and color, crop an image, resize an image, how to adjust color and how to sharpen or soften an image.

Summary

In this chapter, the traditional education system in Ethiopia was discussed. Historically the Ethiopian education system was based primarily on religious texts that were solely drawn from the Bible. These schools were taught by the Ethiopian Orthodox Church, and their primary purpose was to produce future functionaries of the church. The church did not have the vision, resources and the knowledge to meet Emperor Menelik II's modernization ambitions; as a result, the emperor introduced Western-style schools in the country. The emperor's successors expanded access to schools around the country. But their combined efforts fell short and left many Ethiopian children uneducated. The current Ethiopian government sought to address the education problem by, among others means, introducing ICTs in high schools as a way to expand access to many more living in rural parts of Ethiopia. The government also integrated ICT as a subject at primary and secondary level schools.

In the next chapter I discuss the following conceptual frameworks: *learning lives* (Erstad, 2013), *law of amplification* (Toyama, 2015), *technology appropriation model* (Carroll et al., 2001). These conceptual frameworks frame this study. I will discuss their significance for the study as well as their relevance to the research question that are addressed in the study. Finally, I will discuss the methodological implications of the theoretical frameworks.

CHAPTER THREE

Literature Review

In this chapter I present three conceptual frameworks that frame this study. I will begin by discussing what Erstad (2013) refers to as *learning lives*, a holistic approach to understanding learning that occurs in and outside of the classroom. Then I will discuss the *law of amplification* (Toyama, 2015) by tracing the origins of the theory, its implications in educational technologies, and why the theory is relevant for this research. I will go on to present a review of *technology appropriation theories* and their significance in addressing my research questions. Finally, I will briefly discuss methodological implications of these theoretical frameworks.

Finding the Limits of Formal and Informal Learning

The term "formal learning" is usually used to refer to a kind of learning that occurs at an educational institution, where learning activities are guided by standardized curriculum. It is often viewed as being time and space bound. In many cases, formal learning is considered an important part of schooling, where standardized curriculum and exams are expected to lead to educational advancements and, ultimately, a career. For example, Bevan, Dillon, Hein, Macdonald, Michalchik, Miller, Root, Rudder-Kilkenny, Xanthoudaki and Yoon (2010) argue that formal learning environments are necessary for more serious career and subject matter engagement. Sefton-Green (2007) confirms this when he notes, in many societies it is "difficult to separate the processes of learning from the practice of education. … and for most of us discussion about learning is inextricably related to formal education systems: how schools should be organised, managed and run" (p. 5). In other words, certifiable learning is associated with formal learning only. In

contrast, informal learning is less rigid. Generally, informal learning is considered more flexible, collaborative, more socially integrated, and usually unbounded by time and place (Khaddage, Müller & Flintoff, 2016).

A focus on neatly categorized learning contexts has its merits (Hull & Schultz, 2001). However, the wide adoption of the internet and penetration of communication technologies in all aspect of modern life across different contexts has made it starkly clear that the various context-dependent categories that were previously obvious or less ambiguous have become increasingly fuzzy, and therefore more challenging to demarcate (Arnseth & Silseth, 2011).

This realization has led to efforts to bridge formal and informal learning by integrating some aspects of informal learning such as flexibility and responsiveness to students' interests into formal learning (Chisholm, 2012). Lemke (2013) argues for the need to move beyond integrating some aspects of informal learning into formal learning contexts. He believes an educational system that fails to recognize students' interests in its consideration of what constitutes learning is "morally and humanly wrong" (p. 66).

Toward a Holistic and Pluralistic Approach to Understanding Learning Contexts

The learning lives approach views the dichotomous approach to understanding and drawing of borders separating formal and informal learning as imprecise and outdated (Rajala, Hilppö, Lipponen, & Kumpulainen, 2013; Hull, 2012; Erstad, 2013). Sefton-Green (2007) and Erstad (2013) argue that this imprecision makes the categories less useful, especially because of the changing nature of learning and the affordances of technological tools we use on a daily basis across different contexts.

One approach Sefton-Green (2007) puts forth offers a flexible approach that reflects how formal and informal learning are situated in relation to one another. This approach recognizes that some contexts are decidedly formal or informal, while many contexts in which learning occurs fall between the two continua. For example, attending lecture in a classroom context may be understood as being more formal, while playing mobile games on the phone at home may be considered informal. However, depending on the context in which they are occurring, both of the above activities may change their positions on the continuum.

Erstad (2013) and Sefton-Green (2007) argue that any discussion about formal and informal learning inevitably leads to a discussion about learning itself. They argue, the manner in which one characterizes formal and informal learning is closely tied to larger theories of learning. For example, those who subscribe to purely behaviorist theories would see a clear difference between formal and informal learning with very little or no overlap between the two. On the other hand, those who see learning as a socially constructed meaning making process see a greater degree of overlap between formal and informal learning (Coiro, Lankshear, Knobel, & Leu, 2008).

The learning lives approach extends the constructivist view and attempts to unify formal and informal learning. At the basic level this approach attempts to address one central question: if learning spans a life time, how do we locate the learner? Erstad and Sefton-Green (2013) offer one place we might want to start from in that "learning needs to be situated intricately and intimately in a matrix of 'transactions': experiences, life trajectories, voluntary and involuntary learning contexts, affective frames and social groupings that make up experience across our life-worlds" (p.1). In essence, they

advocate for the dislocation and disassociation of learning from physical spaces and distribute it across contexts learners occupy.

They also suggest that in a world where it is possible for a learner to be located in multiple places at the same time mediated by ever-changing communication technologies, it is important that researchers look at a learner's life in its totality. In doing so we not only acknowledge the fact that learning occurs everywhere, but also embrace what Bauman (2005) calls 'liquid lives' where our surroundings, including the technological tools we use in our learning lives, are in constant flux.

Beyond situating learning within the matrices of everyday life 'transactions,' Erstad and Sefton-Green (2013) emphasize the need to take into consideration the artifacts and tools used in daily lives. Erstad (2013) argues:

> Human development is characterized by interconnections between our knowledge building and the tools provided to us by the culture. This does not mean technological determinism, i.e., that we follow what the technological development gives us, regarding possibilities … We are, ourselves, the ones who develop new technological tools; these developments then give us new possibilities in different social practices … [presenting us with] a totally different [kind of] engagement (p. 43).

The point here is that although technologies have value systems embedded within them, their use, continual existence, and demotion is regulated by sociocultural forces. The extent to which technological tools might influence learning lives would be determined by the context in which they exist. The next section explains in depth how these sociocultural forces support or challenge existing practices and norms in all aspect of life.

Law of Amplification

Debates about the value and impact of technology in our lives flare up periodically. At times these debates occur publicly on mainstream media outlets. Topics range from Massive Open Online Courses (MOOC) to the Arab Spring and the role social media was said to have played in it. Technology enthusiasts typically credit technology as the cause for the perceived transformation. Embedded in this perception seems to be a type of technological determinism that views technology as a tool without which change cannot be affected. Detractors, on the other hand, argue technology is *just* a tool we happened to use, because it was the best tool available at the time.

Academics like Shirky (2008) assert that our modern communication mediums are unique tools that make 21st century revolutions possible. Others challenge this claim. Gladwell (2010) for example, observed "the world, we are told, is in the midst of a revolution. The new tools of social media have reinvented social activism. … Some of this grandiosity is to be expected. Innovators tend to be solipsists. They often want to cram every stray fact and experience into their new model" (p. 43). Gladwell admits advancements in technology can solve some of the most challenging problems humans face today, such as the energy problem; however, he asserts, no amount of technology can solve the underlying dynamics of 'human' problems, such as social, cultural, economic, educational, or political problems.

Scholars in the field of educational technology wrestled with similar questions many decades ago. In a series of scholarly publications Clark (1983, 1985a, 1985b, 1985c, 1986 & 1987) argued that it was not possible to attribute gains in learning to the use of educational technologies. He eventually declared, "media will never influence learning" (Clark, 1994). His oft-cited quote aptly summarizes his argument: media are

"mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition" (1983, p. 445). In other words, the delivery method matters the least. Clark (1994) concludes by asserting that technology is not a solution for a problem that is not well understood, or misunderstood, and starting with the solution, i.e., technology, is impractical and unethical.

More recently, the infoDev- and UNESCO-backed website edutechdebate.org hosted debates on the topics of efficacy and value of technology for education. In these debates, scholars argued the merits and pitfalls of technology in the classroom. In summary, the debates attempted to address how much technology, if any, are sufficient to transform education. Those arguing against the idea that technology can transform education seem to agree that technology is a multiplier of existing institutional, social and personal capabilities.

Toyama (2015) calls this multiplication function of technologies, the *law of amplification*. The law of amplification makes a far reaching claim in suggesting that technology alone does not and cannot impact or solve problems where humans are at the center. The law of amplification argues technology simply amplifies human intent, as Toyama (2015) notes, "Like a lever, technology amplifies people's capacities in the direction of their intentions" (p. 28).

The law of amplification is not an entirely new concept. For example, Mumford (1966) stated that technology "[supports] and [enlarges] the capacities for human expression" (p. 53). Similarly, Hagen (2001) observed, "computer technology is not an independent force … [it amplifies] trends at work or reinforces existing institutions (p.

56).” Cohen and Levinthal (1990) described the law of amplification as *absorptive capacity* while Agre (2002) described it as *reinforcement model*. Another term that echoes the same idea as the law of amplification is what some have called “The Matthew Effect,” which gets its name from a verse in the Gospel of Matthew that says, “for unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath” (Matthew 25:29, King James Version).

The law of amplification is not the only model that attempts to explain how technology comes to influence social outcomes. There are other models that attempt to explain the relationship between technology and humans. These models may be generally categorized into four groups: technological determinism, social construction of technology, technological skepticism, and technological contextualism (Toyama, 2015). Despite their looming suggestiveness, a detailed exploration of these models is beyond the scope of this dissertation. However, I will present a brief summary of each model.

Technological determinism, as the name suggests, is the belief that technology dictates human action and social outcomes. According to technological determinism human progress is made possible as a result of the technological inventions. To support their claim, proponents of this view cite as evidence the way in which advances in medicine, transportation, engineering and other fields have changed the course of history.

The *social construction of technology* model, on the other hand, argues that social needs dictate technological inventions. In this view technology is an instrument or a tool humans use to advance their interests. Through their individual intents as well as their collective and social interactions, humans shape how technologies are used.

Technological skepticism views technology as a force that alters society in ways that make it less human-centered and less balanced. Technological skeptics see themselves as realists, and they are realists to a large degree because their observations of technology are not theoretical or imagined. They point to the economic woes and social ills technological advancements bring to vast sections of society that is already at a disadvantage due to historical and political reasons. The most important aspect to remember about technological skeptics is that they are not technology deniers. They share the view that technology can be a force for good, but that non-critical or blind acceptance of technology is detrimental to human progress.

Technological contextualism takes the middle ground and argues that the impact of technology is delimited by the context in which it exists. Technological contextualism holds that both technology and society influence each other depending on the context in which both of them exist. The combination of time, space, individual preferences, culture, politics, geography and other factors play a critical role in determining the human-technology relationship. The challenge with this perspective is that "context" could imply a host of variables without clear boundaries. As Edward (2009) notes, life itself could be a context, which makes technological contextualism a less precise model to understand our complicated relationships with technology.

The law of amplification seeks to find a common ground by combining some aspect of each of the models discussed above. It agrees with technological determinism in its belief that human progress may be dictated by technology. It shares social construction of technology advocates' view that humans shape technologies in ways that advance their inner desire and need. It agrees with the technological contextualist view that context

plays a significant role in shaping the relationship between technology and society. It concurs with the views of technological skepticism that the affordances of technologies must be earnestly considered in accordance with society's needs before embracing them.

At first glance the law of amplification appears very similar to technological contextualism. However, there are critical differences between the two models. Whereas technological contextualism offers conditions and hedging for how and when technologies may be useful, the law of amplification promises a kind of explanatory precision that may be applied to wide ranging phenomena occurring in natural contexts. Toyama (2015) claims that, unlike technological contextualism, the law of amplification can be used to make predictions, too, but prediction is not what I am after in this study. In addition to its explanatory power, what makes the law of amplification unique and relevant to this study is the fact that it originates from Toyama's studies and work on economic development projects in international contexts.

The law of amplification is at its heart a technology appropriation model, be- because it explains why technologies get adopted. It asserts that technology as designed does not have a direct influence on how users ultimately decide to use it. However, the law of amplification does not offer a framework to explain how technologies get appropriated. The next section will address the question of how technologies get appropriated.

Technology Appropriation Model

Studies on learners' outside-of-school ICT use suggest that learners' behaviors are mainly influenced by social interaction and learners' personal interests, which, arguably, are also closely tied to culture and context (Ito et al., 2010). The former influence presents little surprise, because, for many decades sociocultural learning models have

underlined the important role social interactions, social norms and culture plays in our learning lives (Raith, 2016). Sociocultural perspectives of learning emphasize the mediated, socially based, distributed and participatory nature of learning (Tharp, 1991). Vygotsky (1978) argued that learning and development "cannot be understood by a study of the individual. We must also examine the external social world in which that individual's life has developed" (Tharp & Gallimore, 1988, pp. 6–7). Based on this perspective, learning is an outcome of culture and collaborative activities constructed through mutual engagement. Learning is shaped by interactions among groups of learners and individuals as well as interaction between learners and tools, sometimes called artifacts and technologies in the literature (John-Steiner & Mahn, 1996). The focus of this dissertation is less on how learning occurs, and more on how learners come to select which tools they choose, and the forces influencing how they come to choose them.

The manner in which high school students come to acquire ICT skills and their choice can be understood within the sociocultural model of learning, because societal influences play a role in how learners choose the type of technology they use and how they choose to use it to learn (Strigel, Ariunaa, & Enkhjargal, 2007). It would seem that high school students have more to learn from one another than their parents/guardians or teachers about ICTs. However, the community in which they live remains an important part in their decision making process (Erstad, 2013) because even as high school students use technologies that are alien to their elders, it is likely that they would superimpose existing knowledge, moral values and notions of privacy onto their digital lives.

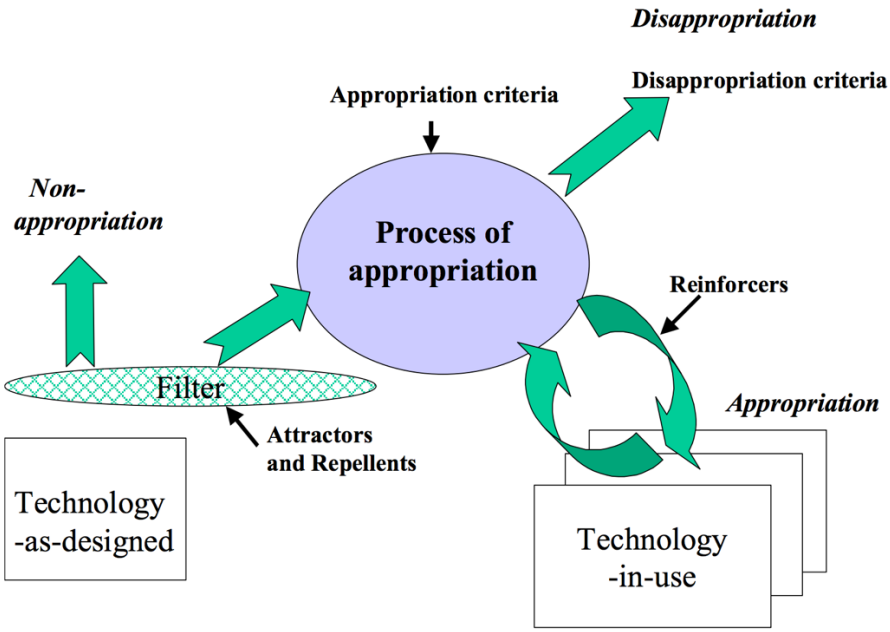

Figure 2. The technology appropriation model.

Understanding ICT use in secondary school students' formal and informal learning experiences calls for an understanding of the process of acquiring ICT skills in contextually relevant ways. One framework that attempts to do that is the Technology Appropriation Model (Carroll et al., 2001) as represented in *Figure 2*. The technology appropriation model. This framework posits that the interaction between technology and the social world plays a central role in how technologies are adopted or disregarded. The more prominent and widely used theory, diffusion of innovation theory (Rogers, 1995), maintains the same position; however, it does not seem to account for the reshaping of the innovation that occurs in the process of technology adoption. The Technology Appropriation Model refers to this reshaping as a process of appropriation. Based on constructionist theories, the theory defines appropriation as "the 'unpacking' of the innovation into its constituent parts or functions and then customising the innovation so

that the user has transformed the shape and uses of the innovation as supplied" (Carroll et al., 2001, p. 4).

In the case of Ethiopia, it seems likely that unpacking may be, to some extent, facilitated by technical and infrastructural limitations. Limited access to ICTs and telecommunication services means students are constrained and need to be selective in their use and time investments (Tibebu, Bandyopadhyay, & Negash, 2009). It is not difficult to imagine that some features of the target technology may remain unexplored and unused because learners do not know the features exist or because the services are unavailable. By applying sociocultural learning theory and the technology appropriation framework, this research will attempt to understand how, why and in what contexts learners choose and use ICTs in their learning lives.

Methodological Implications

What unites *learning lives*, *law of amplification,* and *technology appropriation theories,* is their advocacy of the need to closely examine technology use in context. A learning lives approach, for example, underlines the need to consider the learners' lives in its totality. From a methodological standpoint, this approach advocates and allows for deeper analysis of learners' intent, technology use and production of digital artifacts as well as the more traditional analyses of observations and interviews that are used in qualitative research.

Similarly, technology appropriation theories and the law of amplification emphasize the need to account for societal needs, norms, expectations and aspirations. These societal and individual tendencies are best understood through qualitative enquiry because, as Creswell (1998) points out, qualitative enquiry is "a process of understanding based on distinct methodological traditions of inquiry that explore a social or human

problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting" (p. 15). For this reason, qualitative methodology was used in this study to investigate the use of ICT in Ethiopian high school students' lives and how, why and in what contexts they choose and use ICTs in their learning lives. Further discussion of the relevance of qualitative methodology is presented in chapter four along with a presentation of the research methods used in this study.

CHAPTER FOUR

Methodology

This research sought to examine how students in a developing country such as Ethiopia use ICTs in their learning lives and how social contexts influence students' ICT use for learning purposes. To reiterate, the research questions guiding this study are:

1. How do secondary school students in Ethiopia use ICTs in their learning lives?
2. In what ways do social contexts influence Ethiopian students' ICT use within personal, social and educational spaces?

Given this purpose, the nature of the research questions as well as the relevant literature outlined in chapters two and three of this dissertation, an interpretive paradigm was the logical choice to methodologically guide this qualitative case study using a systematic approach.

In this chapter I describe the rationale for why interpretive methodology was used and explain how decisions about data collection and data analysis were made. I also describe the research setting and how research participants were sampled and will then discuss my role as a researcher. I describe how I addressed questions of rigor and quality (Patton, 2015). I also discuss trustworthiness, triangulation and member checking in detail (Merriam, 2009). Finally, I present how ethical issues that arose during the data collection process were addressed.

Research Paradigm

Van Maanen (1979) describes qualitative research as, "an umbrella term covering an array of interpretive techniques which seek to describe, decode, translate, and

otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomenon in the social world" (p. 520). In other words, qualitative research is characterized by its focus on meaning making, framing of the researcher as primary instrument, emphasis on inductive process, and the production of thick description. As a result, the interpretive researcher is intimately involved in active, "sustained and intensive experience with participants" (Van Maanen, 1957, p. 187).

Yin (2008) states that there are at least two characters that distinguish case study from other types of research methods. The first is that case studies "investigate a contemporary phenomenon in depth and within … real-life context[s]" (p. 53). Second, case studies "cope with the technically distinctive situations in which there will be many more variables of interest than data points, and one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion" (p. 54). To say it differently, case study is especially useful when employed to understand natural phenomenon that are closely tied to the context in which they are occurring by utilizing multiple sources of data to understand a phenomenon and its relationship with the context in which it is occurring.

Like many other qualitative research methods, researchers conducting interpretive case studies need to make clear and communicate the researcher's role in order to establish trustworthiness (Creswell, 2014). The researcher has an obligation to communicate or reveal ethical, strategic and personal issues for increased trustworthiness of the study being conducted (Locke, Spirduso, & Silverman, 2013). Keeping these concerns in mind, Creswell (2014) says qualitative researchers need to be cognizant of potential biases. He reminds researchers to explicitly identify reflexively their biases,

values and personal background, such as gender, history, culture and socioeconomic status that shape their interpretations formed during a study. In addition, gaining entry to a research site and the ethical issues that might arise are also elements of the researcher's role (p.187).

Concerns of trustworthiness will be raised and discussed throughout this chapter. I will reflexively discuss my own subjectivity, values, and personal background that shape my interpretations, as I continually did so while conducting the study. I will discuss qualitative strategies I employed in order increase credibility of my findings.

Entry into Research

This dissertation sought to conduct a qualitative multiple-case study in two high schools; one public (School A) the other private (School B). Entry into School B did not pose many challenges. This may be because private schools in Addis Ababa are typically owned by individuals; therefore, gaining access to them is less bureaucratic compared to public schools. I sent a letter to the school in early 2014 requesting informed consent to conduct the research study. The school returned their signed consent letter within one week of receiving the letter.

As for the public school, my initial correspondence with officials working at the Kefle Ketema (**ክፍለ ከተማ**) or sub-city began in late 2013 prior to receiving IRB approval for the study. It was my belief that I would encounter political and bureaucratic roadblocks that might either prolong the possibility of getting access or hinder me from conducting research in government high schools. Therefore, I sought to understand what I would need to write a proposal that closely resembled the context in which the study was going to occur. The Kefle Ketema was unable to shed light on steps that were necessary to conduct the study.

Armed with a letter of informed consent, I directly approached school officials to allow me to conduct the study at the school. The school in turn directed me to the Kefle Ketema. However, the Kefle Ketema's leadership remained unavailable for multiple months due to ongoing training and frequent meetings. Finally, after two months, the Kifle Ketema informed me that I could obtain permission directly from the school.

The school was informed of the Kifle Ketema's decision, at which point the school's director, who was three months away from retiring, approved the study with his signed informed consent. When I arrived at the school in mid–2014, a new director had been appointed. The new director agreed to honor the prior signed consent and made arrangements to assign one person from his team to provide support and to make the initial contact with students and teachers.

Research Participants

I employed a purposeful sampling strategy (Patton, 2015) to select participants for the study. A critical consideration that led to the formulation of the participant inclusion criteria listed below was the desire to select non-typical cases. It should also be noted that individual students in two different schools are the unit of analysis for this multiple-case study. Stake (1995) notes, "the real business of case study is particularization, not generalization … there is emphasis on the uniqueness, and that implies knowledge of others that the case is different from, but the first emphasis is on understanding the case itself" (p. 8). However, a focus on particularization does not mean the researcher is precluded from making generalizations (Stake, 1995).

