Ministry of Education

READ TA

Information and Communication Technology (ICT)

Baseline Assessment Report

December 2013

The READ TA Project

Initiated in October 2012, the Reading for Ethiopia's Achievement Developed Technical Assistance (READ TA) Project is a five-year initiative to improve the reading and writing performance of 15 million primary grade students in seven (7) Ethiopian languages (Amharic, Afaan Oromo, Sidamu Afoo, Af Somali, Tigrinya, Wolaittatto and Haddiyisa), in addition to English as a second language.

The READ TA Project is implemented by Research Triangle Institute (RTI) and its partners: Save the Children, Inveneo, Florida State University (FSU), SIL LEAD, WhizKids Workshop and Africa Development Corps.

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DISCLAIMER
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ACRONYMS and ABBREVIATIONS

CTE	College of Teacher Education
EGRA	Early Grade Reading Assessment
FSU	Florida State University
ICT	Information and Communication Technology
ICIP	Inveneo Certified ICT Partner
LAN	Local Area Network
MOE	Ministry of Education
MT	Mother Tongue
ODK	Open Data Kit
READ TA	Reading for Ethiopia's Achievement Developed Technical Assistance
RSEB	Regional State Education Bureau
RTI	Research Triangle Institute
SS	Satellite Primary School
SAVE	Save the Children - Ethiopia
SCC	School Cluster Center

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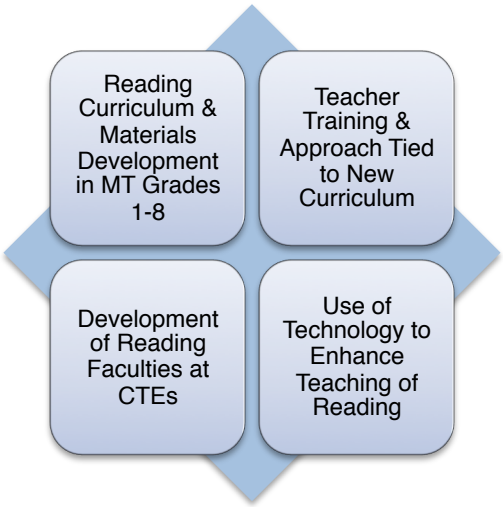
Background

A USAID-funded Early Grade Reading Assessment (EGRA) performed in May and June of 2010 in six languages and seven of Ethiopia's nine regional states revealed shockingly poor results in reading achievement. By the end of 2nd grade, 34% of students were unable to read even one word and 48% of students scored a zero in comprehension. Grade 3 students were 20% nonreaders and 30% with zero comprehension.[1] These results diverge greatly from the MOE's minimum learning competencies – the national standards that expect a child to be reading near levels of fluency, with appropriate levels of comprehension, by the end of Grade 1. The Reading for Ethiopia's Achievement Developed Technical Assistance Project (READ TA) is a 5-year initiative, in collaboration with MOE and funded by USAID, to improve the reading and writing performance of 15 million primary grade students in 5 regional states and 7 Ethiopian Mother Tongue languages.

As implementer of READ TA, RTI, in collaboration with MOE and its Partners, intends to achieve these results by focusing on these four (4) main activity areas:



Beginning in Spring 2013, MOE, in collaboration with READ TA, began the process of developing new reading curriculum and materials for MT reading in grades 1-8 by first reviewing and validating findings for what was currently in existence. A similar process for the remaining three activity areas began in May 2013 with rapid baseline assessments for pre- and in-service teacher training and ICT in Colleges of Teacher Education and primary schools. This report is one in the series that outlines not only the findings and validation process for the baseline assessment for the respective activity area, but also presents conclusions and early recommendations to MOE for review and approval so that READ TA work under the associated activity area can begin.

[1] Piper, B. (2010). *Ethiopia Early Grade Reading Assessment, Data Analytic Report: Language and Early Learning*. Report prepared for USAID/Ethiopia under Ed Data II Task Number 7 and Ed Data II Task Number 9.

Introduction

In addition to providing support to the Ethiopian Ministry of Education (MOE) through pedagogical improvements such as the adoption of a national framework for instructional design for reading and the development of reading faculties at Colleges of Teacher Educations (CTEs), READ TA also seeks to use media and Information & Communication Technologies (ICT) to enhance pre-service and in-service teacher training in reading pedagogies and inclusive education for students with disabilities. With the assistance of its ICT Partners Inveneo and CoreNet Technologies (CoreNet), and in partnership with the Ministry of Education (MOE), Regional State Education Bureaus (RSEBs), and College of Teacher Education (CTEs), READ TA intends to explore cost-effective and innovative applications for computing technologies, efficient methods of content delivery, and opportunities for capacity building. The main goal will be to enhance the delivery of MT reading and writing instruction while ensuring that any introduced solutions are sustainable, in context with the local environment, and able to be cost-effectively used and maintained. Particular attention will be given to introducing technologies that could help overcome the obstacles faced by students with disabilities and help enhance their educational participation and outcomes.

As a first step and in preparation for designing these ICT implementations, Inveneo and CoreNet participated in a series of initial baselines assessments undertaken by READ TA Partners between May and June 2013 for the purpose of capturing the current environment surrounding the instruction of reading and writing in MT and English languages. Inveneo and CoreNet's task was to assess the state and use of teaching and learning technologies in CTEs and School Cluster Centers (SCCs), and satellite primary schools as a counterpoint. While each of the READ TA implementing partners carried out their respective surveys independently, a concerted effort was made to coordinate and collaborate on questions across the different tailored surveys to ensure that, where appropriate, the overall results could include responses from a cross-section of stakeholders. This specific report discusses the ICT portion of the baseline surveys carried out by the Inveneo-CoreNet partnership, outlining the objectives, methodologies, findings and recommendations. The report also documents efforts to validate the initial findings with a cross-section of representatives from MOE and outlines future steps that should be taken.

Executive Summary

With experience addressing related challenges in 23 countries in Sub-