As stated at the outset, what this study seeks to understand is the role that relatively new and unequally distributed digital technologies are playing in students' learning lives. The unequal nature of distribution of these technologies led to recruiting

research participants whose ICT use patterns are non-typical, as opposed to the typical case, in which hundreds of thousands of students in high schools across Ethiopia have little or no access the internet.

As shown in *Figure 3,* to be included in the study, participants met the following criteria:

1. Must be high school students in grade 11
2. Must own an internet-connected personal computer or mobile device, and
3. Must use the internet on their personal computers/mobile devices at least three hours a week.

School officials made the initial contact with students in both schools. Students were informed of the study and made aware about their rights to leave the classroom if they were uninterested in participating in the study. The school officials invited me to the classroom to further explain the purpose of my research and to inform them of their rights. Participant consent forms were distributed for students to read, and if they agreed, to sign the forms. Since there was limited time, students at both schools did not complete the survey on the same day.

I contacted the homeroom teachers to learn if there was a way to assign random numbers to students in order for them to avoid writing identifying information, such as names, on the survey. At School A, students already had "roster numbers" associated with their names. These numbers are generated anew every year from an alphabetized student list, which, I was assured, changes from one year to the next. These numbers are typically used to monitor student attendance.

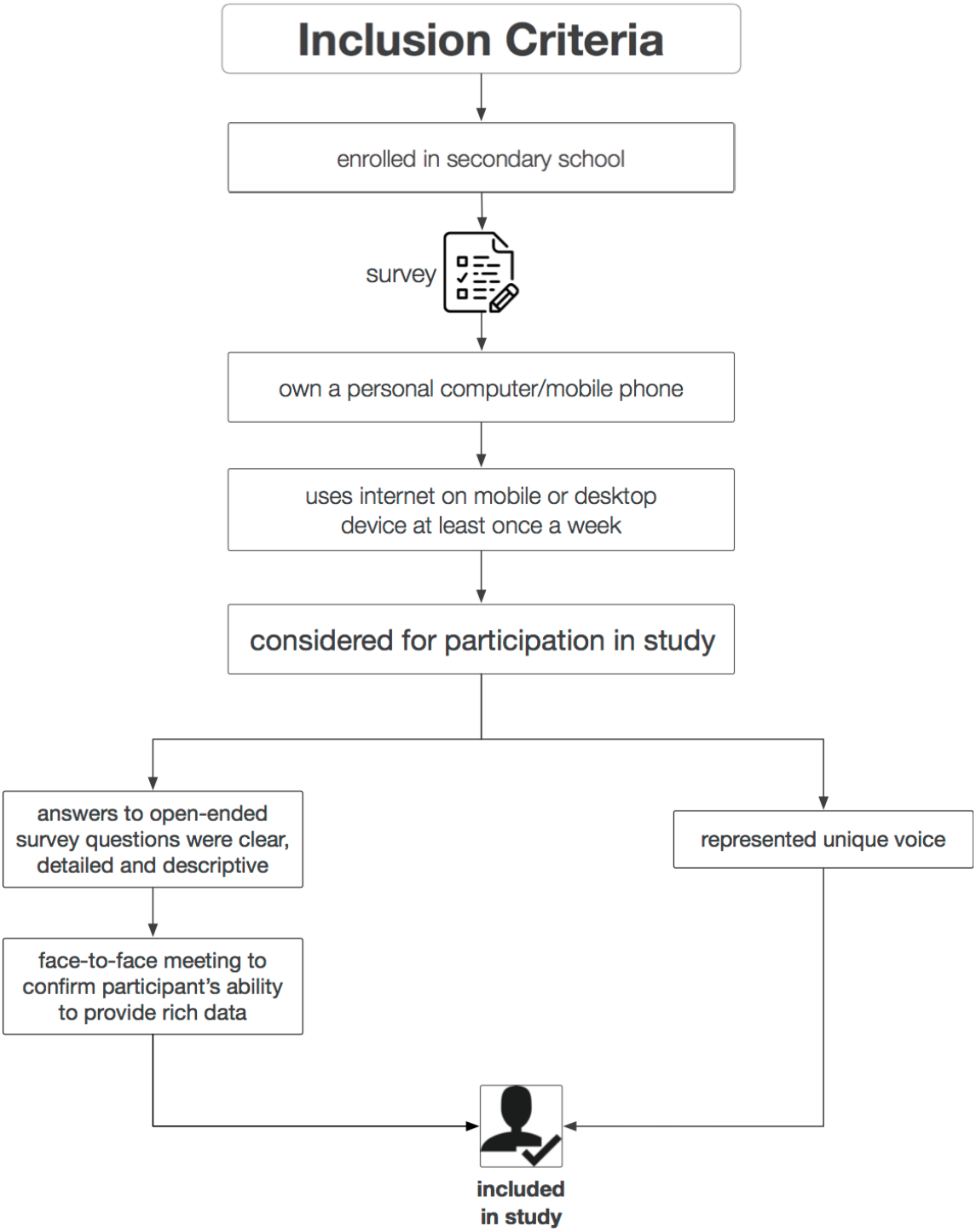

Figure 3. Inclusion criteria used in the systematic approach to purposeful sampling for participant selection.

Students at School B did not have "roster numbers," therefore the assistant director randomly assigned numbers to them. He then asked each one of the students to

record their newly-assigned numbers on the survey that was administered minutes later. During survey collection, the assistant director double-checked to see if students wrote the correct roster number on the survey. He proceeded to give me the roster containing student names with corresponding roster numbers, but I declined citing ethical concerns and research protocol laid out by the IRB, which dictated that the initial selection be as blind as possible. This was particularly important as there were students who lived in my childhood neighborhood, where I still have connection.

At School A, eight students that met the inclusion criteria emerged as a result of the survey analysis. To narrow the number of participants down to two, another layer of selection criteria had to be implemented. I sought participants who were articulate and descriptive in their responses to the open-ended survey questions. This narrowed the number of potential participants down to four males. At that point I met with each of the candidate-participants to verify some of the information they provided in their survey responses. During our meeting I also made notes about the candidate-participants' communication skills and potential to provide rich data, because qualitative investigation relies heavily on the richness of data participants will provide (Merriam, 2009). Therefore, it was critically important to recruit participants who can communicate clearly and explain their intents, attitudes and actions.

I employed the same participant selection procedure in School B. There was one important difference, however. When the random identification numbers assigned to students were matched with names of the selected students, it became clear that all but one of the six students were male. I decided to automatically enroll the one female student in the study, and then screened the remaining five male students to enroll as a

second participant from School B. Automatically including the female student was important, because to conduct the study without female students' voice would have been an unjustifiable omission, especially considering female students represented more than half of the participant population in both schools (see Table 1). It would have robbed the study of a critically important perspective. The four participants were compensated $25 or 500ETB for their participation.

Table 1

Male vs. Female Distribution in School A and School B Combined

Participant Sex	Number
Male	35 (49.30%)
Female	36 (50.70%)

Data Collection

Data collection methods were determined by the two main research questions, and sub-questions (see Table 1). Following the use of surveys, the main data sources for this study were then generated from individual interviews with participants and their parents/guardians. Additional sources of data such as observation, photographs taken during observations, field notes and researcher journal were used for triangulation. Triangulation was achieved in this research through multiple sources of data or methods (Merriam, 2009).

As mentioned above, two high schools in Addis Ababa, Ethiopia were selected based on availability of access to schools. Study participants, who fulfilled the inclusion

criteria detailed earlier, were invited to participate in the research through formal gatekeepers. Peticca-Harris, deGama, and Elias (2016) refer to formal gatekeepers as individuals, who "enable access, monitor, and control the activities of the researcher throughout the data collection process" (p. 3). Gatekeepers in this study refer particularly to school administrators, who agreed to allow me to conduct the research in their respective schools.

Table 2

Connection Between Research Questions and Data

Main Research Questions	Sub-Questions	Data Source(s)
How do students in a developing country such as Ethiopia use ICTs within their formal and informal learning?	a. What are the prime reasons for students to use ICTs in their learning lives?	- Individual participant interview
	b. What do students consider to be the perceived benefits of ICTs for learning?	- Individual participant interview
	c. In what ways do access to ICTs shape students' learning lives?	- Individual participant interviews - Field Notes
In what ways do social contexts influence students' ICT use for formal and informal learning?	a. What shapes students' personal objectives to use ICTs for formal and informal learning experiences?	- Individual participant interview - Field Notes
	b. How does students' ICT uses reflect local, institutional and societal contexts?	- School official semi-structured interviews - Parent semi-structured interviews

Participant Survey

The purpose of the student survey was to help with participant selection. Although I expected students to understand the English language and to be able to

communicate effectively with it, all survey documents were translated and administered in Amharic (see Appendix E).

Two interviewees were selected from each school based on a thorough analysis of survey responses provided by students. The participant selection process started when I collaborated with gatekeepers to invite students to complete a paper survey.

The surveys were manually read to find students who met the participant inclusion criteria. Then I compiled the names of those students who met the criteria and proceeded to read participants' answers to the open ended questions. The respondents whose responses were clear, detailed and descriptive were then asked to meet with me to determine how well they communicate their thoughts orally. Qualitative research relies heavily on the richness of data participants will provide; therefore, it was important that I systematically evaluate their communication skills and potential to provide rich data.

Overall, the survey showed that both schools had a high number of students who owned mobile phones (see Table 3). In fact, there were only three students who did not own mobile phones.

Table 3

ICT Ownership Distribution in School A and School B Combined

Device Types	Yes	No	Total
Personal Computer	27 (44.4%)	34 (56%)	61
Mobile Phone	64 (96%)	3 (4%)	67
Game Console	12 (22%)	42 (78%)	54
iPod (or other mp3 players)	13 (24%)	42 (76%)	55
Smartphone (such as iPhone, Android Phones, Blackberry or other)	20 (33%)	40 (67%)	60

Individual Participant Interviews

To guide the interviews, two semistructured interview protocols were developed using Creswell's (2007) recommendation for crafting qualitative research interview protocol. Semi-structured interviews were especially relevant to this qualitative case study, because semistructured interviews, as Merriam (2009) notes, "allow the researcher to respond to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic" (p. 90). I also chose semistructured interviews because of a recognition that my understanding of the case will evolve and change as I interact with the participants, and the place and space they occupy.

The first version was developed for students and it addressed issues related to students' ICT usage habits and possible influences on their usage patterns (see Appendix E). The second version was developed for parents/guardians and it covered topics such as parental expectations of ICT use, what their initial reasons were to purchase ICTs, especially since the total ICT ownership and operation costs are so high (see Appendix I).

Interviews ranged in duration from 45 minutes to 120 minutes. These semi-structured interviews occurred in person. Two parents/guardians were interviewed at their residences and two others were interviewed outside their home at two different restaurants, where the noise level was acceptable. Student interviews occurred in four different places. Students chose where they would like to be interviewed and I met them at their preferred location. In one instance the interview needed to be moved due to noise levels that exceeded expectations in order to ensure that communication exchange was comfortable and clear and interview recordings were clearly documented.

Observations

I visited the schools for the first time on weekends. Having arrived in Addis Ababa on Saturday night, I felt it would be best to immediately visit both schools and their surroundings the next day in order to reacquaint and familiarize myself with the context. In addition, because Sunday is a non-school day I suspected I would have a better sense of the spaces students occupy at the schools. The last time I saw both neighborhoods of the schools was five years prior.

I had initially proposed to observe three ICT class periods; however, at School A it became impossible to observe even a single class session due to teacher absenteeism. The teacher who was teaching the class I sought to observe arrived at the school several hours after the class period ended. The teacher's habitual tardiness continued for the duration of two weeks in which I was at the school. I observed a single ICT lab period after the school administrators' intervened to make sure the teacher attended the period.

Since observing additional ICT periods became next to impossible at School A, I decided to observe two periods during which students in groups of four or five acted in a play they co-wrote and directed. I attended two class periods and watched a total of four plays. The purpose of seeing the play was to observe to what extent ICTs were incorporated as props in the plays and if so, what social, educational, political, or economic values were being assigned to them.

At School B, I was informed that it would be impossible to observe ICT classes because the teacher was traveling abroad, and that students were being taught by one of the school's relatives, who the school administrative said were knowledgeable about computers. Regardless of their confidence in the replacement teacher, the administrators did not allow access to ICT classes. As a result, I was confronted with a dilemma

regarding whether or not I should refrain from including my observation at School A as a source of data. Ultimately, I was convinced that the insights that were gained from data collected from School A were too illuminating and valuable to discarded.

In addition to observing class periods, I observed flag ceremonies that occurred every morning. During these flag ceremonies the *mini-media*, a student operated morning broadcasts, played popular foreign songs and broadcasted school announcements. I arrived at the schools early in the morning to observe research participants' ICT use as well as their interactions with others before school, in between classes and after school. To aid my observation I used a slightly modified version of Creswell's (2014) observation protocol (see Appendix F).

I also took photos during my observation. The photos helped me document and capture existing conditions at the school and its surrounding. The photos served as important artifacts to complement my observations and field notes, and they came to represent important findings as a result of data analysis.

Field Notes, Researcher Journal and Role of Researcher

In order to capture and process reactions, expectations, assumptions and biases, I kept detailed field notes. The field notes and researcher journal also served as a space to document my role as a qualitative researcher. Glesne and Peshkin (1992) argue that the researcher in qualitative research is the primary instrument through which the research is conducted. This recognition compelled me to be aware of my own histories and experiences. To that end, I discuss how the connections and disconnections between myself, the research site and the larger context in which the research occurred.

I attended School A as a high school student. The school has changed significantly over the years including its name, teachers, administrative staff, curriculum

and physical attributes. The surrounding area of the school has also changed. The vast and open field across the school has transformed into a collection of large and tall buildings. The private residential houses that were surrounding the school were replaced by office buildings, government offices, private schools, and embassies. There was little that was familiar when I entered the school compound. Some of the older buildings seemed to have been neglected. They were dilapidated. Coincidentally, during the second week of my visit to the school, brick walls built around the school compound collapsed overnight.

Although I was a student in School A many years ago, the new school staff and the physical changes inside and outside of the school made it far less familiar than I had expected. I used the field notes to document the physical, educational, and political changes, and my relationship with the space, where I spent four years of my life as a high school student. According to Merriam (2009), field notes are important in interpretive research, because they serve as an "introspective record" of the researcher's experience in the field. I began recording my expectations and potential roadblocks several months prior to traveling to Addis Ababa.

The field notes provided an additional source of data, and also informed data analysis. For example, many months before I traveled to the research site, I made a reflective note, "I continue to worry about whether I will be able to collect enough data while I'm in Ethiopia. There are two fronts: First, … Second, I may forget to collect important data only to realize or recognize it after I come back here." Reflecting on the process of my data collection led to better planning and preparedness. It also lent to

researcher reflexivity, which Denzin and Lincoln (2011) contend is necessary for credibility of the research findings.

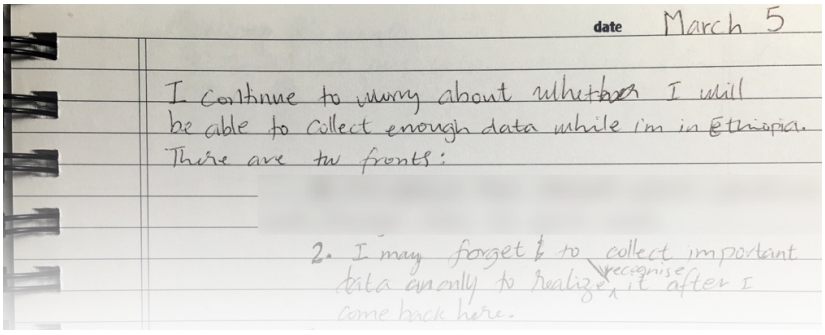

Figure 4. When home is no longer home: on my realizing how Ethiopia, where I am from, has drastically changed.

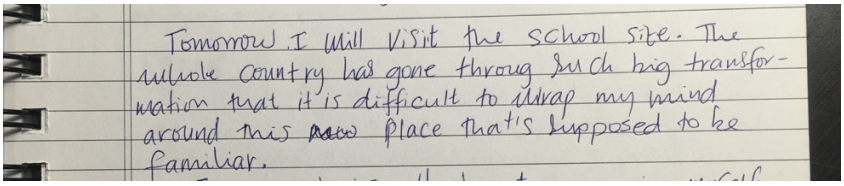

Figure 5. When home is no longer home: on my realizing how Ethiopia, where I am from, has drastically changed.

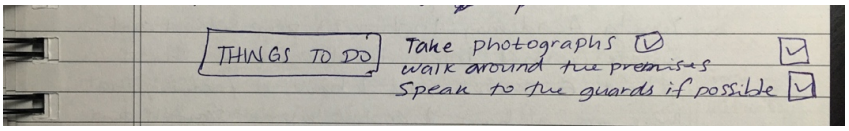

Figure 6. To-do list for pre-entry observation at the research site

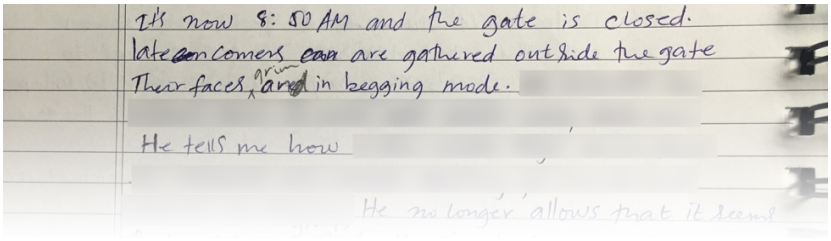

Figure 7. Recording my observation during one morning.

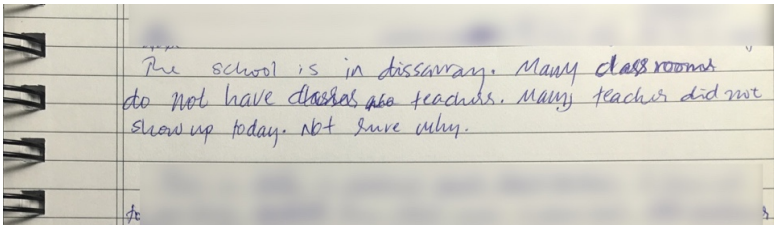

Figure 8. Another reflection noting some of the problems I observed at the school.

My journal entries informed future decisions about data collection and what was necessary to dig deeper into with further data collection. As data collection was iteratively conducted in tandem with data analysis, the nature of entries transformed. For example, my journal was initially used to record potential challenges I may face upon entering the research site (see Figure 4). Prior to data collection, I recorded my own feelings about the research context (see Figure 5), and later I used my journal to keep track of research-related activities I wanted to complete, such as taking photographs, etc. (see Figure 6). Then the journal became a place where I wrote my observations. My observation included flag ceremonies, teacher's interactions in the staff room, ICT period student-to-student, student-to-teacher, student-to-computer interactions (see Figures 7 and 8). Later, I began using the journal as a place where I reflected on the collected data (see Figure 9).

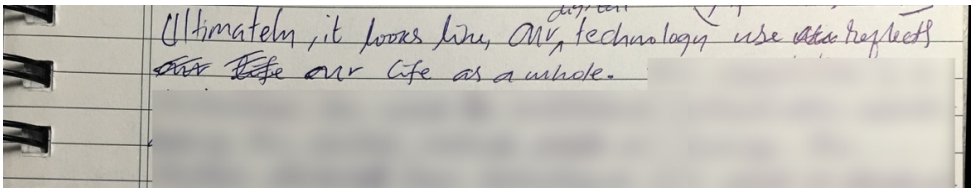

Figure 9. Reflection on data that was already collected and continuously analyzed.

Student Journal Entries

Participants recorded and reflected on their daily ICT uses and experiences for two weeks. This method was sought in order to understand how ICTs are integrated in participants' lives and what contributions ICTs make in their learning lives. I provided participants with student journal protocol (see Appendix G), stressing the importance of using the journal as a place of reflection and not just a space to report events that transpired during the day.

School observation and students' journal writing occurred during the same time period. The following are two examples from students' journals. I present these journal entries to provide a sense of how participants write their entries including their word choice and language preferences. Most importantly I present these entries, especially those written mostly in Amharic, to showcase the approach I took to translate the entries.

Example one:

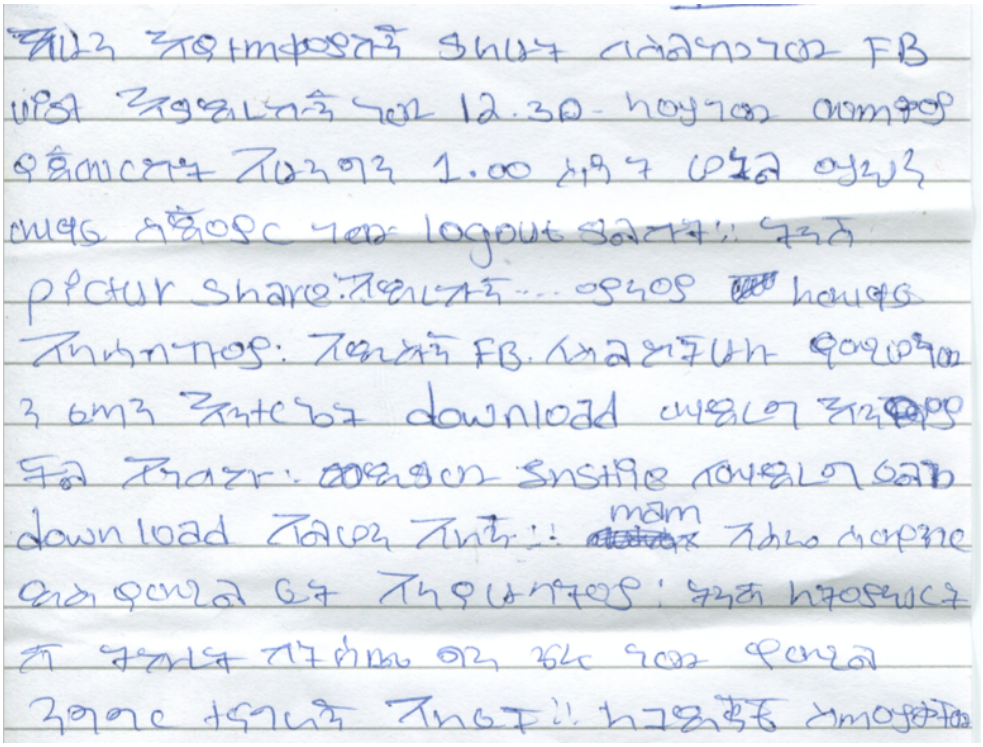

Figure 10. One of Hanna's journal entries.

(Transcription of the entry)

> **አሁን በመጠቀም ላይ ያለሁት በስልኬ ነው[።] FB [unintelligible] አያደረኩኝ ነው 12:30 ላይ ነው መጠቀም የጀመርኩት። አሁን ግን 1:00 ሰዓት ሆኗል[።] ይሄን መፃፍ ሰጀምር ነው logout ያልኩት[።] ትንሽ picture share ... ምንም ለመፃፍ አላሰብኩም[።] አዲሱን FB ለስልኮች ሁሉ የሚሆነውን ፈጣን ኢንተርኔት download አንደምችል አነበብኩ: ወዲያው install ለማድረግ ፈልጌ download አልሆን አለኝ። mam, አስሬ ስሞክር ደስ የሚል ፊት አላየሁባትም: ትንሽ ለትምህርትሽ ትኩረት ብትሰጪ ግን ጥሩ ነው የሚል ንግግር ተናግራኝ አለፈች።**

(Translation of the entry)

> I'm using my phone right now. I'm posting on Facebook. I logged out from Facebook when I began writing this. I started using Facebook 12:30. But it is now 1 o'clock. I shared some photos and so far I'm not planning to post anything. I tried to download the new Facebook that is supposed to work on all mobile phones, but I couldn't download it. I tried repeatedly, however mom did not appreciate that I was trying so much. She commented saying something like "you better focus on your studies"

Example two:

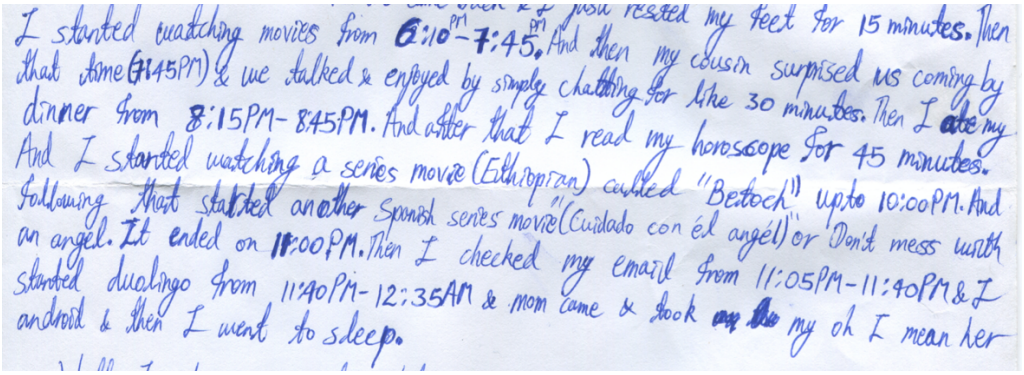

Figure 11. One of Yaqob's journal entries.

> I started watching movies from 6:10PM – 7:45. And then my cousin surprised us coming by dinner from 8:15-8:45PM. And after that I read my horoscope for 45 minutes. And I started watching a series movie (Ethiopian) called "betoch" upto 10:00PM. And following that started another Spanish series movie "(Cuidado con él angél)" or Don't mess with an angel. It ended on 11:00PM. Then I checked my email from 11:05PM-11:40PM & I started Duolingo from 11:40PM – 12:35AM & mom came & took my, oh I mean her android & then I went to sleep.

Ethical Considerations

Informed Consent

Informed consent is an important ethical consideration in the research process (Patton, 2015). It was necessary to obtain informed consent from each school where I collected data, from each of the student participants, as well as each participant's

parent/guardian. I obtained informed consent from each school before I began the study through the school staff that was assigned to support me. In addition, because most students I intended to enroll in this study were under the age of 18, I acquired informed consent from parents/guardians as well as the students themselves before embarking on the study (see Appendix B).

Informed consent documentation was written in both English and Amharic, which is the working language of Addis Ababa City. This documentation stated that the names of participants, the school, the teachers, and the administrative staff would not be used in published reports. Instead, identification codes would be used on all records. It also explained that data from this study would be kept in separate locked filing cabinets, and all digital files would be kept securely in an encrypted computer to which only I have access. Participants were informed that the aim of the study was to help researchers and policy makers understand how ICTs are used to support students' learning lives and how social influences shape their use. Additionally, it was made clear to participants that there were no known risks associated with participating in this study, and that there would not be invasion of privacy in any manner. Benefits of the study were also explained as the findings may improve how schools and teachers approach ICT integration in schools.

Other Ethical Concerns

There were two ethically challenging issues that became salient as I began collecting data. First, I encountered some pressure from school officials on who I should enroll as participants in the research and why. The officials had a list of students, who they believed deserved to be enrolled in the study, so they can receive the token of appreciation I had promised to give to research participants. Although I empathized with

the school officials, it was important that I decline their offer because I had an ethical responsibility as a researcher to ensure that the participants who will be selected to provide the richest data were chosen according to the practice of purposeful sampling.

Second, as I began interviewing participants I became concerned about the political nature of some of the topics they were discussing. Although the recordings and other documentation I was collecting were saved on my computer and encrypted, I felt it was important to steer participants away from topics that were politically charged in nature. I made this decision to protect participants from any risks that may come as a result of the Ethiopian government's attempt to seize research data. For example, when discussing the Plasma Television program at the school, I asked participants to avoid inserting political comments into their discussions as much as possible.

Finally, in one of the research sites, I observed regular teacher absenteeism and chronic disengagement among teachers. I observed a group of instructors who consistently failed to arrive at the school on time to open computer laboratories, at times keeping the computer labs closed until noon. Further, I observed what I considered to be a high level of indifference. I witnessed carelessness that amounted to gross negligence in the way the computer lab was being managed. I struggled with whether I should communicate these glaring defects or maintain my distance. I ultimately decided it was in the students' and the schools' best interest to communicate high-level, preliminary findings without singling out individual teachers at the schools.

Data Analysis

Stake (1995) observed that "there is no particular moment when data analysis begins" (p.71). Similarly, Maxwell (2013) and Merriam (2009) assert that in qualitative research data analysis goes hand-in-hand with data collection as an iterative rather than a

linear process. Indeed, in this study data analysis commenced as it were being collected. I began recording observations and reflections as soon as I entered the research site. I listened to recorded interviews on the same day to bolster notes that were taken during the interview. As soon as individual interviews were transcribed, I read and reread them line-by-line. Eventually all of the data that were collected were translated into English as needed.

The data were analyzed in two stages. First, within case analysis was conducted to (1) provide detailed description of each case (2) to create categories, and (3) to identify themes within them (Stake, 1995). During the second stage, cross-case analysis (Stake, 1995) was conducted to identify areas of similarities and divergence among participants. Cross-case analysis is a process of analysis where the researcher seeks unifying description of phenomenon, which may lead to the formulation of categories, themes or "typologies that conceptualize the data from all the cases" (Merriam, 2009, p. 204).

The six stages of inductive thematic analysis proposed by Braun and Clarke (2006) were used during both stages. The six step-by-step guidelines include:

1. familiarizing oneself with the data
2. generating initial codes
3. reading throughout each transcript to immerse in the data
4. reviewing themes
5. defining and naming themes, and
6. producing the report

During the first phase, I actively read and reread the collected data to understand the depth and breadth of the content. I transcribed participant interviews and had them translated by a professional translation firm as needed.

I searched for meanings and patterns in the transcribed interviews, and put together a list of meaningful concepts and similarities in the data that related to the research questions and could eventually become codes, which Braun and Clarke (2006) refer to as "candidate codes". In the second phase, initial codes were produced based on meaningful pieces, phrases and concepts generated in the first phase. These initial codes were then analyzed for potential themes or patterns, and in this process I examined context and relationships among codes. Phase three commenced as available data was coded and organized. During this phase I also identified and arranged the codes into one or more broader themes.

In phase four candidate themes were further refined using Patton's (2015) internal homogeneity and external heterogeneity criteria. In this process, I actively engaged in two activities that included (1) checking for coherence among extracts in each theme (i.e. internal homogeneity) and (2) making sure the themes accurately reflected the collected data (i.e. external heterogeneity). These dual-criteria were essential in identifying themes that may need to collapse into a single one and those that may need to be separated into two or more themes.

In phase five, the themes were solidified by further defining, refining, and naming the themes. During the sixth and final phase of producing the research report, a coherent and consistent narrative was created using data extracts. In this process, I also attempted to present a "concise, coherent, logical, non- repetitive, and interesting account of the

story the data tell – within and across themes … [by] providing sufficient evidence of the themes within the data" (Braun & Clarke, 2006, p. 23).

Looking Ahead

In the following four chapters, I present a detailed account of the participants learning lives. Participants are identified by a pseudonym they themselves chose. Two of the participants chose last names, while two others did not. For consistency and clarity, I have assigned each participant last name pseudonyms.

The discussions in chapters five through eight are divided into five sub-sections based on five major themes that were systematically identified through data analysis:

1. Snapshots of participants learning lives
2. Lives consumed by National Exams
3. ICTs as a means to an end
4. Self-Initiated learning practices
5. Dimensions of ICT use
    a. School mandated ICT uses
    b. Socially mandated ICT uses

Erstad and Sefton-Green (2013) assert the impossibility of trying to understand learning lives without also understanding the social contexts in which individuals' interests and learning priorities are embedded. For this reason, in each of the following four chapters, based on inductive analysis of data collected about the participants, I will systematically present a detailed account of the participants' background, their learning priorities, their views on perceived benefits of ICTs for learning, and internal and external forces that influence their learning efforts based on the five major themes that were generated from the data.

CHAPTER FIVE

Daniel Menelik

Daniel is 16 and attends School B. Like all the participants in this study he is in grade 11, and lives with his parents. His mother, a stay-at-home mom, never attended school and cannot read or write in either of the two languages she speaks. His father, an educated, federal-judge-turned-business-man, spends the majority of his time, including many nights, busy at work. These circumstances have left Mrs. Menelik as the sole decision maker in regards to Daniel's schooling and ICT use at home.

Mrs. Menelik says, "his father is extremely busy, and tired when he comes home, so [he] cannot be bothered by day-to-day decisions about Daniel." In describing Mr. Menelik, she uses the pronoun "**አሳቸው**" (esachew), a pronoun typically reserved for respectfully addressing individuals in positions of power, or elderly individuals. It is atypical for married couples living in the capital city to address each other as such. When I asked Daniel why his mother addressed his father with such a pronoun, he indicated that it was probably because of her roots. She grew up in a rural part of the country where wives addressed and referred to their husbands with the more respectful pronoun. This family and social dynamic in the home would come to explain some of Daniel's ICT use patterns, and his family's decision making process regarding his ICT use.

Although Daniel's mother never attended school, she makes the majority of the decisions regarding Daniel's schooling. For example, when Daniel wanted to leave the private school he was attending, and join the usually disfavored public school system, she was the one who helped him transfer to the new school. She cannot remember why she felt compelled to help Daniel make the transfer, but she guesses it might have something

to do with wanting him to experience what it was like to attend a public school. Daniel's insistence also made her decision significantly easier. And later, after a year of attending public school and failing his classes, it was her that helped him move back to School B where I met him.

As an elder of two school-aged children living at home, Daniel experiences pressure from his parents and older siblings, three of whom live abroad, to do well in school so that he sets a good example to his youngest siblings. One of his elder sisters, who is in her late 20s and has a full-time job, also lives at home. According to Mrs. Menelik, Martha is often "the first to spot warning signs" regarding Daniel's computer "misuse." "[Martha] has told me many times to check on him while he uses computers, because she thinks he may be using it for wrong purposes," says Mrs. Menelik. I would later learn by "wrong purposes," she was referring to adult entertainment such as pornography.

Snapshot of Daniel's Learning Life

Daniel has no problem admitting to watching adult content. He remembers spending nearly all of his monthly 3GB data allotment watching adult content online and YouTube videos online. He can no longer watch adult content online, because Ethio-Telecom, the sole internet Service Provider in Ethiopia, actively blocks websites containing adult content. When I brought up the cultural taboo associated with adult content, he dismissed it saying it is hypocritical for anyone in his community to hold that position.

> Our culture is such that we are disallowed to speak, let alone participate in, all of these taboo activities, and yet we have so many people dying of AIDS all around us, because we've decided sex is a taboo subject. As far

> as I'm concerned, adult content is nothing more than an entertainment. To me it's no different from learning a new card trick on YouTube. You grew up here. You know how it is. There are no entertainment centers or gyms. Have you seen the youth centers? They are a joke.[2]

His conceptions of what should or shouldn't be considered taboo mainly grew out of conversations with his friends at school and abroad. Typically, their conversations occur face-to-face or via Facebook chats. In positioning himself against what he considers to be a sanctimonious societal standard, he constantly finds himself looking for reasons to reject what he considers unreasonable limits imposed on him by people whose knowledge of the world is less sophisticated and often under informed. However, he seems to make exceptions depending on who is relaying the information, even when the information presented to him is verifiably inaccurate. For example, more recently his school brought two medical professionals Dr. Seyoum and Sister Saba, who may also be described as Christian fundamentalists, to explain the "detrimental and irreversible" effects of pornography and homosexuality on the human body and mind. According to their presentation homosexual individuals regularly visit the hospital to remove objects such as bottles and snakes from their intestines, because of their deviant sexual practices. The presentation was delivered as part of a campaign against homosexuality funded by religious institutions.

The extreme nature of Daniel's retelling or their presentation compelled me to conduct further research online. Daniel was in fact correct. The presenters have numerous YouTube videos online where they make those same claims. One exemplary video may be found at https://youtu.be/aG2jAV2RLRI (see Figures Figure 9. *Reflection on data that*

[2] Many sub-cities in Addis Ababa have opened youth centers equipped with ICT centers and sporting equipment. However, they are still rare and often overcrowded.

*was already collected and continuously analyzed.*Figure 12. *A screenshot of a YouTube video showing Dr. Seyoum and Sister Saba* and Figure *13.* A screenshot of a YouTube video showing one of Dr. Seyoum's presentation slides that claim 33% of homosexuals as being pedophiles..

Figure 12. A screenshot of a YouTube video showing Dr. Seyoum and Sister Saba.

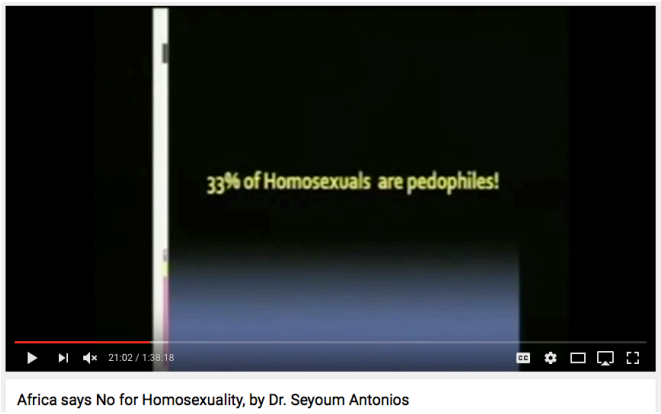

Figure 13. A screenshot of a YouTube video showing one of Dr. Seyoum's presentation slides that claim 33% of homosexuals as being pedophiles.

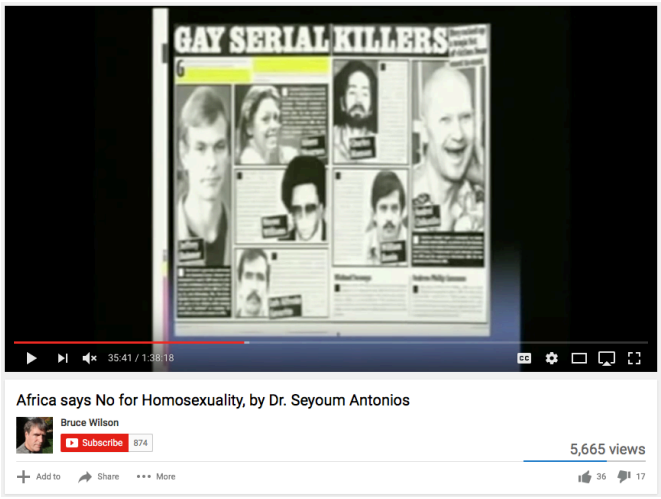

Figure 14. A screenshot of a YouTube video showing one of Dr. Seyoum's presentation slides showing "Gay Serial Killers."

Given the esteemed position doctors occupy in Ethiopia, Daniel was less sure how to reconcile their assertions with his own beliefs, especially about pornography. I observed that instead of challenging the doctors' opinions, especially regarding the manufactured health consequences of homosexuality, he seemed to lean toward acceptance of their narratives as facts. Given his access to the internet I was surprised to learn that he didn't take advantage of his access to learn and potentially challenge their opinions, especially regarding their claim regarding adult content consumption and its impact on one's health.

This was the first instance that signified Daniel's still forming conceptions of the value of the internet in his learning life. Daniel could have easily used his internet access to verify or challenge the information shared with him in the classroom, but he seems comfortable accepting their assertions as fact, because of the individuals' professional authority.

Even as he berates what he considers to be a hypocritical societal standard applied to sex and the entertainment built around it and defends (even justifies) his ICT use

habits, the irony is not lost on him. He realizes the internet and computer entered his life for exactly the opposite reasons. Namely, these tools were intended to help increase his morale, productivity, and ultimately support his educational endeavors; it was not intended to be a source of entertainment.

A Means to an End

Ms. Menelik says, "his father promised he would buy him a laptop computer if he passes 8th grade national exam with high scores." Daniel passed the exam and Mr. Menelik fulfilled his promise. Ms. Menelik recalls that Daniel was the top student in the entire school that year.[3]

There were other reasons for why the laptop was gifted to Daniel. One reason, according to Daniel, was that his parents were concerned for his safety because in the absence of a computer at home, he relied on computers at internet cafés. During this time, Daniel often returned home late in the evening, and his parents spent hours worrying for his safety. Daniel also believes the laptop purchase was a cost saving effort on his parents' part. In addition to spending money to access the internet at internet cafés, he needed to print copies of his internet research because he couldn't save files to a removable storage. One reason for that was that in an attempt to thwart computer viruses that typically come with customers' removable storage devices, internet cafés routinely disable optical drives and flash or portable device ports to combat computer viruses. Furthermore, even if he could save the files on a portable disk, there was no a way for him to use it at home because the Meneliks did not own a computer.

[3] When I checked with the school if her claims were accurate, it was indicated to me that that wasn't the case; but the school did confirm Daniel's test score was in the top 10 percent.

Mrs. Menelik, however, dismisses this claim. As far as she can remember the computer was merely a form of encouragement. “We weren’t concerned for his safety. We never assumed the internet research was taking him as long as it did. We knew he was wandering around in the neighborhood, and to make matters worse, a couple of our neighbors told us he was beginning to associate with vagabonds. We hoped to some extent that the computer would put a stop to that.” However, she reminds me, the primary objective of the laptop was to “motivate him to do better in school. That’s why his father bought him the computer.” Daniel knows this, too.

A Life Consumed by the Prospect of EHEEE

Daniel tells me he would do whatever it takes to “pass [he means score high on] the [EHEEE: Ethiopian higher education] entrance exam next year. Even if it means changing schools, which I might end up doing next year because [my school] doesn’t have as good a record as some of the other schools in the city that have high passing rates.” He goes on to list some of the more popular schools in the city he is considering.

Daniel is convinced his success in life depends on how well he does on the EHEEE. Grade 11 is a critical bridge to that goal. Like the majority of the participants I interviewed for this study he believes the concepts taught in grade 11 make up about half of the knowledge required to pass the EHEEE. In other words, grade 11 gives him the foundation he needs to perform well on the EHEEE, which will likely lead to getting assigned to a field that is high-paying. Better still, it will insure his attendance at Addis Ababa University, which is located in the capital city, Addis Ababa, where he currently resides. Scoring high on–not just passing–the EHEEE with high scores is critically important to him and many Ethiopian students if they want to join a public university. In

addition to dictating what they will study once they enter the university, it also influences which one of the public universities they will join.[4]

At this point in Daniel's learning life, knowledge acquisition is relevant only when it is directly connected to the EHEEE. His singular short-term objective is passing the EHEEE next year because he is convinced it is "a make or break event." Indeed, failing the EHEEE has high costs. He says, "If I don't make it next year and fail to score high on the entrance exam, I will either get assigned to study a field I have no passion for, or worse, I may never get admitted to a university unless my parents send me to a private college." His fear is not unfounded. The EHEEE is offered only once a year, and failing it presents difficult choices for students. Students who score low on the EHEEE may choose to attend a private university or college, where the tuition is high; making it inaccessible to many Ethiopians. Or they may retake the exam one year later by re-enrolling at a private secondary school.

Reflecting on his own ICT uses in and outside of the classroom, Daniel has come to view ICTs in his possession as obstructing his path to scoring high on the EHEEE. "I honestly don't think our [learning] culture is suited for technologies like these. Wealthy countries use these devices to create and innovate, while we use it for useless purposes." He adds, "It's not like I haven't tried to use the internet to learn new things. I have, but it's difficult to balance learning new things and keeping up with school work." In his out-of-school time Daniel is usually busy completing worksheets or preparing for tests that are typically conducted once every two weeks in hopes that the tests will get him and his classmates ready for the EHEEE.

[4] See chapter 2 for a broader discussion on the Ethiopian public education system.

Self-Initiated Learning Practices

Daniel doesn't seem to be familiar with educational resources that are offered for free online. It would seem reasonable to expect a student as focused as he is on scoring high on the EHEEE to at least know the availability of free tutorials online. When I bring up free resources on YouTube, Daniel seems to not know what I am referring to even after I explained it to him. Instead he discusses a free "Network Hacking" course he participated in months ago. He dropped the class because he could not afford to purchase the required equipment needed to continue participating. Therefore, it would appear that he is aware of the existence of free offerings online, which indicates the idea of free online courses is not alien to him.

In addition to the free "Network Hacking" class, Daniel claims to have learned some "magic" on YouTube. The purpose was to entertain his friends and family. The "magic" constitutes tricks and illusions that involve a deck of cards and an orange. Daniel says there are numerous videos on the topic. Indeed, currently searching YouTube for "Card Tricks" will produce about 907,000 results, and "Levitating Orange" returns about 6,970 results. Daniel says he has performed magic trick to his family at home, and to small groups of friends at school. Unfortunately for him, Mrs. Menelik doesn't seem to remember any one of the tricks he performed for the family.

Dimensions of ICT Use

School Mandated Uses and Non-Uses

Students are not allowed to use personal ICT devices at School B because, according to the assistant school administrator, they disrupt the teaching-learning process. To enforce this, the school conducts random or, as Daniel calls it, "surprise" searches. Because these searches are done regularly and because they take a long time to conduct,

the school limits each search to one floor. Doing so keeps the surprise fresh because a prolonged search gives students more time and resources to hide their devices. For example, they cannot give it to another student on a different floor.

Daniel tells me he does not take his portable devices to school. He has a good reason not to. In addition to forfeiting their personal devices for an entire school year, the school makes an example out of those who bring their personal devices to school. For instance, during one of the random searches, the assistant director told me, a student whose phone was seized during a random search contained adult material that the school administration found to be alarming enough to notify the student's parents. Furthermore, given the gap the school deliberately created between the internet, personal devices and the teaching-learning process, there is no space or opportunity for Daniel to use his personal devices in school.

The only time students are allowed to enter the computer lab is during "Information Communication Technology" period.[5] The school computer lab houses 25 computers. Even though I was unable to see the lab in person, Daniel confirmed the number of computers that were said to be available at the lab. One of the facts that stood out to me was that none of the computers in the computer lab are connected locally or to the internet. The rationale for the absence of connectivity is to shield students from inappropriate content on the internet. The decision to omit an ocean full of valuable information on the internet for the perceived benefit of shielding students from "inappropriate" content does not seem like a well-considered decision.

Daniel doesn't seem to know or care about the rationale for the absence of access to the internet at school. When I bring up the reason for why it is absent, he points to the

[5] Many of the individuals I spoke to in schools refer to ICT period simply as "IT."

bluntness of the decision but notes that he "does not get much from IT period at school" anyway. He cannot remember the last time he learned anything novel or of substance in his IT class.

Not all of the schools Daniel attended denied students of the ability to bring or use personal devices on school premises. In his previous school he regularly took his personal devices to school and used them to look up definitions of terms he did not know, especially during Biology period, where the terminologies "bore little resemblance to English words." Other times he used his access to find answers to "bonus" questions. Bonus questions were presented during Math period, and the questions were believed to be unsolvable unless a student already has a strong foundational knowledge about the specific Math topic being taught during that period. Daniel routinely used his device access to find solutions online and earn bonus marks. I asked Daniel if he was worried about the ethical implication of such uses in the class. He says,

> it was very advantageous to me. I was doing very badly at [the public school I was attending] that I didn't even think twice about earning those bonus points the way I did. My mom told me the school administrators were pressuring her to have me repeat grade 9. I needed to prove to her that I was capable, and would be ready to pass the EGSLCE exam in grade 10.

Daniel's general perception about the role of ICTs in school seems to be a negative one. Although he has used ICTs for constructive and useful school-related purposes, he often talks about the negative aspects such as classmates who are "addicted to Facebook" and use their ICT devices not for learning but to "get a fix for their Facebook addiction." I asked him if the students were potentially using their Facebook

access for learning purposes; for example, to post questions online and have a school-focused conversation. He admits it's possible, but says his observation tells him the opposite. "I don't think they are using it for learning at all. All they do is chat with friends and look at posts. I don't believe you can learn anything by distracting yourself and by playing hide and seek with the teachers. Maybe it's possible. I don't know."

Socially Mandated Uses and Non-Uses

Daniel's ICT use at home is under constant surveillance. Although Mrs. Menelik cannot tell the difference between two textual contents, she understands the difference between an image and a text, or a video and a text. She often pays Daniel a "surprise" visit to his room. Daniel's room is located outside of the main house, alongside a row of single rooms Daniel refers to as "service rooms." Daniel likes the distance between his room and the main house. Among other reasons, it gives him time to stage a scene of academic pursuit. He readies himself for the surprise visit by designating multiple windows containing PDF files with texts and science images; for instance, microscopic images of a human cell. Mrs. Menelik confirms this. She says she sometimes visits Daniel to make sure he is studying. "He shows me what he is reading. He says, look I am reading this and I am reading that." Perhaps her visits may deter Daniel from indulging in entertainment-focused activities or at least disrupt it for a short period of time. However, her visits do not seem to hold any value in helping Daniel focus on learning.

CHAPTER SIX

Hanna Markos

Hanna attends School A. She is older than most of her classmates, because she repeated two grades in elementary school. Hanna lives with her single mother in a rented house on the outskirts of Addis Ababa. Hanna does not remember her father because he left her and Ms. Genet, Hanna's mother, when she was a toddler. Ms. Genet is in her late 30s. She says she feels 15 years older than her actual age. She has led a difficult life riddled with poor health and worries about finances. All of the jobs she has worked were and continue to be low-wage that barely support her and Hanna. She says, "Hanna has always been the focus of my life. I live and work for her. My dream is to give her a life better than mine. I always tell her to learn from my own failures. I tell her how difficult it is to work in a factory line. I think she has learned a lot from me. She's turned out to be a good child." It was clear from our conversation that she was proud of how Hanna has turned out. For instance, in describing Hanna she uses words like *thoughtful*, *knowledgeable*, *smart* and *well-mannered*. She says raising Hanna as a single mother has been one of the most challenging tasks of her life; especially, because of the stigma attached to children raised by single mothers in Addis Ababa.

Ms. Genet remembers being fearful of neighbors and others in the community calling Hanna *yeset lij,* a phrase that roughly translates to *brat*. *Yeset lij* in its most literal sense means *a woman's child*. There are rare circumstances in which the phrase may be used to describe children living in a traditional family, where both parents live under the same roof, but the mother wields more power in the home or has a more prominent

presence at home. In essence, *yeset lij,* is a disparaging phrase that deems women unqualified to raise well-behaved or disciplined children.

She says, although Hanna is honest and does not lie, typically she attempts to verify Hanna's whereabouts. For example, because Hanna is an only child and does not have close friends in her neighborhood, she visits her cousins over most weekends. Ms. Genet does not rely on Hanna's words to keep track of her whereabouts. Instead she tracks at what time Hanna left their home; what time she arrived at her cousins' house; what time she left her cousins' place; and what time she arrived at home. She says "raising a child as a woman is very hard. It requires a lot more energy and time [laughs]. There is nothing worse than other people calling your child '*yeset lij'*."

Clearly Ms. Genet is weary of the phrase. The thought of community members calling Hanna "*yeset lij*" or even perceiving her as "*yeset lij*" seems to invoke a sense of fear and panic in her. She is cognizant that, because of this fear, she can sometimes be overprotective and even overbearing in how she relates to her daughter. But she says she is not regretful of having been overprotective because Hanna has "turned out fine. [she has] no fear that [Hanna] will lose her way" to an extent where community members would call her "*yeset lij*." However, more recently she has been feeling less in control because Hanna has become part of world that is vastly outside of Ms. Genet's view and control—the internet.

Hanna's uses the internet regularly. It is as though she is "addicted" to it, she confesses. She typically uses the internet at an internet café, but in the instances that she needs privacy, she prefers using the internet at her friend's house. Her most preferred place to access the internet is on her own mobile phone. However, accessing the internet

on a mobile phone was not always possible for two reasons: first, she did not own a user friendly internet browser on her old mobile phone, and second, the mobile network was unreliable. She believes ICTs are of little value to her as a teenager living in Addis Ababa, but she also feels inextricably tethered to it. So far Hanna's internet use is as wide and deep as Facebook. She shares photos, website and Facebook application links, and regularly joins religious and local news-oriented Facebook groups.

Snapshot of Hanna's Learning Life

Hanna brings her mobile phone to school. She says it offers a means to transcend the boredom and chaos she experiences during "free periods." Typically, Facebook's news feed is her first and only destination. Once on Facebook, she scours the news feed page for updates from her friends and pages she "liked" on Facebook. Although her primary intent is to entertain herself, Hanna says she has "learned a lot from some of [her] Facebook friends' postings." Topics of these learnings include: medical marvels, sex education, relationship advice, and amusing world facts. She says the lessons drawn from Facebook are more usable in the real world than what is taught at school. She feels more informed than some of her friends about the world in general. She says it offers unending flow of information to share with family members and friends. Ms. Genet confirms, "[Hanna] has so much information. Sometimes the only way to stop the information coming from her is to decline it. I tell her 'no, please don't tell me about that'."

There appears to be no connection between the information Hanna obtains from Facebook and the information she acquires at school. In fact, Hanna thinks the two are separate worlds with little or no relationship. Furthermore, Hanna is a skeptic of classroom technologies. Her experience does not bear witness to the idea that ICTs can

help students become better learners, or that it can elevate the quality of her own education. “Perhaps ICTs will be more productive in higher education setting,” she states. I ask her, “would it be helpful in your effort to pass the EHEEE?” No, Hanna does not think access to the internet can help students pass exams.

Like all of the participants in this study, Hanna believes high EHEEE performance is the key to her success, but gradually her attitude towards the EHEEE has become one of indifference induced by fear and anxiety. Hanna’s mother, Ms. Genet, observed as much. She indicated that Hannah has the potential to perform well on exams, but constantly fails to fully utilize her potential to be successful in school. Ms. Genet says, "The girl has the knowledge she needs. But she is afraid. She participates in class, but she doesn’t do well on exams because of her anxiety." There are no formalized parent-teacher conference sessions at the school, so I asked Ms. Genet if she has had a chance to arrange one. She has not. In fact, because of her work schedule, she has not attended any of the school events in the school year. Ms. Genet’s assertions are based on a discussion she had with Hanna.

Hanna says that she has not always been afraid of high stakes exams. In grade eight, for example, she scored above the 90th percentile on the eighth grade national exam. She was still attending a private school. She says high scores were the norm at her previous private, church-affiliated school, where students test scores on national examinations also served as a kind of scorecard for the school itself. It is important to note, however, that her achievements were not simply a result of her attendance at a private school. Hanna worked hard to meet her teachers’ expectations and received support whenever she needed it. As a result, Hanna remained to be a high-performing

student throughout her primary schooling. According to Ms. Genet, during Hanna's last year at the school her overall academic performance was in the top five percent of her class. However, at her new school Hanna saw her academic performance decline. Hanna is unsure why her academic performance took a plunge at the new school, but she has her suspicions. According to Hanna, the teachers at her current school are less interested in their students. She observed rampant absenteeism and apathy, especially towards students that struggled in the classroom. Hanna feels as though some of her teachers consider her "unworthy" because of her increasingly low academic scores. But there is a more pressing problem that is making her current state even worse; namely, some of her teachers are either chronically absent from the classroom or worse, they have left their position without notice.

During my observation at the school, I saw official notices from school administrators posted in the teacher's lounge warning several teachers about their absenteeism and potential consequences. In two instances the notices spelled out absenteeism as the reason for why the teachers were relieved of their duty. In reality, the teachers had already left their posts like a defecting soldier: without notice or a plan for succession. For example, at the time of this research two of the three English teachers had left the school. The remaining teacher was later joined by a Peace Corp volunteer whose original assignment at the school was unrelated to classroom teaching.

Hanna feels neglected. She believes her teachers have their own financial battles to fight. Because they are not compensated well for their work, they take their jobs less seriously. As a result, she believes most of them are not willing to spend their energy and effort on struggling students like her. Some of the teachers I interviewed tend to have a

different perspective on this. They believe students like Hanna, who come from a private school, are used to being "spoon-fed," and because they are spoon-fed,

> they also get expelled in great quantities from [public] Universities … Private schools in general don't teach students how to survive in a rigorous academic setting. They teach students dependency. Instead of teaching them how to fish, they give them fish. For example, students in private schools get tested every week and then sit for a couple of mock exams every semester. This is a form of handholding that borders irresponsibility. No one will handhold these students at [public] universities. Absolutely no one. There are no weekly tests or mock exams. If students don't know how to fish they will starve to death, and eventually they will perish.

In other words, what Hanna considers and views as neglect is, according to her teachers, a form of caring.

Hanna disagrees. From her perspective the majority of her teachers are incapable of caring for students that are not ranking in the top 10. The one exception seems to be her homeroom teacher, who Hanna says cares deeply about the academic success of her and her classmates.

Regardless of her reality at the school, Hanna says she is putting as much effort as she can in to her school work.

> It's not like I'm sitting around with my arms crossed over my chest negligently waiting for my teachers to rescue me. I work very hard, but every day I fall farther behind, and there is no one to help me at school. Everything we learn in class is like a riddle I can't solve. It's discouraging to me. I'm so discouraged that I've lost all hopes. Think about it, how do you stay hopeful when your teachers regularly ask you

to read the textbook, distill the main points by yourself and then study them to prepare for exams? There's no point in trying.

Dimensions of ICT Use

School Mandated Uses and Non-Uses

ICT classes are mandated by the curriculum. In other words, schools are required to offer the classes and students are expected to attend the classes. It follows, then, that teachers are required to teach the class. Hanna says it doesn't work that way.

Researcher: You must feel lucky to have a computer lab at your school. What types of learning activities do you guys do in the classroom?

Hanna: [grins] You think we're learning in the computer lab? We play 'vice city.'

Researcher: What is 'vice city'?

Hanna: You don't know 'vice city'?! It's a game where you run around a city stealing cars and police chases you.

Researcher: That sounds a lot like Grand Theft Auto. I am a bit confused here, though. Doesn't your teacher object to you playing a video game instead of doing actual school-related work? I am also curious to know who installed the game on the machines in the lab.

Hanna: [laughs] work? in the lab? you think our ICT teacher cares about what we do in the computer lab? He doesn't care at all. Usually what happens is, he comes to our classroom and tells us it's 'lab day'. Usually the computer lab work comes as a surprise, because he doesn't tell us in advance if we will be working in the lab. Or sometimes we beg him to go to the lab. Then, as soon as we enter the lab, he either tells us what software we are studying, or simply leaves the lab, and we won't

> see him until five minutes before the end of the period. Sometimes he might not even come back to the lab, so we leave the lab on our own.

Indeed, during one of my observation sessions, I saw that the total number of minutes their ICT teacher stayed in the computer lab was about 9 minutes. Hanna's comments seem to suggest that what I observed is not peculiar. He seems to habitually leave the computer lab for a prolonged time making it impossible for students like Hanna to receive support.

The teacher, a recent university graduate in his early 20s, seemed apathetic towards students' activities in the computer lab. Even when he was physically present at the school, he was absent in all the ways that mattered to students. In the few minutes he stood in the lab he interacted only with one group of students, who were making jokes about an image on their screen. It seemed as though he was not interested in what Hanna and her classmates were doing while they were in the lab.

In fact, by the time the last students settled in the lab, eight minutes of class time had already passed. The teacher arrived soon after all of the students settled in their seats. As far as I can tell, there was no direction or instruction from him. Some students launched Microsoft Publisher and others opened Microsoft PowerPoint. A few others began browsing images on the filesystem.

As I looked around the computer lab, it was not clear what the objective was for students to be the computer lab, and it was not clear why or how students were assigned to the small groups they were in. It seemed as though they self-selected to congregate around a single computer in groups of four even though there were more than 15 machines in the computer lab sitting idle. According to the ICT teacher, most of the computers are in working condition, but many of them are inoperable due to a shortage of

extension cords. When I asked whose responsibility it was to supply the cords, the teacher indicated it was the school's responsibility; but he added he did not communicate the need to school administrators. The school administrators on the other hand incorrectly believed the problem was bigger. They informed me that that they have already applied for funds to purchase 30 brand new computers for the school.

In one revealing moment, I observed a group of six female students struggling to get their self-selected computer to work (see Figure 15). The computer was frozen with none of the peripherals working for them. They attempted to "restart" the computer by pressing the *monitor's* power button and then, after a brief stay, pressing it again so as to turn it back on. Unsurprisingly, when the monitor lit the computer was as they left it. The students discussed a variety of ways to make the computer work for them including single, double, triple and quadruple clicking the mouse to no avail. They gave up. They did not make any attempt to seek help from classmates. Neither did they make an attempt to inform the teacher about their computer troubles when he briefly came back in to the computer lab. When I asked why they made no attempt to seek his help, the consensus among the group was that it did not matter if they got the computer to work or not because the "computer lab period" is a kind of strategic move by the teacher. It allows him to escape from the classroom. Unlike being absent from school, which will surely be recognized and most likely reported to administrators, leaving the classroom during lab time, no matter how unplanned, is defensible and in most cases difficult for the school to detect. The students believe the function of computer lab periods is to simply free up the teacher's time to allow him to attend to other matters. It seemed like a bleak and almost pessimistic assessment, but there were no arguments to counter their perspective.

The teacher seems to have a slightly different interpretation of how the *computer lab period*, where students learn in the computer lab, and the *classroom teaching period*, where students stay in their classrooms for theory-focused instruction, are supposed to be divided up. According to the ICT teacher, the curriculum focuses on theory during the first semester and then shifts to practical or hands-on lessons during second semester. Reading through the student textbook, instructor textbook and grade 11 curriculum guide distributed by the MOE, I was unable to observe any evidence to support the teacher's interpretation. Furthermore, there were multiple successive periods during my observation at the school when students did not set foot in the computer lab.

Figure 15. Six female students gather around a non-functioning computer in the computer lab.

One of the facts Hanna did not mention during our interview, but one I observed and soon verified with the school administration, was the fact that ICT classes, like many other school subjects, suffer from teacher absenteeism and retention problems. I experienced this firsthand when I attempted to observe a computer lab period. I was scheduled to observe a class during the first period; however, Hanna's ICT teacher was absent for three consecutive periods, or one full week. It was not clear if the pattern would have changed had the school administration not intervened.

Socially Mandated Uses and Non-Uses

Hanna used the internet for the first time in grade eight. She says her friends insisted that she signup for a Facebook account. To do so she needed an email account. Although she was reluctant to have a Facebook account it was a *fashionable* thing to do. Hanna says it took her more than six months to realize the internet was more than Facebook. Although Hanna realizes the internet constitutes more than Facebook now, she says she has not found reason to look outside of Facebook. The social network seems to offer all of the information she needs, including news, social interactions, games, religious teachings, etcetera. It is as if Facebook is her human-powered algorithm for more relevant and personal information.

Hanna occasionally uses email to correspond with friends in the Netherlands, but email seems a dated and slow medium to her. Email is "slow and more serious" she says. Facebook, on the other hand, allows for customization made possible by filters she created consciously and unconsciously. One such filter involves religious Facebook groups that deliver biblical quotes and science stories that "prove" biblical stories. For instance, Hanna described one recent article she read about the time when Jesus Christ sweated blood in Luke 22:24, which reads, "And in His anguish, He prayed more

earnestly, and His sweat became like drops of blood falling to the ground." Hanna said science has now proven the possibility of such events in human beings. She then shared this information with her mother, who viewed the information as evidence of the validity of claims made in the Bible, and as further evidence that the internet was a superior source of information.

Hanna says Facebook has become one of the prominent media in which she makes sense of her religious beliefs. She says, "Christian theology helps [her] live a better life."

CHAPTER SEVEN

Teddy Yohannes

Teddy attends School A. He is the youngest of four children in his family. In his out-of-school time he tutors an 11th grader, who is the same age as him, and who attends a private school not very far from where School A is located. His tutoring income was what allowed him to buy a desktop computer and a smart phone, or else he would not have been able to afford either of the devices.

Teddy lives with his mother, who is widowed and doesn't work outside of the home. In the absence of his father and due to his aging mother's deteriorating health, Teddy's oldest brother Telahun has emerged as Teddy's guardian. Telahun is newly married and in his 30s. Telahun teaches at the Teachers' Training College in Addis Ababa, and in addition to financially supporting the entire family, Telahun has assumed a guardianship role for Teddy.

With Telahun at the helm, Teddy is afforded greater autonomy both at home and school. He thinks it may be a result of his high academic performance. This year for instance, he ranked at the top of the entire school. His teachers invite him to the teacher internet café, whose official rules explicitly deny access to any student enrolled at the school. And in the home, his family trusts him to make sound judgments about where and with whom he will spend his time. The autonomy afforded to him at home has additional layers of trust that emanate from the faith his family places on his religious upbringing. For example, Telahun indicated that he did not believe or feel that it was necessary to monitor Teddy's computer use because "Teddy's entire being is molded by the words of God. Our family understands that the word of God has a stronger power and authority on

him than what we might say or do to Teddy. For this reason, we entrust God to help guide him. To show him the light in the shadow of death. To help him make the right decision, and to help him stay away from trouble." This belief seems to permit his guardian to embrace a hands-off approach with Teddy.

At school Teddy is highly regarded by his teachers. So much so that when I first shared my research plans with the teacher that was assigned to assist me while I was on the school premises, he recommended that I enroll Teddy in my study because Teddy was deserving of the 500ETB research participation compensation I had promised participants. The teacher spoke highly of Teddy, detailing his work ethic, demeanor, achievements and low socioeconomic status. However, I had to politely decline his proposal because his rationale did not align with the research participant inclusion criteria. However, Teddy was then selected through purposeful sampling anyway.

Snapshot of Teddy's Learning Life

Teddy lives in a community inured to poverty, exempted by political, historical and cultural forces from questioning their poverty-laden lives. Teddy developed an acute sense of the gap between his dream and the economic, social and technological tools available for him to achieve it. He recognized school was the only means he could escape poverty. Although formal education is mandatory and free for many Ethiopians living in Addis Ababa, school choices remain limited. For example, the high school he eventually joined was not a result of his or his family's choice. He was assigned there by the school district. Neither he nor his family are pleased with his current school located about an hour and a half away from home. Because there are no public school transport systems, Teddy uses public transportation. It typically takes him about 90 minutes during rush hour to arrive at school.

More recently his cell phone has proven to be a valuable companion during his commutes. He says:

> I typically don't read [physical] books on the bus, because people stare at me like I'm a mental, and frankly the bus is so packed it's impossible to read books. I usually read on my smartphone when I'm on the bus, because it's more convenient. It does not take a lot of effort to turn pages, and I don't have to one-handedly fight with collapsing pages of a [physical] book.

Addis Ababa City Buses, or "**አምበሳ አውቶቡስ**" (ambassa autobus) as they are informally referred to, are operated by the City of Addis Ababa. They offer a cheaper alternative to the privately-operated mini-buses or taxis, so they are the clear choice for him. I asked Teddy what makes his phone more convenient other than the physical attributes and convenience. Teddy says,

> Reading on my phone is the perfect excuse to keep an eye on my phone, you know, to guard it against pickpockets. But the best part of reading on the phone is that I can read anything as long as it's a PDF [file]. [Recently], our homeroom teacher gave our class[6] a bunch of PDF books on a flash drive. In addition to hundreds of fictions, and educational books, it contained [Education Materials Production and Distribution Agency imprinted] subject-specific textbooks from the MOE, which we saved on our phones. Now I can read any of them whenever I want.

Access to government-issued subject textbooks on the go, like the PDF books Teddy mentions, can be valuable, but their utility is limited. In Teddy's experience, government-issued textbooks, which are prepared for Ethiopian Schools by the Education

[6] Note that when Teddy says "our class" he is not referring to all of his classmates. It is a euphemism for a subset of students, who are recognized worthy of obtaining resources based on their academic standing at the school. The rest of the students' existence barely registers on the school's radar. As one of the Peace Corps volunteers at the school put it, "[they are] a class of students who are absent in the minds of the system, their teachers and even their classmates."

Materials Production and Distribution Agency (EMPDA), are insufficient to fully prepare for Ethiopian national exams. Teddy treats the textbooks as a starting point, and instead studies supplemental books that are designed specifically to prepare students for various Ethiopian national exams. These materials provide worked-out examples of questions that are modeled after items that appear on national exams. The supplemental books explain in detail every step required to answer questions. If Teddy has his way, he would only study the "supplemental books, but a soft copy is hard to obtain in that form."

A Means to an End

Teddy believes "The most viable avenue to change [his] life is through education." He believes *only* education offers a more direct path to success in Ethiopia, but he also understands that path is no longer as straight or predictable as it used to be. "Being a good student, passing exams and getting into good universities aren't enough to make it [in Ethiopia]. The job market is saturated, so to be successful you must be willing to sacrifice some of your values." What Teddy is alluding to is a kind of political reality many Ethiopian college graduates seems to find themselves in upon graduating from college. There is a widely-held belief among students and teachers I interviewed in Addis Ababa that university graduates are being forced to become members of the ruling party if they are to find employment in government offices and even some private companies.

Teddy is not alone in his belief. Teachers I interviewed shared similar fears. They indicated that their professional ambitions have been held hostage by the government's insistence that any professional growth can only occur if teachers become members of the ruling party. Teddy believes his fate will be no different from that of his teachers.

To be clear, I was unable to obtain indisputable evidence to suggest that this kind of discriminatory hiring practices were occurring in Addis Ababa or any of the other

cities in Ethiopia. However, it would be imprudent to dismiss such claims, and it would be callous to assume that these alleged state-sponsored discriminations would be detected easily and on the surface waiting to be discovered. Regardless of whether or not Teddy's beliefs about the job market and the obstacles that face him are fact-based, they seem to influence his learning priorities.

Self-Initiated Learning Practices

For Teddy, real learning with real consequence is not online or on the computer. The kind of learning that matters occurs in the classroom. In a context where exams dictate who succeeds and who does not, scoring high on the EHEEE takes precedence. In that regard, Teddy believes ICTs offer little to no value for his educational endeavors. As a result, ICT use that does not have immediate and tangible effects on exam outcomes is a waste of time and resources. Teddy is disheartened by the number of close friends "who spend countless hours having a Facebook chat with their neighbors or classmate, whom they can visit in person to have that same conversation face-to-face." I asked him if there is a different kind of learning that can be had on social networks. He says there is, but adds, it's inconsequential. Whatever kind of learning that's occurring on social media offers nothing of permanent value and distracts students from real-life problems that can affect their lives in tangible ways. For example, "failing exams and leading a life of poverty and of constant unmet needs" are more tangible threats.

Teddy says that it is disturbing for him to see so many of his friends devoting much of their waking hours on social media. He believes it is because they are deluded into thinking social media use is a manifestation of modernity. He finds it appalling that many of his friends spend the majority of their waking hours chatting on social media with their friends. He believes such an "irresponsible use" of social media "is neither

indicative of modernity, nor a barometer of one's computer skills." To his mind, the only positive uses he can think of involve two cases. The first involves his tutee, who "regularly uses Facebook Chat to speak with a girl he likes." The second case involves his own use, such as accessing links for downloadable spiritual and educational resources such as books and videos and connecting with relatives living abroad.

In other words, according to Teddy, acceptable ICT uses are those uses that are educational in nature, or that extend one's reach either by allowing the user to do what he or she cannot do in real life, or by affording the user access to materials he or she cannot obtain locally. He considers any duplicative utility as a waste of time and resources.

One area where Teddy is extending his reach with ICTs has been by "dedicating [himself] to learning how to boost [his] brain powers." He has been studying resources from Genius Intelligence, whose mission is to help customers "Increase [their] IQ And Intelligence. Boost [their] Brain Power At Last!" and whose website claims to employ "mental training techniques to re-wire … neurons, build glial cells and accelerate mental growth. The combination of techniques and strategies allows IQ to increase by more than 20 points over time." This is a claim that appears to be both hyperbolic and vague.

Teddy encountered Genius Intelligence for the first time while looking through the flash drive his teacher gave to the class. One of the books they found was "GENIUS INTELLIGENCE: Secret Techniques and Technologies to Increase IQ." The book was outdated, but it led them to a companion website (see Figure 16), where they found "valuable techniques" to boost their brains. Teddy does not seem skeptical about the claims that are made on the website, in fact he believes the information is cutting edge science. The validity of the claims made on the website are convincing enough for Teddy

that he emailed them to waive the fees the company charges for materials and send him updated resources.

What he wanted more than all of the materials were the BrainTune® sounds. Genius Intelligence describes BrainTune® as "a special sound for your mind. It fine tunes your brainwave states so that optimal states of mind can be achieved. The brain has many electrical impulses occurring within. By streamlining that process you can raise your mental powers hugely" (Genius Intelligence, 2011, np). It becomes even more clear why BrainTunes® are appealing to him considering the claim that "for students, listening for 30–60 mins per day, as [they] study, will allow [them] to memorise … information faster and cut down … learning time dramatically" (Genius Intelligence, 2011, np).

Teddy offers little explanation for why or how he came to conclude the information presented on the webpage is trustworthy, so I ask him why he trusts the claims. He finds my question too obvious to be taken seriously. He asks, "are you doing your [due diligence] as a researcher to dig deeper, or are you wanting me to really answer it." I tell him it's both. Teddy struggles to put a coherent response. In his attempt to answer my question about the credibility of information on the website, it becomes clear that the majority of his trust emanates from the very existence of the information on the web and how it's written in "the language of science." He had become familiar with the specialized "language of science" in his biology class. Therefore, it was easy to connect the information on the book and website with his own understanding of how the human brain works. I can't help but wonder how much of his desire to achieve his desired score on the EHEEE fueled his willingness to accept the information without serious consideration.

Figure 16. Genius Intelligence website.

I had come to recognize that Teddy's ambitions extend beyond passing the EHEEE. The EHEEE did not intimidate Teddy. Being a student at the top of his batch of 11th graders in the entire school, he has no consternation about failing the exam. His desire was more precise: score high enough on the EHEEE so as to secure placement at Addis Ababa University in the Technology Faculty, where he would study Electrical Engineering.

Dimensions of ICT Use

School Mandated Uses and Non-Uses

Personal ICT use on the school grounds that Teddy attends is prohibited according to school policy. Neither the school director, who was recently assigned to the

position, nor the teacher that was assigned to facilitate my observations and visits at the school, seem to have a firm grasp on why personal ICTs are prohibited on school premises. One thing is clear about the "no cell phone on school grounds" policy is that the school rarely enforces it, and students are happy to ignore it. I observed numerous students using their cell phones during my school visits and classroom observations.

Teddy brings his cell phone to school, but there were no instances of personal ICT use during my observations, and during the individual interviews he denied using such devices during class time. It would be impossible for Teddy to use personal ICTs during classroom sessions because he permanently sits in the front row.

Socially Mandated Uses and Non-Uses

Teddy's desktop computer is situated in the living room at home, not because his family would like to monitor his computer use, but because the living room is the only available place in the house for his computer to be placed in. Telahun, his brother, "has confidence in [Teddy's] ability to know what is acceptable [ICT] use." It would seem that Telahun is the only person in the family who might fully comprehend the risks and benefits of ICTs. And yet he has absconded and fully relinquished his responsibilities to Jesus.

Telahun has not paid any particular attention to how Teddy uses ICTs in his possession because, reiterating his earlier point, "Teddy grew up learning about Jesus, who we know will guide him in his journey through life's difficult decisions." In fact, Telahun's child-rearing philosophy and beliefs seem to be based entirely on the belief that God would provide guidance to his brother. As a result, he thinks the internet does not and will not negatively impact Teddy's learning life. I present Telahun with scenarios

in which the internet can pose challenges. For example, I ask if he fears addictive or time consuming online and offline computer games diverting Teddy's attention from school work or if he is weary of ICT-based entertainment. Regardless of the examples and possibilities I present to him, Telahun's answer remains the same: Teddy is an exception, because God is on his side. Seeing that there is not a scintilla of doubt in Telahun's response, I engaged in a dialogue that extends my role as a researcher and ask him why he seems unwilling to consider the possibility that, no matter how small, the internet can have negative influences on Teddy. Unfazed, Telahun reiterated his trust in God's capacity to guide Teddy. It is evident that Telahun's beliefs about ICTs and their potential for abuse are shrouded in hardened certitudes based exclusively on religious grounds.

Instead, Telahun highlighted the positive impact ICTs have had on Teddy and, by extension, the rest of his family. According to Telahun, Teddy has been studying the hidden satanic power of music, especially pop-music. Telahun says:

> The only way you can fight evil is by understanding how it works. Learning about Illuminati fits that goal. [Teddy] showed me videos that prove the sophisticated ways in which Satan controls the minds of young people, and how very well-known and famous people become Satan's instruments to enslave generations of young and old people all over the world.

Teddy, said that he learned about Illuminati by accident while he was "looking for evidence" in his "never-ending debate on religious issues with Muslim students in his classroom," who claim that the *Bible* is incorrect or inferior to the *Quran*. In fact, he and his classmates frequently engage in debates about the validity of the other's religion.

Teddy readily accepts the challenge to defend his religion as an opportunity to learn more about his own faith and to understand the "invisible forces that influence our lives." He says he spends as much as two or more hours a week studying how the forces of evil influence our thinking and behavior.

CHAPTER EIGHT

Yaqob Muluken

Yaqob is the youngest of the participants in this study. He attends School A, which is located about one hour from his home. The school was located at a walking distance from his home when he began attending it more than 10 years ago. However, his school relocated to what was then considered the outskirts of Addis Ababa City three years ago. The city has since expanded, drawing the school closer to the center of the city.

Neither Yaqob nor his mother, Ms. Muluken, find the school appealing. Both of them believe the school lacks a strong track record of graduating students who score high on the EHEEE. Ms. Muluken had considered pulling Yaqob out of the school, but decided against it for two reasons. First, she is "confident his batch is one of the best in the school's history;" and second, changing school at this stage of his high school career would not radically alter his exam results. She trusts his academic tendencies, learning habits and curiosity will propel him to do well. She says,

> Yaqob likes reading. He has done well academically because he enjoys learning, reading and obtaining new information. He has always been like this, even when he was little. As he got older, I'm seeing the value of accumulating those [seemingly] useless information. I have reached to a point where I feel overwhelmed by the amount of knowledge he has in his brain about all kinds of topics. I can no longer get a short answer for any of my questions. The depth of his arguments have increased. which leads me to believe that the sophistication of his thinking is a direct result of his love for reading and obtaining new information. I am

also hopeful he will do well on the exam no matter where he attends his senior year of high school.

Yaqob is afforded the freedom to host learning-focused group meetings at his residence. He organizes group study meetings at least once a week with Ms. Muluken's permission. They meet most Saturdays and sometimes after the school's mandatory after-school tutoring to work on Physics and Mathematics questions modeled after the EHEEE. What I observed attending one of these all-male group meetings is that in addition to working on model EHEE questions, they share various types of tips and tricks. For example, one of them showcased a new computer program he discovered. He described the program as a valuable tool to hide computer games from parents and other adults. All of them took turns identifying use cases. Another one of the group members explained a nefarious-looking shell script that, when run as an administrator, would presumably erase an entire operating system.

Although Yaqob cares about his friends in the study group, leading the group is not an altruistic decision on his part. Leading the group gives him the opportunity to complete multiple rounds of reading of the same material. He often conducts additional readings both online and offline in preparation for their meeting. These efforts have helped him become an expert on relevant topics that he deems instrumental in preparing him for the EHEEE.

Snapshot of Yaqob's Learning Life

Yaqob's learning life is driven by his unrelenting desire to become a commercial airplane pilot. To make his dream a reality he has been closely following his uncle's recommendation for how to successfully gain admittance to the Pilot Training School (PTS). Yaqob's uncle, who is an engineer at Ethiopian Airlines, advised him to continue

working on his English proficiency and also learn "one of the six United Nations official languages [English, French, Russian, Spanish, Arabic, Chinese]." His uncle also strongly recommended that Yaqob study electrical engineering once he joined the university.

Contrary to the additional information shared by Yaqob's uncle, the official information on the PTS website does not offer preferences for a particular field of study, and it does not include any recommendation or requirement for knowledge of a foreign language. The official qualifications for admission to PTS are stated on the website as:

> BSC degree in Electrical Engineering / Electronics Engineering / Aeronautical Engineering / Mechanical Engineering /Civil Engineering/ Industrial Engineering / Chemical Engineering / Computer Engineering/Software Engineering/ Hardware Engineering OR in Physics/ Mathematics/ Computer Science/Computer Programming/ Information Science/ Information Technology/ Electronics and Communication Engineering/ Computer Science & Engineering from a recognized university/ college with a minimum CGPA of 2.75 and above (from Recognized Ethiopian Higher Institutions) and CGPA of 3.0 (for countries other than Ethiopia)
>
> **Note**
>
> 1. Height minimum 1.70 meters.
> 2. Age limit for external applicants 21 - 25 years old. For Internal Applicants < 27 years old
> 3. Applicants should be Natural Science Stream students at Preparatory Program or High School.

Yaqob realizes his uncle's recommendations are narrower or more specific than the official requirement for entry into the program. But he views his uncle's advice as more valuable because it comes from an "insider." In his view, the advice gives him a competitive advantage over hundreds of his peers, who would likely assemble their application based on the "generic" information found on the website.

In compliance with his uncle's recommendation, Yaqob has decided to study electrical engineering. He has also been studying French through a language learning mobile application called Duolingo. He completes what are called 'daily challenges' through the application every morning. Most of his diary entries contain a variation of the following set of morning events: "Today I woke up from my sleep on 8:50AM, and I did my daily challenge on Duolingo as usual from 9:10AM - 9:20AM, Next to that I turned on the downloading of 2 games & started eating my breakfast. The downloads finished on 10:05AM." He estimates, by the time he graduates with an electrical engineering degree from the university, he would also be proficient in French.

Eventually Yaqob would like to join Alliance Ethio-Francaise, a non-profit organization that offers multi-proficiency level French Language classes in Addis Ababa. His parents support his plan, but they would like him to wait until after he takes the EHEEE to attend Alliance Ethio-Francaise. In the meantime, Yaqob is relying on the Duolingo application to study French.

A Means to an End

Religion and educational attainment are of significant importance at the Muluken's household. Mr. Muluken, Yaqob's father, works as an engineer at a large company. On Sundays he serves as a deacon at his church. Ms. Muluken, on the other hand, is a homemaker. She attends church twice a week and also participates in prayer

groups multiple times a week. Mr. and Ms. Muluken do not attend the same church and, for the moment, the children attend Ms. Muluken's church. Yaqob and his sister are encouraged to maintain a close relationship with God through prayer, regular church attendance and watching Christian television programming. To that end, one of their two satellite dishes they purchased is dedicated to Emmanuel TV, a Christian satellite television channel transmitted from Nigeria.

Ms. Muluken says Yaqob has always excelled in school. His academic performance has significantly improved as he progressed through elementary and high school. She seems proud of his achievements so far. "As a parent, you can do everything right in your child's life, and still fall short. We have been blessed."

Beyond the blessings, Yaqob's family is financially secure. As a result, he is able to attend a private school, and Mr. and Ms. Muluken entice him with various kinds of coveted electronic gadgets. In fact, nearly all of the ICTs at the Muluken household entered their home as an encouragement device. The desktop computer, the satellite dish, the flat screen television, the laptop, and more recently his Android phone came to exist in his life because he performed above a grade average Ms. Muluken set for him.

> To be honest with you, I didn't like the idea of buying [Yaqob] a laptop, but his father wanted him to have it. Whenever I dissent he would say to me, 'this is a different time. these kids live in different times; it's not like when we were growing up. the kids expect to have these things.' I know it's a different time. I just don't know if the laptop is adding value. All he does with it is play games.

Yaqob disagrees. All he does is *not* play games. He concedes gaming is one major function of the computer; however, he also uses it to complete homework and conduct

research on the internet. Although he considers the laptop his "secondary device," it is frequently used for what he considers serious work. For example, to read long PDF documents downloaded from the internet, download and watch movies, and download music. Nearly all of his school-related work, for example, requires laptop use for typing homework assignments and projects. His smartphone, on the other hand, is better suited for social networking, Voice Over Internet Protocol (VoIP) communications, international news consumption and sometimes movie watching. Both the laptop and his Android phone have limited impact on his life in that neither of them hold material value in helping him prepare for the EHEEE.

Dimensions of ICT Use

School Mandated Uses and Non-Uses

Yaqob's school follows the national curriculum. Some of the teachers ask students to consult potential resources on the internet to complete an assignment. However, there are barely any guidelines for how to conduct online searches and how students can integrate them in their own work. For example, in discussing how he uses information from the internet, Yaqob clearly describes plagiarism:

> I Google the term I am looking for and then I select the first result that gets displayed on the [Google's results'] page. Then I copy everything to a Microsoft Word document. Then I start editing and taking out things I don't need. For example, one time we were asked to write a paper on the question: 'why is the Sky blue.' I knew from reading our textbook that Rayleigh Scattering was the most relevant information. The rest of the text on the website that discussed X-Rays and Gamma Rays was irrelevant to answer the question, so I removed those parts. And then I

> reorganized the remaining content, added some of my own summaries from other sources, and submitted it.

Yaqob does not recognize by copying without proper citation and references that he is engaging in plagiarism. But more importantly, the teachers who accept his work do not recognize the work's lack of authenticity. Yaqob remembers a time when one of his teachers deducted two points because he "copied and pasted everything." Yaqob's take-away from that experience was also revealing. He attributes the lost points to "failing to remove non-essential information." In other words, the problem was not plagiarism per se. It was an issue of too much irrelevant information in the work he submitted.

All of the research students conduct for assignments is expected to be completed outside of the school's premises because administrators plan on keeping the school an internet-free zone and the internet is often needed for such research. School administrators make a concerted effort to rid the school of any electronic devices with access to the internet. To enforce the rules, entire building floors are regularly subjected to surprise searches. These searches often come at the cost of classroom learning time because teachers are not always aware of the planned searches. The device searches sometimes move to the school's gates, where students get patted-down and backpacks get emptied to the floor. Devices that are uncovered during these searches are then seized and will only be returned to students at the end of the year. No amount of pleading or opposition will save the devices from seizure. Although these surprise searches deter many students from bringing their devices to the school, there are some who do. Favorite hiding places include, bras and inside lunch boxes wrapped in *enjera*, a bread-like food made from teff.

The school itself has a computer lab, but all of the computers in the lab are air-gapped; that is, they are purposefully disconnected from the internet. The school administrator's rationale is that access to the internet does not benefit students. Instead it would have a strong maligned influence on student learning and school culture in the long run. Above all, school officials fear that in the immediate present ICTs will disrupt classroom learning and potentially introduce non-age appropriate materials such as violent films and pornographic images to the classroom. Not long after the school instituted the searches, their suspicion and fear found its expression when they seized a student's phone and later unearthed pornographic images saved in it. This and other incidents have convinced school administrators of the need to keep the school untethered from the internet.

Yaqob is among the students that do not take their devices to school because he "cannot afford to lose his phone for an entire year." Losing his phone even for a single day would be like "losing a third of [his] life." My observations confirm his assertions. More importantly, Yaqob supports the school's position about ICT use in the classroom. He says, "I'm a kind of student who learns more from in-class discussions and lectures. So I would be doomed if I somehow miss class lectures and discussions."

On the contrary, Yaqob also understands why some of his classmates feel the urge to bring their devices to school. "My addiction [to social media and the internet in general] is not as severe as some of my classmates, who are always checking their Facebook news feed and also chat with friends. I don't know how they do it." Yaqob says he knows classmates who insert headphones in their ears and listen to music during class periods. He says he does not have time to engage in self-sabotaging activities such as

those. The only exception to his longstanding rule about classroom etiquette occurred when he brought his point-and-shoot camera to school.

Yaqob asked for and was granted permission to bring a point-and-shoot camera to take photos during one of his friends' birthday celebration, which was held at the school. Later that afternoon, Yaqob made an impulsive decision to include his teachers in the classroom as his photography subjects. Yaqob thought it would be "fun" to take photos of his Mathematics teacher in a "creative" manner. Since Yaqob maintains a close relationship with his teachers and the school administrative staff, he assumed taking one "silly" photo would not land him in detention. So he took the photo.

The photo shows the Math teacher standing in front of the class, writing notes on the board; Yaqob's hand is superimposed on the photo, his hand thumb and forefinger are positioned in a manner that makes it seem as though he is holding the teacher's head between his fingers (see Figure 17). The resulting composition is what is sometimes called a "forced perspective" photo. It is similar to photographs tourists take in Paris, for example, pretending to be touching or pushing the Eiffel Tower. Yaqob's photo does the same. His photo skews the viewer's perspective and makes the teacher appear as though he is a model-toy-man that is about to be carefully lifted up into the air. Yaqob did not immediately see the implications or potential problems of his composition. After all, his teachers like him and surely they know he respects them. He assumed his teacher would understand, but he was wrong.

Figure 17. A photo showing Yaqob's hand thumb and forefinger framed in a manner that makes it seem as though he is holding the teacher's head between his fingers.

Yaqob's next action was difficult to justify or defend. After taking the photo, Yaqob decided it was reasonable to upload the photo to Facebook. He only considered his own motive, which was not malicious. He incorrectly believed others would understand his intent. Not long after the photo was posted online, the first comment on the photo appeared. It was from his Math teacher himself, who was also his Facebook friend. The teacher was not amused. He said that he did not understand why Yaqob thought it was within reason to take such a photo and, most of all, the teacher could not understand why Yaqob needed to upload the photo to a social networking website. In the ensuing days, the photograph drew more negative attention.

The reaction was not what Yaqob expected. He thought he would be celebrated for his creation. He said the experience was a learning opportunity for him. He realized good intentions were inadequate to justify one's actions. However, this realization did not come to him easily. He initially resisted conceding to others' points of view. He insisted the photo was not intended to be disrespectful or malicious, and therefore others should have seen his act not as a form of disrespect to the teacher, but as a manifestation of his creativity.

I asked him if there were alternative approaches or if he could have, for instance, taken a photo of one of his friends instead of the Math teacher. Yaqob said he did not think of alternatives. In hindsight he believes that might have saved him the trouble. The photo was not planned. It was a "spur of the moment" decision, which left him no time to cogitate on the potential ramifications of composing such a photo.

Yaqob's school administrators initially sought to pardon his transgressions, given he is one of their more well-behaved and academically talented students. When teachers

realized Yaqob was not going to be disciplined for taking the photograph and sharing it online, some of them threatened a strike. They came to view the photograph as a symbolic representation of how the school viewed them. They interpreted the school's decision to mean that students were more important and powerful than the teachers were. They pointed out how poor, overworked, underpaid and underappreciated they were. To add insult to injury, they asserted their dignity and the respect they deserved were being stripped off publicly. The school decided it was better to give the teachers what they wanted, and as a result the school director sentenced Yaqob to a week-long suspension.

Socially Mandated Uses and Non-Uses

Ms. Muluken was displeased with the school's decision on this matter. She said that she was never happy with the seemingly unbounded nature of Yaqob's relationship with the teachers at school.

> let me be clear with you, I do not wish to raise my child the way I was raised or expect him to experience school the way I experienced it. My relationship with my teachers was difficult to say the least. It was based on fear; not respect. I believe the student-teacher relationship should be based on mutual respect. It should not be friend-like. Boundaries must be established, and both the students and teachers need to respect that boundary. What [Yaqob] did is completely wrong, but he is a child. To interpret this issue as a struggle between rich students versus poor teachers is uncalled for. He didn't know what he was doing. It's unfortunate that they took it so seriously.

Ms. Muluken went to school to speak to the Math teacher as well as the school administrators. She told the Math teacher that

> Yaqob would do anything he asks. I reminded him how much Yaqob loves him. Before all of this mess, the teacher had said Yaqob was the reason [the teacher] came to class every day. I'm sure it's because Yaqob is respectful, and because he is hardworking. Yaqob is very serious about school. He feels terrible about being suspended from school.

The suspension was especially difficult for Yaqob. He had never been suspended from school before, and he said spending the entire day at home was akin to being a prisoner. Moreover, there is little to do at home. He cannot use the internet without his mother's supervision. Ms. Muluken has taken over his Evolution-Data Optimized (EVDO) dongle, which is a Universal Serial Bus (USB) modem he uses connect to the internet. He still had his Android phone, so all was not lost. However, to his dismay, two days into his suspension, Ms. Muluken decided it was time that he gave up his Android phone because he was overusing it. That night he wrote in his journal:

> She was really pissed at me … she took my android and changed my SIM card. Now it's her phone. I was really sad because of that. I almost cried but she did not even try to give me. I even told her that all I want is to say bye to [my friends on Skype]. But she refused. She said, "I know you, you are my son. If you get the chance to use it, you would not stop & you have to sleep." I got pissed at that, but what can I do? I begged & Begged but her answer was no.

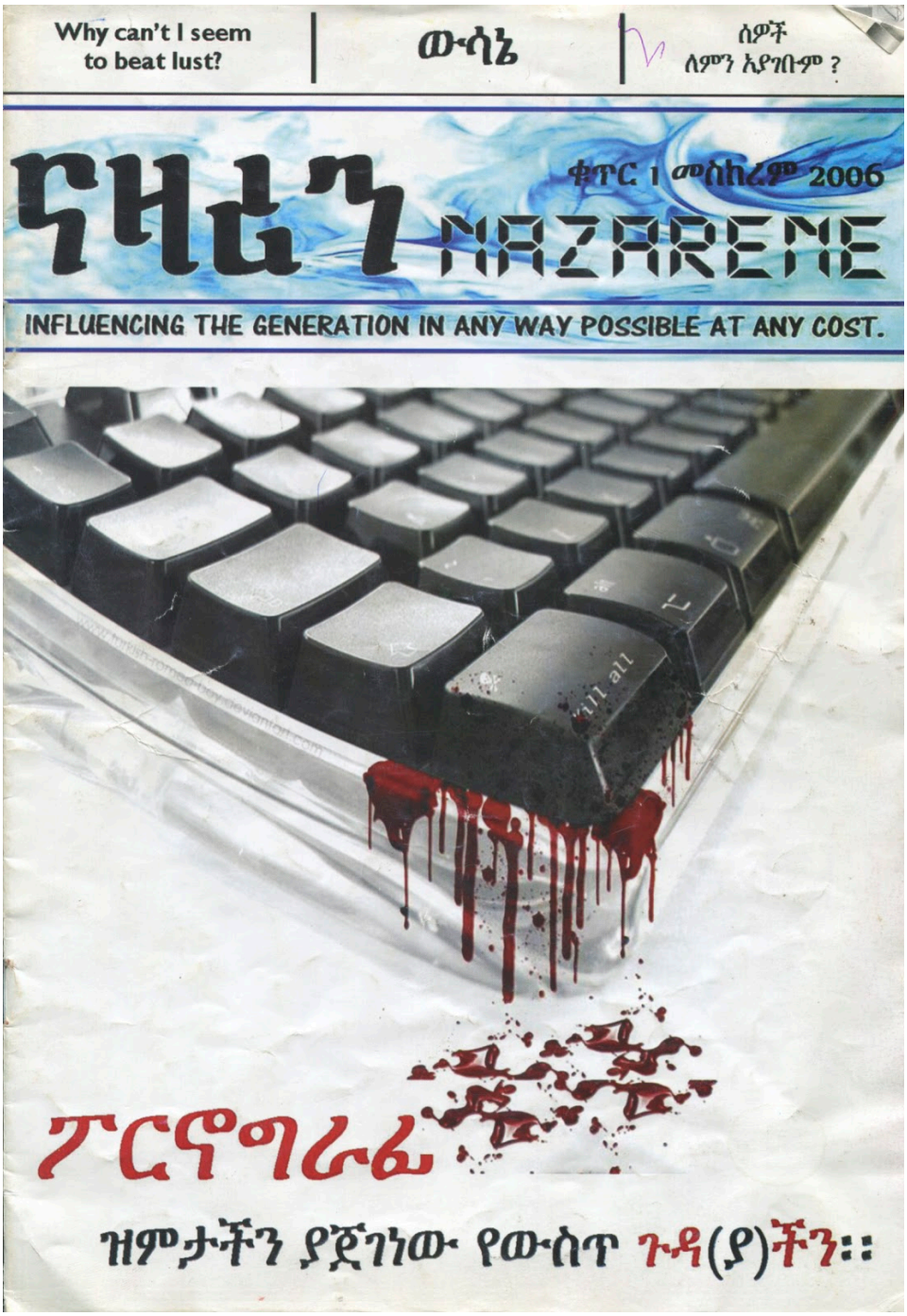

Figure 18. Nazarene magazine cover showing a bleeding keyboard.

Ms. Muluken looks at the utility of the internet through a Christian lens. She reported seeing what she referred to as "deliverance" videos on Emmanuel TV, a satellite broadcast that carries Prophet T.B. Joshua's sermons, which include prophecies and

deliverances that show young men and women being delivered from a pornography addiction. She holds those videos as evidence that pornography is the devil's tool. "A while ago I saw a man possessed by the devil. The devil spoke and said it entered his life through pornography." She says her experience watching such videos have made her vigilant about the horrors of unfettered access to the internet.

Indeed, a search on YouTube returns multiple videos that show Prophet T.B. Joshua performing exorcism on young men and women. In addition to exorcising the pornography addiction out of the individuals, the prophet educates the congregation regarding how to avoid falling into the traps the devil casts through pornography on the internet.

It is worth point out that Ms. Muluken does not speak English. Her understanding of Prophet T.B. Joshua's performance is limited to what she can glean from what she sees on the videos and her limited English. Luckily, her favorite Christian Magazine called "Nazarene," whose tagline and motto reads: "influencing the generation in any way possible at any cost" covers similar topics (see Figure 18), and often includes articles that reference Prophet T.B. Joshua's teachings and sermons.

The issue that seems to have changed Ms. Muluken's understanding about the internet, and ultimately influenced how she approaches the manner in which she monitors her children's internet use, was an in-depth article that discussed pornography and its impact on youth. She says the articles fundamentally changed her understanding and attitude about internet use. So much so that she purchased additional copies of the magazine and gifted them to friends and family members living in Addis Ababa and abroad.

These two sources of Christian teaching have prompted her to take an active role in terms of Yaqob's ICT use; for example, she actively monitored Yaqob's internet use. She sat next to him during his active internet use, which according to Yaqob and Ms. Muluken, was primarily focused on Facebook. Occasionally she asked Yaqob questions about what pictures he was looking at and insisted that he moved to a different page. Failing to comply with her direction usually resulted in her forcibly taking the EVDO dongle.

Yaqob was accepting of her heavy handed supervision, because his laptop computer was not the only place where he accessed the internet. His Android smartphone was where he conducted most of his internet browsing, and that was mostly free from his mother's surveillance because access to the internet on his mobile phone does not rely on external dongles such as an EVDO.

CHAPTER NINE

Discussion and Implications

The purpose of this study is to offer a multidimensional and nuanced account of how a purposefully selected group of high school students use ICTs in their learning lives. The study's primary objective is to address how secondary school students in Ethiopia use ICTs in their learning lives and in what ways social contexts influence Ethiopian students' ICT use within personal, social and educational spaces. In this chapter, I present an interpretation of themes that emerged as a result of data analysis, followed by implications of findings for theory and methodology as well as future directions for research. Finally, I discuss limitations of the study and how those limitations are mitigated.

Digital Literacy Deficits Threaten Learning Lives

By far the most significant threat to students' learning lives is the lack of adequate guidance on how to use ICTs for learning purposes. Both the teachers and the curriculum fail to fulfill their duties in helping students learn how to utilize ICT in ways that enrich their learning lives.

The ICT curriculum in grade 11 as reflected in the student textbooks and as described in chapter two offers the first clue to explaining the poor state of digital literacies among participants. Many of the lessons in the textbook are devoted to complex topics regarding hardware, software and network systems. These topics have value for those students who plan on pursuing computer science or other information technology related fields, but the true failure of the ICT curriculum lies in its egregious omission of lessons on how to interact with information available the internet. As a result, one theme

that was common among participants was their lack of understanding of determining which information was trustworthy and which was not.

I asked all participants how they located new information, as well as how they determined which information on the web was trustworthy. Their responses were eerily similar. Participants obtain new information from Google searches. Their strategy invariably includes the following steps: 1) type google.com on their browser address bar 2) enter the search term, and 3) click the first link on the results page. For example, they reported using ask.com, answers.yahoo.com, about.com, wikihow.com and wikipedia.org as trustworthy sources they depend on for some of their assignments and for general knowledge searches.

What also emerged from the data analysis was that participants did not understand or know how to identify which sources of information online were trustworthy and which ones were not. For instance, when Yaqob wrote a paper on 'why the Sky [was] blue' he Googled the question, and then relied exclusively on the first link that was provided on the first page of the search results to complete the assignment. The first link, according to Yaqob, was from Yahoo! Answers.

A related challenge that has emerged from the data analysis was a widespread tendency among participants to copy information and offer it to their instructors as if it was their own. Even those participants who were ranking first in their respective schools were unaware of ethical transgressions. The problem is exacerbated because of teachers' tendencies to accept plagiarized student work without a question. Participants reported only two instances in which teachers raised questions concerning information sources, but neither of them were about plagiarism or trustworthiness of the students' works.

There are also clear patterns in the data of students not being taught how to supplement their studies with ICTs. The lasting consequences of students' digital literacy deficits are not yet evident, but it is not impossible to imagine how these learned behaviors might impact students at the university and later in life. What has become clear from the data is that digital literacy deficits are by far one of the most problematic areas in participants' learning lives. One approach to addressing this problem may be expanding the definition of academic dishonesty to include plagiarism. Teacher training on the expanded definition of academic dishonesty may also help teachers distinguish between original student work that relies on sources obtained from the internet, and student work that is entirely copied from the internet. A more effective approach may be to emphasize student learning more than passing exams.

The law of amplification can be seen at work in these circumstances. First, because the schools put emphasis on passing exams, teachers spend most of their energy making sure students are prepared for the exams. Preparing students typically involves covering the topics presented in the textbook. One approach teachers take to accomplish their goal of covering all of the topics in the textbook is to have students write a paper on a given topic. The purpose here is not necessarily for students to gain new understanding of the topic they were taught in the classroom. Neither is it to help students advance their existing knowledge. The purpose of the assignments is to insure all of the topics are somehow covered during the school year. As the law of amplification suggests, ICTs only amplify human intent, which, in this case, is teachers' desire to cover every topic in the textbook. Therefore, teachers care more about the completeness of the content rather than how original the work is.

ICTs are the Domain of Males

In all but one case, decisions about how research participants should or should not use ICTs were made by female guardians or parents. They are tasked with the responsibility to monitor and judge acceptable or acceptable ICT uses. This fact may make it seem like women have a significant or even an outsized role in shaping how the participants used ICTs in their learning lives. However, a closer look at the patterns of interaction among participants and their parents/ guardians tells a different story.

It is important to remember that two of the parents or guardians never attended formal schools and the third graduated high school in a rural part of Ethiopia more than 20 years ago. In all instances these parents or guardians had no computer training to be arbiters of acceptable ICT use. However, all three women had taken on the responsibility to manage participants' ICT uses at home. What emerged from parent/guardian interviews is that there is a hidden entity that authorizes or condemns contested cases of ICT use. For example, when participants and their female guardians or parents had conflicts that were unresolvable, the male guardians or parents made the ultimate and unimpeachable decision, often in the research participants' favor. For example, Daniel often felt his mother failed to understand how he should use ICTs for learning. He lamented on the time when she took away his EVDO dongle and refused to return it to him. He often took his grievances about what he considered unreasonable limitation placed on him by his mother to Mr. Menelik. Mr. Menelik often overturned Ms. Menelik's decision.

A similar power dynamic was present in Mr. and Ms. Muluken's household. Although Ms. Muluken seemed more assertive and actively involved in directing Yaqob on how he should and should not use ICTs, she still surrendered to Mr. Muluken's

opinions and decisions. For example, she was against the idea of buying computers for Yaqob, but her concerns were ignored. In fact, when it was time to buy the computer for Yaqob she was compelled by Mr. Muluken to accompany Yaqob while he shopped for a laptop she did not believe was necessary or valuable in the first place.

Another common theme among parents/guardians was the absence of digital literacy. The three parents/guardians did not know or clearly understand how ICTs may be used for learning. Instead the they drew from traditions, religious dogma and parental intuitions to justify what kinds of ICT uses were and were not permitted. This approach did not sit well with the research participants. Thematic analysis of findings show that the research participants dissented and often sought a means to evade or override the limitation imposed on them. To aid their protest against the limitations, they sought arbitration from male parents or guardians, who were a reliable, albeit unwitting, ally.

Beyond the home, males dominated nearly all layers of school and district leadership positions. All three directors in School A, and both the director and assistant director in School B were males. Decisions regarding ICT integration in schools was in the domain of these same individuals; resulting in utter absence of women's voices and perspectives. In addition, all four of the ICT teachers in School A and both ICT teachers in School B were males. It was evident that when it came to ICTs, women's voices were virtually absent in both schools and the district. It was difficult to observe what the cost and consequence of the exclusivity of power was. Further research may be necessary to observe how men's grip of power impacts learning lives and the use or non-use characteristics of participants.

Schools are Disincentivized from Fully Integrating ICTs

One common theme that emerged from the data is that schools are disincentivized from fully integrating ICTs due to internal and external forces. Internally, ICTs had no more than nuisance value. School administrators and teachers only saw the disruptive nature of ICTs. Externally, the schools were pressured to produce superior EHEEE results. However, the external pressures were exerted on the schools from multiple sources. In the following section I will discuss the internal and external forces in more detail.

At School A, the new school director was looking to achieve a higher number of students passing the EHEEE, because more than half of the students taking the EHEEE were failing. As indicated in chapter four, School A is situated in an affluent community, where international organization residences and offices, government official residences, and more notably a well-guarded government installation are located. For this reason, the district office keeps a close eye on the school's activities. The new director's appointment was reflective of the school's relative importance in the district.

One of the first steps the new director took was to ban student-owned ICTs from school grounds. He also opted to keep the internet out of computer labs; although he planned to reinstate internet access later. Furthermore, he mobilized teachers to use Plasma TV as per MOEs guidelines, but he quickly reverted his decision, because of unreliable Plasma TV lessons. His ultimate goal was to increase student performance and scores on the EHEEE. He admitted feeling hopeless in the face of chronic teacher absenteeism and a student body that comes from the poorest and most educationally disadvantaged population as he explained, "There is nothing I can do about the parents and the students we get here. Many of the parents don't show up for meetings at school. I

do not have the power to make them come [to meetings]. What we can do is put some deterrents in place to help students focus on what they are learning in class."

My observations tell a different story regarding how successfully the ICT restrictions were working. At the time of my observations, I saw and documented several students using their smartphones during class. In one of the classes, I observed several students using their smartphone cameras to record the play that was being performed by their classmates. I also saw numerous instances where students used their smartphones to share multimedia and electronic documents with one another.

Unlike participants attending public School A, who were assigned to the school by the school district, those participants who went to private School B chose to enroll there. The participants, their parents or guardians and the school assistant director commonly identified as their primary criteria for choosing the school to enroll their child as being the school's prior semi-successful track record in helping a large portion of their students to achieve higher scores on the EHEEE. It is as though the school's worth is measured by the number of EHEEE success stories. As a result, the school puts a prodigious amount of effort to rid the school of all activities and devices they consider distracting from this goal. This effort has led to banning ICTs from the school altogether. Surprisingly, the ban extends to the computer lab itself, where the computers within the lab remain air gapped. The outcome of such drastic decisions is that students will never learn about the internet or how to best use it to enrich their learning lives while they are on school grounds.

It might look as though School B's anti-ICT integration strategy is a marketing move, and it may very well be; however, it is also important to recall that parents send

their children to this school because they believe the school will support and guide their children to success. These parents could easily send their children to public schools, where school tuitions are next to free. Instead they send them to a private school, where personal electronic devices are banned, because they believe the first and critical step to insure their children's success in life begins at a school that will support their children to obtain high scores on the EHEEE.

ICTs are more effective in the classroom when they are integrated within the curriculum in a manner that amplifies learning. To achieve this goal, the curriculum must be redesigned to take advantage of the unique attributes of ICTs that make learning more authentic and relevant for the context in which learners find themselves.

The case I am making for integrating ICTs is based on the curriculum's existing intent as well as the resources that are available at both schools. I am not suggesting for schools to acquire new devices. I am arguing, however, that a fundamental shift in how ICTs are used at schools needs to occur to move administrators and teachers to a place where they can integrate ICTs meaningfully so as to support students' learning lives.

ICTs are Worth More in the Unknown Future

Another common theme among participants was their belief that ICTs were irrelevant to their academic success. ICTs were especially inconsequential to help them in their preparation for EHEEE. Furthermore, participants believed that relying on ICTs would lead to low EHEEE scores. However, they had an optimistic outlook regarding the role ICTs might hold in the future. Contrary to their current attitudes and experiences about ICTs, participants asserted that ICTs would *become* more useful when they join the university. My observation of the participants' ICT skills and general set-up of the education system learning leads me to conclude differently.

Before discussing my justification for my differing conclusion, it is important to remember the conditions in which participants came to own ICTs. The participants came to possess ICTs because they convinced their parents/guardians that ICTs would elevate their academic performances to new heights. In Teddy's case he purchased a home computer with his own money. Many months after their initial ownership of ICTs it had become evident that the participants' predictions did not materialize. Daniel's and Hanna's academic performances were at their worst, and Teddy and Yaqob did not experience any boost in their academic standing. More importantly, it was common belief among participants that ICTs' utilities ranged from distracting to mildly useful for the purposes of typing assignments. Even as participants acknowledged the shortcoming of these technologies in their learning lives, they remained hopeful and optimistic about what computers will offer. When speaking about the productivity of ICTs for learning, positive claims were presented in future tense. Hanna, for example believed "ICTs *will* be helpful when [she enters] the university, because [she] *will* need to read articles." Daniel was less enthusiastic about ICTs in general, but he was hopeful about what he will accomplish in the future using ICTs. He said "ICTs are more useful when we enter in our fields. We wouldn't need to worry about general knowledge [that may be necessary for EHEEE] … we *will* be looking for specific information about a [specific] topic, so ICTs *will* be more important."

The participants' current disappointments are not inherent in the capabilities of ICTs themselves. ICTs are simply amplifying existing norms. There are many factors contributing to the reasons why ICTs are not working for participants as well as they had hoped. First, ICT integration at school and within the curriculum in general was poorly

conceptualized and deployed. Second, schools were incentivized to spend their resources on creating EHEEE success stories. Third, when ICTs were used their impact was overshadowed by deficits in digital literacy. Each one of these factors have been discussed further in various sections of this chapter.

ICTs Induce a Heightened Sense of Communal Panic

The actions of parents/guardians, teachers, and school administrators taking place at home and at school can be understood as a concerted effort to assert tradition in the midst of technological change. This is so much so that learning lives are inundated with a heightened sense of communal panic that emanates from the fear of what ICTs introduce to the participants' and their communities' lives. The potential transfer of what parents/guardians consider to be foreign ideas such as unfamiliar religions, pornography, and homosexuality through ICTs worried educators at both schools as well as three of the four parents/guardians. They viewed the internet as a destructive tool that indoctrinates their children to become desensitized to amorality and an unchristian life. The three families differed in how they approached and addressed the potential harm ICTs may cause their children. Daniel and Yaqob's parents/guardians especially took extraordinary measures to insure their children were not misusing ICTs. All but Teddy's family saw ICTs as powerful tools, whose reach were potentially life altering.

When it comes to monitoring ICT use at home the families differed in their strategies. Ms. Muluken treated the internet as a dangerous place, where young men and women go to lose their innocence. To combat negative influences Yaqob might import from the internet Ms. Muluken closely monitored his online activity with a special focus on his use of social media. She dictated the terms of his use including how long he can expect to use the internet while he is at home. When Yaqob failed to comply she

instituted limitations that ranged from taking away his mobile phone to refusing to give him money to buy additional bandwidth. Her actions were cautionary measures that were meant to discourage internet browsing behaviors that may lead to acts that she considered deviant and hurtful to his spiritual well-being. She feared the internet would make it easy for him to access age inappropriate content that may tarnish his Christian life. It was also evident that most of her concerns about Yaqob's internet use were conceived as a result of religious readings embedded in Christian beliefs.

Ms. Menelik, on the other hand, was less driven by religious convictions. Instead she determined acceptable computer use based on the amount of school work Daniel was expected to complete on a given day or week. For example, the intensity with which she monitored Daniel's computer use increased as exams neared. At times she sat next to him in his room as he studied or pretended to study. She had conflicting feelings about the efficacy of ICTs in his learning life. On the one hand she recognized he needed the technological advantage to do better in school; but on the other hand, seeing that he was losing ground in his academic standing at school, she was beginning to worry ICTs were becoming a liability and not an asset. More recently, she was beginning to see that he appeared to be in the process of adopting a new religion and slowly leaving behind his Ethiopian Orthodox roots. She was concerned about it, but she was convinced that in the grand scheme of things changing his religious affiliation was not too terrible. In addition, family members convinced her it was better for him to immerse in religious activities, albeit a different version of Christianity than hers, than to access and immerse himself in non-age-appropriate materials found online.

Ms. Markos was not very different from Ms. Muluken and Ms. Menelik. She saw ICTs as powerful tools that can be a force for good and evil. Ms. Markos focused mostly on the positive aspects of ICTs. She appreciated the joy ICTs brought to Hanna's life. Ms. Markos saw the value of ICTs when she saw Hanna use it to maintain her friendship with old friends who were living in Amsterdam. She admired Hanna's ICT skills, and appreciated the information Hanna gleaned from Facebook to share with her on a regular basis. However, she was concerned about Hanna's excessive ICT use. Ms. Markos was concerned when she woke up in the middle of the night and saw Hanna surfing the web. She expressed her concerns when Hanna used her smartphone without rest for long periods of time. As a single parent, Ms. Markos struggled to monitor Hanna's ICT use. The challenge was worsened by the fact that Hanna often spent the better part of the day and night alone in their rented house. Although Ms. Markos lacked the time or knowledge to monitor Hanna's ICT use, she was concerned about the negative impacts of ICTs on Hanna's schooling. But her concern was mostly about time management rather than the content Hanna was consuming on her device.

On the contrary, Tilahun, Teddy's guardian, believed the internet did not raise ethical concerns. He believed Teddy possessed superior digital literacy skills, and moral sensibilities that allowed him to gauge what was valuable or acceptable and what was not. Tilahun's confidence emanated entirely from his belief in divine power and interventions. One approach to understanding his attitude is to simply accept his resistance at face value and record it as evidence. Another approach to understand his attitude would be to take into consideration the context and circumstances in which he is proclaiming his confidence regarding Teddy's ICT use; his refusal may be understood as

a form of denial. Considering Tilahun believed that other people routinely misuse ICTs, it becomes more difficult to reconcile his stance on how he has chosen to allow Teddy to have unfettered access to ICTs. His affirmation of divine intervention forgoes what should have been scrutinized and given careful consideration. On the other hand, Tilahun's trust in Teddy, while based on intangible and religion-fueled convictions and a trust in the providence of a deity, may have provided Teddy the right combination of support, trust and agency to be thoughtful about his ICT use.

ICT Integration is Poorly Conceptualized in the Curriculum

The Ethiopian national curriculum clearly states that ICTs need to be an integral part of all governmental and private schools. It also states that ICTs must be integrated within school subjects. However, ICT integration at both School A and School B were poor.

The national curriculum may be best seen as a declaration of wishes. On the one hand, it stresses the value and importance of ICTs for learning in the classroom, yet on the other it fails to include learning activities within subjects that leverage ICTs. In the absence of clear curricular guidelines on how to incorporate ICTs in the classroom and concrete suggestions designed to help teachers move beyond the textbook, teachers seem uncomfortable and, therefore, unwilling to venture outside of the boundaries set for them in the student textbook and instructor handbook.

Participants claimed there were very few instances in which they were asked to use ICTs to complete learning activities within or outside of the classroom. Participants in School A recalled only two instances in which their teachers required them to research a topic online. One was for Biological Sciences and another for Health and Physical Education (HPE). There have been times when participants conducted online research,

but those instances were not initiated by teachers or the curriculum itself. Participants in School B identified only Biological Sciences as a subject that incorporated some element of ICTs during the school year.

Figure 19. The protective metal box carrying the plasma television is used as a canvas to draw the Grand Ethiopian Renaissance Dam (GERD) under construction on the Blue Nile.

The outcome of the absence of clear guidelines in the curriculum and teachers' inability or unwillingness to deviate from the student textbook results in a chain of events that render ICTs meaningless. For example, government issued textbooks and supplementary exam preparation books establish themselves as the only source of relevant information. As a result, participants come to view ICTs as less valuable or less

relevant to their learning efforts, but rather as distractions that take time away from the real work of studying for exams.

The Plasma Television program, which is only available in School A, was also failing to deliver on its promises. The program never ran during the entire duration of my observation at the school, because of intermittent satellite. As a result, teachers abstained from using the Plasma Television transmissions in their classes. All of the classrooms I observed housed Plasma Televisions that were locked away in a protective box made of metal. In one of the classes, the protective box carrying the television was used as a drawing canvas to depict the Grand Ethiopian Renaissance Dam that is being built on the Blue Nile (see Figure 19).

Critics of the Plasma Television program (Bitew, 2008; Lemma, 2006; Hussien, 2006) contend that the program is unfit for the Ethiopian educational system because the Plasma Television program failed to match students' English proficiency levels, and because the pace of instruction was too fast.

Similar to many educational technology projects, the Plasma Television program was conceived to solve a problem quickly and efficiently; however, integration of ICTs in both schools, including the Plasma Television program were poorly conceptualized in the curriculum. Furthermore, historical evidence and the law of amplification suggest that the Plasma Television program was ill-fated due to the nature of the problems it was attempting to solve, i.e. teachers' English language and knowledge deficits, teacher absenteeism, and teacher shortages in remote parts of Ethiopia. Although Plasma addressed some of these challenges, it also created new ones as detailed in chapter two.

Plasma Television program did not attempt to halt teacher absenteeism. It also did not improve teachers' English language and content knowledge deficits. It simply replaced classroom teachers with virtual ones. The current state of technology integration in schools, especially in School A, is the direct result of technocentric thinking that regarded teachers as nothing more than switch operators.

The ICT integration in Ethiopia has much to learn from similar endeavors like Digital StudyHall (DHS). DHS offers instructive lessons about how to implement technologies among low-income communities. The project produced content that was easily adaptable and relevant for its target audience, which constituted disenfranchised Indian citizens that lived in rural areas (Sahni et al., 2008). What makes DHS's approach different from the Plasma Television Program is the critical role teachers played within the program. Instead of having teachers serve as television operators, it facilitated a way for them "to watch the lesson and learn from them themselves, they are taught through in-service sessions to mediate the recordings" (Sahni et al., p.4, 2008). DHS's approach to ICT integration resulted in higher knowledge acquisition. Sahni et al. (2008) report that "children [in the] intervention scored almost 400% higher in English and almost 300% higher in math than did children in a comparison school" (p.23).

It would be remiss not to recognize that some of the challenges facing the Plasma Television program in Ethiopia were not dissimilar to education technology integration challenges in other countries around the world. For example, the Indonesian Distance Education Satellite System (SISDIKSAT) was launched to share faculty and facility resources among Indonesian universities scattered across the island. However, similar to Plasma Television in Ethiopia the SISDIKSAT endeavor was not fruitful, because of a

lack of well-established institutional leadership and management, as well as the lack of clear goals and cost-effectiveness issues (USAID, 1987). Similar examples, where classroom television failed to live up to its promise may be found, for example, in Peru (USAID, 1987) and the U.S. (Salomon, 1979).

High Stakes Exams Dictate Learning Lives

Another common theme among participants was their anxiety and fear towards the EHEEE. Their anxiety and fear, in turn, dictated how their learning lives were lived and managed. Even though the participants had personal interests, personal projects, hobbies and various kinds of learning initiatives they were pursuing in their moments of aloneness and out-of-school group meetings, their conception of what learning meant constituted sitting in a classroom, attending lectures, taking notes, doing homework and studying for exams. All of these learning activities were framed in a context of formal learning spaces. If the learning environment and culture was not responsible for students' attitudes and perceptions about learning, it certainly reinforced their beliefs and expectations of what learning is and what it is not.

It is important to recall that Yaqob spent a considerable amount of time learning French language; Teddy studied advanced electrical engineering; Hanna took the time to learn about the intersection of science and Christianity; Daniel made attempts to study how to hack networks. These learning activities *are* a kind of learning when taking a wider view of what learning is. However, the participants tended to characterize these activities as future-oriented and inconsequential to their learning lives. Participants were not alone in their thinking. Parents/guardians did not approve any amounts of time to be spent conducting the kinds of activities that did not directly relate to school work,

because they did not consider these activities as being 'serious' forms of learning. For them serious learning was synonymous with the kind of learning that affected participants' future success in life in tangible ways, which occurred only in school.

Clearly participants' and their families' beliefs about what learning constitutes are skewed, but their viewpoints are not unsubstantiated. Their tendencies to view school work as more significant and needing more attention rose out of their lived experiences and direct observation of the challenges faced by those individuals who fail the EHEEE. Namely, underperforming or failing on the EHEEE negatively impacts lives. For example, underperforming on the EHEEE would result in students being placed at one of the less established universities or colleges in remote parts of the country, and then getting assigned to a field of study they are disinterested in. But failing the EHEEE has even more repugnant consequences. Those who fail to meet the minimum score requirement for higher education placement would need to enroll at a private school in order to retake the exam and improve their score. There are no available data on how many students reenroll in high schools to retake the EHEEE.

For the participants and their parents, learning is closely aligned to obtaining higher scores on the EHEEE. This reality has led participants and their parents/guardians to focus their energies towards attainment of higher academic performance as measured by EHEEE scores. Ignoring this reality in which they live would result in dire economic prospects for the participants.

This is not to say participants halted their learning activities that were unrelated to EHEEE. They continued to engage in learning activities that were unrelated to preparing for the EHEEE. The way in which participants set differential priorities to various types

of learning underscores the elasticity and flexibility of learning lives. However, it also shows the fact that the EHEEE has an outsized influence on setting the agenda for how participants allocate time to various types of learning activities in their learning lives. This fact is unsurprising. The learning lives approach deemphasizes where and how we learn and, instead, advocates that we understand learning as a continuous process embedded in everyday living. This implies that the importance of the EHEEE is only a matter of temporal emphasis and is, therefore, tentative. Participants would undoubtedly alter their learning priorities on the basis of pressing needs for learning, which, again, underscores the fluidity of their learning lives.

The practices of participants and their parents/guardians raise one question regarding the law of amplification: if technologies amplify human intent, what happens when the technologies that are available fail to support human intent? Looking at the behaviors, interactions and decisions participants make about how they appropriate ICTs offers one possible answer to this question.

A close examination of how participants and their parents/guardians interact with ICTs reveals that ICTs fall by the way side as exam time approaches because ICTs offer virtually no support or advantages for helping participants become proficient test takers. The law of amplification says that technology use follows human intent. In this particular case, the participants' intent is a need for them to score high marks on a high stakes national exam. If the law of amplification was at work, we would have seen participants reconfiguring ICTs to amplify their intent. Instead, what we observe is the opposite. ICTs are viewed as a liability because they introduce distractive engagement such as social networking activities and other online entertainment. Therefore, instead of relying on

ICTs to expand their knowledge, students rely on the tried and true approach to achieving higher EHEEE scores, which involves distancing themselves from ICTs to focus on studying test preparation books that contain model questions and test taking strategies.

Implications

Implications for Research Methodology

Employing diverse theoretical approaches. In order to capture the complex nature of learning, it was important to employ theories that supported a range of methodological approaches so as to represent and capture the participants' learning lives as completely as possible. To that end I used multiple theoretical perspectives including law of amplification, technology appropriation theory, and learning lives approach to understand patterns of ICT use in the learning lives of secondary students in Addis Ababa, Ethiopia.

I used the combination of these theories to help explain learning activities that took place and were embedded across multiple places and contexts including the home, school and social or youth group meetings. My approach was not without challenges. The very nature of studying 'lives' presents dilemmas about which parts of a participant's life to study. The challenges of where and how to focus were partially delimited by ethical research practices that are put in place to limit researcher access to private spaces and contexts. For example, spaces that might offer a clearer understanding of participants' online practices and learning activities, such as examining internet browsing history and other personal computer usage statistics and patterns, were not used because of their invasiveness to participants' privacy. Therefore, even as I was trying to cast a wider net to understand the vast and complex contexts in which learning lives were being lived, it was evident that some aspects of the participants' learning lives were either challenging to observe or impossible to reach.

Some of these methodological challenges may be addressed using a variety of data sources and a combination of methodological approaches, as I did so in this study. However, there are other approaches that Erstad (2014) suggests would be of value. He recommends ethnographical studies, biographical studies and case studies to help mitigate methodological challenges. Another methodology he suggests is 'timescales' (Lemke, 2000). A timescale-focused methodological approach assumes that individual, everyday *moments* add up to what we all ultimately recognize as *lives*. For example, students' individual or singular learning activities that occur in multiple contexts come to form a larger whole: a learning life. Therefore, Lemke suggests studying these moments in context to extract and map out the building blocks that make up learning lives as a whole.

Diverse research settings and participants. One important decision I made early in the process of conducting this research was placing emphasis on including diverse participants. Although I had established inclusion criteria before entering the research site, it was evident that my initial criteria favored males over females because of the historical disadvantages women and girls face in Ethiopia. I responded to this realization by modifying the participant's inclusion criteria. As a result of the modification, I was able to enroll one female participant. Future learning lives-focused researchers in this context must recognize the existing cultural and social structures that are in place. Recognizing the unequal nature of the dissemination of technology and differential ICT usage patterns will help inform theoretical and methodological choices.

Implications for Future Research

In some respects, Ethiopia represents the economic transformation many have been hoping to see in the African continent. For example, school enrollment in high schools has increased dramatically and many children live closer to schools than ever before. Secondary school enrollment has increased dramatically because of Plasma TV broadcasts. However, this research reveals what enrollment statistics conceal. Namely, once enrolled, students are afforded minuscule attention in the classroom. Findings in this study point to socio-cultural, economic, and political shifts that must be made in order to cultivate and fully support the learning lives of students in Addis Ababa, Ethiopia.

Drawing on the experiences of participants this research adds to a growing body of scholarship (Dombrowski, Harmon & Fox, 2016; Maryam & Imran, 2016; Ames, 2016;) that focuses on low-income communities. The findings in this study suggest that a multitude of interrelated, multi-faceted and complex factors such as differential access to ICTs, teacher absenteeism, standardized high-stakes exams, and cultural, religious and social norms influence technology appropriation for learning. And these factors often amplifying existing inequalities and exclusions. The current nationwide project of digital technology in the Ethiopian education system has not achieved the desired educational outcome because of a lack of understanding among Ethiopian policy makers of the trajectories of students' digital technology use and their learning lives more holistically.

Further, the findings in this research point to a systemic tendency to center educational goals around increasing the numbers of students that join universities. This center must be moved to place students and their learning lives at its core. Furthermore, when considering and implementing ICTs in the classroom, the interrelationship and transitions between the home, community and school must also be considered in tandem

with prevailing social norms to amplify the transformational capabilities of classroom technologies.

Additional research is also needed to understand technology non-use. One pattern that emerged from the findings of this study is a tendency among participants to *not* use technology for long periods of time. This research is not the first to identify the need to study technology non-use as an important area of future research. Baumer, Burrell, Ames, Brubaker, and Dourish (2015) also identified technology non-use as an area needing further study, because non-use occurs as a result of complex factors and not simply as an outcome of having no access to technologies. Although we are living at a time when ICTs and other technological advances have penetrated every aspect of modern life, instances remain when technology non-use presents itself in surprising ways. For example, there were instances when participants in this study rebuffed ICTs momentarily to focus on the EHEEE. As Baumer et al. (2015) point out, technology non-use is a continually negotiated practice. Further studies looking at these negotiation practices, especially as they relate to the learning lives of students, would help us reconsider how we define technology use as it relates to learning.

Limitations

There are several limitations to this research. The first limitation arises from the very nature of interpretive case study design. Stake (1995) contends that interpretive research concentrates on sensemaking. The researcher is continuously disassembling observed reality and piecing it back together again more meaningfully with the support of theory, as well as his or her "personal experience, scholarship and assertions of other researchers" (p. 12). Therefore, I do not expect the findings from this study to be widely

generalizable. Although my objective is not to generalize nor to provide an unimpeachable account of the current state or pattern of Ethiopian students' ICT uses for learning purposes, it does not mean that assertions and insights gained from this study are unhelpful to other researchers and policy makers. The implications that are presented in this study may be extended or applied to research in similar contexts, where adequate overlap in the political, social, historical and economic landscape can be established or traced.

This research sought to understand how students in a developing country such as Ethiopia use ICTs in their learning lives and how social contexts influence students' ICT use for learning purposes. Embedded in the research questions is an assumption about learning itself and ways to recognize it through the perspectives of social constructivism. When viewed through this lens, learning is understood as a meaning making process facilitated by authentic interactions within social groups, the natural world and within the person himself or herself. Yet it is possible that I may have overlooked new forms of learning. Furthermore, it is necessary to acknowledge that how I come to define learning is informed by academic traditions and culture embedded within Western scholarship.

Finally, incomplete member checking posed another limitation for this study. Despite repeated efforts to connect with participants to conduct member checking, I did not receive a response from them. Part of the challenge was geographic—I live in the U.S. and they live in Ethiopia. The other part of the problem was that the Ethiopian government was periodically blocking internet services to international calls, social networking sites and other VoIP applications, such as Skype and Viber, due to ongoing political upheaval in the country. These mediums of communication were the only means

by which I was able to attempt to make contact with participants following data collection.

The limitations of this study are mitigated through rigorous and strategic engagement in data collection and analysis. They are also mitigated through detailed presentation of contextual and historical accounts that were drawn from publicly available documents and textbooks, direct classroom observations, interviews with school officials, and data captured in the personal accounts shared by participants and their parents/guardians. Thorough, sustained researcher reflexivity throughout the research process was also used as a means to acknowledge and address the limitations of the study and maintain methodological quality and rigor.

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Appendix A

IRB Approval

UNIVERSITY OF MINNESOTA

Twin Cities Campus

Human Research Protection Program
Office of the Vice President for Research

D528 Mayo Memorial Building
420 Delaware Street S.E.
MMC 820
Minneapolis, MN 55455

Office: 612-626-5654
Fax: 612-626-6061
E-mail: irb@umn.edu or ibc@umn.edu
Website: http://research.umn.edu/subjects/

April 3, 2014

Solen D Feyissa
Education/Human Development
Room 210 LES
6197A
1954 Buford Ave
St Paul, MN 55108

RE: "Communication Technologies in formal and informal learning experiences: the case of Ethiopian secondary school students in Addis Ababa, Ethiopia"
IRB Code Number: **1402P48284**

Dear Mr. Feyissa

The Institutional Review Board (IRB) received your response to its stipulations. Since this information satisfies the federal criteria for approval at 45CFR46.111 and the requirements set by the IRB, final approval for the project is noted in our files. Upon receipt of this letter, you may begin your research.

IRB approval of this study includes the assent form and parent consent form received March 28, 2014.

The IRB would like to stress that subjects who go through the consent process are considered enrolled participants and are counted toward the total number of subjects, even if they have no further participation in the study. Please keep this in mind when calculating the number of subjects you request. This study is currently approved for 80 subjects. If you desire an increase in the number of approved subjects, you will need to make a formal request to the IRB.

For your records and for grant certification purposes, the approval date for the referenced project is March 21, 2014 and the Assurance of Compliance number is FWA00000312 (Fairview Health Systems Research FWA00000325, Gillette Children's Specialty Healthcare FWA00004003). Research projects are subject to continuing review and renewal; approval will expire one year from that date. You will receive a report form two months before the expiration date. If you would like us to send certification of approval to a funding agency, please tell us the name and address of your contact person at the agency.

As Principal Investigator of this project, you are required by federal regulations to inform the IRB of any proposed changes in your research that will affect human subjects. Changes should not be initiated until written IRB approval is received. Unanticipated problems or serious unexpected adverse events should be reported to the IRB as they occur.

The IRB wishes you success with this research. If you have questions, please call the IRB office at 612-626-5654.

Sincerely,

Christina Dobrovolny, CIP
Research Compliance Supervisor
CD/bw

CC: Aaron Doering

Appendix B

Letter of Informed Consent (Schools)

Solen D. Feyissa
University of Minnesota
Education/Human Development
Room 210 LES
1954 Buford Ave, St Paul, MN 55108
612-208-6710
feyis003@umn.edu

January 26, 2014

Dear Principal(s) of [redacted]

Title of the Study: Information Communication Technologies in formal and informal learning experiences: the case of Ethiopian secondary school students in Addis Ababa

Background Information
My name is Solen Desalegn Feyissa, and I am a Ph.D. candidate at the University of Minnesota, in the United States of America. I am currently conducting research on how secondary school students use Information Communication Technologies (ICTs). The purpose of this study is to understand how secondary school students use ICTs for formal and informal experiences, and in what ways social contexts influence their use. I believe that researchers, teachers and policy makers will be able to use this information to understand how best to use and integrate ICTs in the curriculum.

I request your permission for students in your school to participate in this research, which will be conducted from April 15, 2014 to May 31, 2014. In this research, I intend to select 40 secondary school students between the ages of 15 to 24 to complete survey questionnaires. The survey will be conducted at the beginning of the study. It will be used to select eight students for further participation. Six of the eight students will participate in one focus group interview that will last approximately two hours. Two of the students will participate in a one-to-one interview with me and will be asked to write a journal entry on how they use ICTs for formal and informal learning in their day-to-day life. I will also do observations in classrooms to see what, if any, role ICTs play.

Upon receiving permission from students' parents and the students themselves, they would only be asked to complete the survey; to be interviewed about and observed during classroom learning activities; and finally to share with me their two weeks worth of student journal, in a mutually agreed upon time and schedule. If you so permit, I intend to do this research within a 5 to 7-week time frame so that I will have time to get to know the school, the teachers, the administrative staff and the students.

Confidentiality:
The names of the school, the teachers, the students and the administrative staff will not be used. Identification codes will be used on all records. The data from this study and the master list of names and identification codes will be kept in separate locked filing cabinets and all digital files will be kept securely in an encrypted computer to which only I have access to. Only University of Minnesota's Institutional Review Board (in the case of an audit), my faculty adviser (Prof. Dr. Aaron Doering), and members of the dissertation research committee will have access to the information. The schools', students' and the teachers' confidentiality will be protected to the maximum extent allowable by law. The research data will be retained for a period of 10 years after the close of the research study.

Risks and Benefits of being in the Study
There are no known risks associated with participating in this study. There is no invasion of privacy in any manner. The benefits to participation are: the study may help researchers and policy makers how ICTs are used to support formal and informal learning and how social influences shape their use. This study may also improve how schools and teachers approach ICT integration in schools.

Financial Benefit
Students and parents who agree to participate in the study and who are selected for the one-to-one interview will receive a total of 350.00 ETB (cash/check), and those students who participate in the focus group interviews will receive 150.00 ETB (cash/check) at the end of the study, July 2014, as a token of appreciation for their support.

Contacts and Questions:
If you have concerns or questions about this study, such as its scientific issues or to report an injury, you are encouraged to contact me at (+1) 612-203-6710 or (+251) 011-371-6926, feyis003@umn.edu or you may contact my advisor, Prof. Dr. Aaron Doering, Learning Technologies Media Lab, 210 LES, 1954 Buford Avenue, St Paul, MN 55108, University of Minnesota, (+1) 612-625-1073, adoering@umn.edu.

If you have questions or concerns about this research, would like to obtain information or offer input, or would like to register a complaint about this research, you may contact, anonymously if you wish, the University of Minnesota Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (+1) 612-625-1650.

You will be given a copy of this information to keep for your records.

Thank you,

Solen Feyissa
Ph.D. Candidate, University of Minnesota

Statement of Consent:
I have read the above information. I have asked questions and have received answers. I indicate my permission for these schools to participate in this study by putting our school's signature on this letter.

_____ _____
(Signature) (School Official Stamp)

_____ _____
(Printed Name and Position) (Date)

Appendix C

Letter of Informed Consent (Parents)

Solen Desalegn Feyissa
University of Minnesota
Education/Human Development
Room 210 LES
1954 Buford Ave, St Paul, MN 55108
612-208-6710
feyis003@umn.edu

Month, Date, Year

Dear Parents/Guardians of _____

Title of the Study: Communication Technologies in formal and informal learning experiences: the case of Ethiopian secondary school students in Addis Ababa, Ethiopia

Background Information
My name is Solen Desalegn Feyissa, and I am a Ph.D. candidate at the University of Minnesota, in the United States of America. I am currently conducting research on how secondary school students use Information Communication Technologies (ICTs) for formal and informal learning. The purpose of this study is to understand how secondary school students use ICTs for formal and informal experiences, and in what ways social contexts influence their use. I believe that researchers, teachers and policy makers will be able to use this information to understand how best to use and integrate ICTs in the curriculum.

Your child (son/daughter) is invited to participate in this research, which will be conducted from June 10, 2014 to July 17, 2014. In this research, I intend to select students to complete survey questioners. The survey will be conducted at the beginning of the study to generate initial data that will be used to select eight students for further participation based on the information your child provided. In the event that your child is selected for further participation he or she will participate in a focus group interview or a one-to one interview with me and he or she will be asked to keep a journal about his or her use of ICTs in his or her daily life.

I intend to conduct a survey, interviews, class observations, and collect two weeks worth of student written journal entries documenting their ICT use. The overall time commitment for this study is small. Your child will only have to agree to complete the survey; to be interviewed about and observed during classroom learning activities; and finally to share with me his or her student journal, in a mutually agreed upon time and schedule. I intend to do this research within a 5 to 7-week time frame so that I will have time to get to know the school, the teachers, the administrative staff and the students.

Confidentiality:
The names your child, the school, the teachers, and the administrative staff will not be used. Identification codes will be used on all records. The data from this study will be kept in separate locked filing cabinets, and all digital files will be kept securely in an encrypted computer to which only I have access to. Only University of Minnesota's Institutional Review Board (in the case of an audit) will have access to the information. Your confidentiality will be protected to the maximum extent allowable by law. The research data will be retained for a period of 10 years after the close of the research study.

Risks and Benefits of being in the Study
There are no known risks associated with participating in this study. There is no invasion of privacy in any manner. There are no direct benefits to participation in the study.

Financial Benefit
If you agree for your child to be part of this study, and if he or she is selected for the one-to-one interview, he or she will receive $25.00 (cash/check), and if he or she participates in the focus group interviews, he or she will receive $15.00 (cash/check) at the end of the study, July 2014, as a token of appreciation for their support.

Contacts and Questions:
If you have concerns or questions about this study, such as its scientific issues or to report an injury, you are encouraged to contact me at (+1) 612-203-6710 or (+251) 011-371-6926, feyis003@umn.edu or you may contact my advisor, Prof. Dr. Aaron Doering, Learning Technologies Media Lab, 210 LES, 1954 Buford Avenue, St Paul, MN 55108, University of Minnesota, (+1) 612-625-1073, adoering@umn.edu.

If you have questions or concerns about this research, would like to obtain information or offer input, or would like to register a complaint about this research, you may contact, anonymously if you wish, the University of Minnesota Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (+1) 612-625-1650.

You will be given a copy of this information to keep for your records.

Thank you,

Solen Feyissa
Ph.D. Candidate, University of Minnesota

Statement of Consent:
I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

_____ _____
(Signature of parent or guardian) (Date)

_____ _____
(Signature of investigator) (Date)

Appendix D

Letter of Informed Consent (Students)

Solen Desalegn Feyissa
University of Minnesota
Education/Human Development
Room 210 LES
1954 Buford Ave, St Paul, MN 55108
612-208-6710
feyis003@umn.edu

Month, Date, Year

Dear _____

Title of the Study: Communication Technologies in formal and informal learning experiences: the case of Ethiopian secondary school students in Addis Ababa, Ethiopia

Background Information
My name is Solen Desalegn Feyissa, and I am a Ph.D. candidate at the University of Minnesota, in the United States of America. I am currently conducting research on how secondary school students use Information Communication Technologies (ICTs) for formal and informal learning. The purpose of this study is to understand how secondary school students use ICTs for formal and informal experiences, and in what ways social contexts influence their use. I believe that researchers, teachers and policy makers will be able to use this information to understand how best to use and integrate ICTs in the curriculum.

You are invited to participate in this research, which will be conducted from June 10, 2014 to July 17, 2014. In this research, I intend to have you complete survey questioners. The survey will be conducted at the beginning of the study to generate initial data that will be used to select eight students for further participation based on the information you provided. In the event that you are selected for further participation you will participate in a focus group interview or a one-to-one interview with me and you will be asked to keep a journal about your use of ICTs in your daily life.

I intend to conduct a survey, interviews, class observations, and collect two weeks worth of journal entries documenting your ICT use. The overall time commitment for this study is small. You will only have to agree to complete the survey; to be interviewed about and observed during classroom learning activities; and finally to share with me your journal in a mutually agreed upon time and schedule.

Confidentiality:
Your name, the school, the teachers, and the administrative staff will not be used. Identification codes will be used on all records. The data from this study will be kept in separate locked filing cabinets, and all digital files will be kept securely in an encrypted computer to which only I have access to. Only University of Minnesota's Institutional Review Board (in the case of an audit) will have access to the information. Your confidentiality will be protected to the maximum extent allowable by law. The research data will be retained for a period of 10 years after the close of the research study.

Risks and Benefits of being in the Study
There are no known risks associated with participating in this study. There is no invasion of privacy in any manner. There are no direct benefits to participation in the study.

Financial Benefit
If you agree to be part of this study, and if you are selected for the one-to-one interview, you/your parents will receive $25.00 (cash/check), and if your participate in the focus group interviews, your/your parents will receive $15.00 (cash/check) at the end of the study, July 2014, as a token of appreciation for your support.

Contacts and Questions:
If you have concerns or questions about this study, such as its scientific issues or to report an injury, you are encouraged to contact me at (+1) 612-203-6710 or (+251) 011-371-6926, feyis003@umn.edu or you may contact my advisor, Prof. Dr. Aaron Doering, Learning Technologies Media Lab, 210 LES, 1954 Buford Avenue, St Paul, MN 55108, University of Minnesota, (+1) 612-625-1073, adoering@umn.edu.

If you have questions or concerns about this research, would like to obtain information or offer input, or would like to register a complaint about this research, you may contact, anonymously if you wish, the University of Minnesota Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (+1) 612-625-1650.

You will be given a copy of this information to keep for your records.

Thank you,

Solen Feyissa
Ph.D. Candidate, University of Minnesota

Statement of Consent:
I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

_____ _____
(Signature of student) (Date)

_____ _____
(Signature of investigator) (Date)

Appendix E

Survey Questionnaires

SCHOOL NAME (look at the back of the form)

- ❍ School A (1)
- ❍ School B (2)

Your classroom roster number

Your Gender

- ❍ Male (1)
- ❍ Female (2)

What is your parents' profession?

Mother's Profession (1)

Father's Profession (2)

What is your age?

- ❍ Below 14 (1)
- ❍ 14 - 16 (2)
- ❍ 17 (3)
- ❍ Above 17 (4)

Have you had any formal computer training?

- ❍ Yes (1)
- ❍ No (2)

Answer If Have you had any formal computer training? Yes Is Selected

If you answered yes to the above question, what type of training did you take?

When did you start using a computer?

- ❍ Before kindergarten (1)
- ❍ In kindergarten-grade 3 (2)
- ❍ In grade 4-5 (3)
- ❍ In grade 6-8 (4)
- ❍ In grade 9 - 10 (5)
- ❍ In grade 11 -12 (6)

How much time do you spend on computers every day?

- ❍ Not at all (1)
- ❍ Less than one hour (2)
- ❍ About 1-3 (3)
- ❍ About 6-9 hours (4)
- ❍ More than 9 hours (5)

How often do you use the internet?

- ❍ Not at all (1)
- ❍ Less frequently than once per month (2)
- ❍ Once a month (3)
- ❍ A few times per month (4)
- ❍ Once a week (5)
- ❍ A few times per week (6)
- ❍ Everyday (7)

I use the internet at

- ❍ home (1)
- ❍ an internet café (2)
- ❍ a friends' house (3)
- ❍ school (4)
- ❍ an office somewhere (5)
- ❍ a library (6)
- ❍ a NGO (7)

Do you own the following devices?

	Yes (1)	No (2)
Personal Computer (1)	❍	❍
Mobile Phone (2)	❍	❍
Game Console (3)	❍	❍
iPod (or other mp3 players) (4)	❍	❍
Smart Phone (such as iPhone, Android Phones, Blackberry or other) (5)	❍	❍

What do you use computers for (choose all that apply)?

- ❑ For learning-related activities (1)
- ❑ For entertainment (playing games, watching videos, etc.) (2)
- ❑ For social/communication activities (chat, e-mail, IM, etc.) (3)
- ❑ For practical purposes (find info. you need) (4)
- ❑ For self-expression (blogging, commenting, etc.) (5)
- ❑ Shopping (6)
- ❑ Other (please specify) (7) _____

What do you use the internet for (choose all that apply)?

- ❑ Searching information for my study (eg. preview, review, homework) (1)
- ❑ Searching information for other practical purposes (e.g., weather, health, etc.) (2)
- ❑ Reading news to know what is going on in this country (3)
- ❑ Sending and receiving e-mails (4)
- ❑ Playing games (5)
- ❑ Online chatting (chat rooms, instant messenger, ICQ, etc) (6)
- ❑ Surfing online for fun (reading novels, stories, entertainment) (7)
- ❑ Downloading music, pictures, movies, etc. (8)
- ❑ Blogging (9)
- ❑ Publishing my digital media files online (eg. On youtube, podcasting) (10)
- ❑ Social networking (eg. Facebook, twitter etc.) (11)
- ❑ Viewing and posting messages (eg. On forums, discussion boards, etc.) (12)
- ❑ Getting information about other places, countries, cultures, and peoples in the world (13)
- ❑ Shopping (e.g., Amazon, Ebay, other) (14)
- ❑ Other please specify (15)

Overall, on which task do you spend most time while using the internet every day (only choose one)?

- ❍ Searching information for my study (e. g., preview, review, homework) (1)
- ❍ Searching information for other practical purposes (e.g., weather, health, etc.) (2)
- ❍ Reading news to know what's going on in this country (3)
- ❍ Sending and receiving e-mails (4)
- ❍ Playing games (5)
- ❍ Online chatting (chat rooms, instant messenger, Facebook chat, google+, etc.) (6)
- ❍ Surfing online for fun (reading novels, stories, entertainment) (7)
- ❍ Downloading music, pictures, movies, etc. (8)
- ❍ Blogging (9)
- ❍ View or publishing digital media files online (e.g., on YouTube, podcasting, etc.) (10)
- ❍ Social networking (e.g., Facebook, Myspace, etc.) (11)
- ❍ Viewing and posting messages (e.g., on forums, discussion boards, etc) (12)
- ❍ Getting information about other places, countries, cultures and peoples in the world (13)
- ❍ Shopping (e.g., Amazon, EBay, other online stores, etc.) (14)
- ❍ Other (Please specify) (15)

Please indicate, on a scale of 1 to 5, your responses to each of these statements. (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree)

	Strongly Agree (1)	Agree (2)	Neither Agree nor Disagree (3)	Disagree (4)	Strongly Disagree (5)
1. Computers are generally reliable. (1)	❍	❍	❍	❍	❍
2. The more technology you use; the more respect you will get from your peers. (2)	❍	❍	❍	❍	❍
3. The more technology you use, the more respect you will get from your peers. (3)	❍	❍	❍	❍	❍
4. I feel comfortable using technology. (4)	❍	❍	❍	❍	❍
5. I do well with computer technologies. (5)	❍	❍	❍	❍	❍
6. Computers and related technologies will isolate students from one another. (6)	❍	❍	❍	❍	❍
7. I am interested in computers and related technologies. (7)	❍	❍	❍	❍	❍
8. I am interested in learning new technologies (8)	❍	❍	❍	❍	❍
9. I am interested in learning new technologies that can help me in the future. (9)	❍	❍	❍	❍	❍
10. I believe that technologies can help me learn better. (10)	❍	❍	❍	❍	❍
11. I believe that technologies can help students learn better. (11)	❍	❍	❍	❍	❍
12. I can solve most of the problems when my computer doesn't work. (12)	❍	❍	❍	❍	❍
13. I am confident in using the internet for my learning. (13)	❍	❍	❍	❍	❍
14. I am confident in using technology in my learning. (14)	❍	❍	❍	❍	❍

To you, what's the most exciting thing about the internet?

- ❑ Getting information I need for my study (1)
- ❑ Getting information I need for other practical purposes (2)
- ❑ Reading news (3)
- ❑ Playing games (4)
- ❑ Making new friends (5)
- ❑ Communicating with my friends (6)
- ❑ Chatting with strangers (7)
- ❑ Knowing things about the world (8)
- ❑ Shopping (9)
- ❑ Downloading files I need (10)

How would you rate your proficiency of the following skills? Please check your response on a scale of 1 to 5.1 = No experience 2 = Beginner (little skill)3 = Moderate (can use some already-prepared applications, or can perform the task with help)4 = Substantial (can use and create/customize many applications on my own, or can perform the task on my own)5 = Expert (could teach others how to use and create/customize many applications, or can teach others how to perform the task)

	no experience (1)	Beginner (2)	Moderate (3)	Substantial (4)	Expert (5)
1. Navigating the Web (1)	❍	❍	❍	❍	❍
2. Finding information from Web searches (2)	❍	❍	❍	❍	❍
3. Evaluating information from Web searches (3)	❍	❍	❍	❍	❍
4. Searching electronic library databases for books, articles, and other resources (4)	❍	❍	❍	❍	❍
5. Using e-mail (5)	❍	❍	❍	❍	❍
6. Playing Online Games (6)	❍	❍	❍	❍	❍
7. Using Web-based course management software (e.g., BlackBoard) (7)	❍	❍	❍	❍	❍
8. Using instant messenger software (8)	❍	❍	❍	❍	❍
9. Developing a wiki (9)	❍	❍	❍	❍	❍
10. Blogging (10)	❍	❍	❍	❍	❍
11. Maintaining a personal social networking site (Facebook, MySpace, etc.) (11)	❍	❍	❍	❍	❍
12. Downloading	❍	❍	❍	❍	❍

pictures/movies/music (12)					
13. Setting up a video conference (13)	❍	❍	❍	❍	❍
14. Word processing (14)	❍	❍	❍	❍	❍
15. Using electronic spreadsheets (e.g. MS Excel) (15)	❍	❍	❍	❍	❍
16. Using electronic databases (e.g. MS Access) (16)	❍	❍	❍	❍	❍
17. Desktop publishing (e.g. writing newsletters) (17)	❍	❍	❍	❍	❍
18. Using presentation software (e.g. PowerPoint) (18)	❍	❍	❍	❍	❍
19. Scanning documents (19)	❍	❍	❍	❍	❍
20. Editing documents (20)	❍	❍	❍	❍	❍
21. Using digital cameras (21)	❍	❍	❍	❍	❍
22. Using audio devices to record sounds (22)	❍	❍	❍	❍	❍
23. Using digital video cameras (23)	❍	❍	❍	❍	❍
24. Editing pictures (24)	❍	❍	❍	❍	❍
25. Editing audio files (25)	❍	❍	❍	❍	❍
26. Editing video files (26)	❍	❍	❍	❍	❍
27. Publishing photos online (e.g. Facebook, Flickr) (27)	❍	❍	❍	❍	❍
28. Publishing audio files (e.g. on soundhound.com) (28)	❍	❍	❍	❍	❍
29. Publishing video files (e.g. on Youtube.com) (29)	❍	❍	❍	❍	❍
30. Using music edit applications (30)	❍	❍	❍	❍	❍
31. Using Web pages (31)	❍	❍	❍	❍	❍
32. Using graphic design applications (32)	❍	❍	❍	❍	❍
33. Creating animations (33)	❍	❍	❍	❍	❍
34. Programming (34)	❍	❍	❍	❍	❍
35. Playing computer games (35)	❍	❍	❍	❍	❍
36. Using hand-held and other mathematical calculators (36)	❍	❍	❍	❍	❍
37. Using hand-held tablet computers. (37)	❍	❍	❍	❍	❍
38. Using idea processors (e.g.	❍	❍	❍	❍	❍

Inspiration, concept mapping) (38)					
39. Using drill and practice programs/tutorials (39)	❍	❍	❍	❍	❍
40. Using other software specific to your work. (40)	❍	❍	❍	❍	❍
41. Using augmentative systems to help persons with disabilities communicate (41)	❍	❍	❍	❍	❍
42. Using assistive technology to help person with disabilities learn (42)	❍	❍	❍	❍	❍
43. Setting up computers (e.g. connecting power cable, data cable, etc.) (43)	❍	❍	❍	❍	❍
44. Installing software (44)	❍	❍	❍	❍	❍
45. Managing, storing, and backing up files on servers, CDs, zip drives, etc. (45)	❍	❍	❍	❍	❍
46. Using Macintosh operating systems (46)	❍	❍	❍	❍	❍
47. Troubleshooting hardware problems (47)	❍	❍	❍	❍	❍
48. Troubleshooting software problems (48)	❍	❍	❍	❍	❍
49. Exploring new technology (49)	❍	❍	❍	❍	❍
50. Other (please describe) (50)	❍	❍	❍	❍	❍

Appendix F

Observation Protocol

Research Site		
Date		
Time	**Descriptive notes** (portraits of participants, reconstruction of dialogue, description of setting, events, activities)	**Reflective notes** (personal thoughts: problems, speculations, feelings, ideas, hunches, impressions, and prejudices)

Observation Protocol Based on Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (4th ed.). Thousand Oaks, CA: SAGE.

Appendix G

Student Journal Guide

Student Journal Guide

1. **ዛሬ ምን ዌብሳይት ወይም የመወያያ መሳርያ (desktop computer or smartphone) ተጠቀምኩ?**
    a. **ስንት ሰዓት ላይ ነበር የተጠቀምኩት?**
    b. **ለምን ያህል ሰዓት ተጠቀምኩ?**
    c. **ምን ፃፍኩ? ምን አነበብኩ?ምን አየሁ? ምን ሰማሁ?**
    d. **ምን ሰማድረግ ፈልጌ አልተሳካለኝም?**
    e. **ምን ሰማድረግ ፈልጌ ተሳክቶለኛል?**
2. **ወላጆቼ ስለ ኢንተርኔት አጠቃቀሜ ምን አሉኝ?**
3. **ጎደኞቼ ስለ ራሳቸው አጠቃቀም አና ስለ አኔ አጠቃቀሜ ምን አሉኝ?**
4. **ከትምህርት ቤት ጋር የተያያዘ የኢንተርኔት አጠቃቀም ሁኔታዬ አንዴት ነበር?**
5. **ዛሬ ከኢንተርኔት አጠቃቀም ጋር የተያያዘ ምን ጠቃሚ ነገር ተማርኩ?**
6. **በኢንተርኔት አጠቃቀሜ ምክንያት የተነሳ ከትምህርት ጋር ያልተያያዘ ምን አውቀት ቀሰምኩ?**

Appendix H

Participant Interview Guide

INTERVIEW GUIDE

1. Do you have access to the Internet?
    a. Where do you have access to the Internet?
    b. How do you use it, and how often do you use it?
2. Can you recall your first experience with the Internet? Tell me about it.
3. What kinds of devices do you use to access the Internet at home?
    - How do you use them, and how often do you use them?
4. What kinds of devices do you use to access the Internet at school?
    - How do you use them, and how often do you use them?
5. Do you use the same kinds of devices (e.g. desktop computers) to access the Internet? Why, or Why not?
6. Give me an example when your access to the Internet helped you.
    - How do you know it helped you learn better?
7. When do you think access to the Internet is not useful?
8. For which subjects do you most use your Internet access?
9. Describe your beliefs/perceptions about using the Internet in your learning.
10. What should the Internet do to help you learn?
11. Do you have regular access to technology in your classroom?
    - How about at home?
12. Do your parents tell you when you can and cannot use the Internet, or your computer?
    - Do they monitor whether you are using the Internet for learning or not?
13. Do your teachers tell or show you how to use the Internet to complete an assignment?
14. How do your classroom teachers use the Internet?
15. In general, what types of technological resources are available in your school for students to use?
16. How do you use technology in your learning?
    - Describe an experience you have had using technology for learning.
        i. What technology tool(s) did you use?
        ii. Why did you choose to use this technology?
        iii. Tell me why you remember this experience.
        iv. Describe your reactions during this experience.
        v. How did it make you feel? (Happy, confident, nervous, excited, frustrated)
17. What were the factors that supported your use of technology in your learning?
18. What were the factors that inhibited you from using technology to support your learning?
19. What factors have most influenced you in terms of using the Internet?
    - Can you speak more specifically about issues that influenced your Internet use for learning?
20. Have you received any computer training?
    a. What were the lessons
    b. How has this computer training you received changed your confidence in using technology for learning purposes?
21. Have you ever received a tutorial from a friend or a family member about the Internet and how to use it?
22. Is there anything you would like to tell me that we didn't cover already?

Appendix I

Parent/Guardian Interview Guide

PARENT INTERVIEW GUIDE

1. What motivated you to purchase a computer/smartphone for your child?
    a. Please describe what the decision making process was like? For example, were there discussions about the benefits and drawbacks of making the purchase?
    b. Were there specific points that were contentious during your discussion?
2. Can you recall your child's first experience with the Internet? Tell me about it.
3. What kinds of devices does your child use to access the Internet at *home*?
    - How does he/she use them, and how often does he/she use them?
4. What kinds of devices does your child use to access the Internet at *school*?
    - How do you use them, and how often do you use them?
    - What do you think is the student to computer ration at school?
5. Does your child use a single device (e.g. only desktop computers) to access the Internet? Why, or Why not?
6. Give me an example when his/her access to the Internet helped him or her.
    - How do you know it helped him/her learn better?
7. When do you think access to the Internet is not useful?
8. Describe your beliefs/perceptions about Internet use for learning.
9. In what circumstance is technology most important for learning?
10. Do you tell your child when he/she can and cannot use the Internet, or his/her computer?
    - Do you monitor whether he/she is using the Internet for learning or not?
11. In general, what types of technological resources are available in his/her school for students to use?
12. Have you received any computer training?
    - What were the lessons
13. Is there anything you would like to tell me that we didn't cover already?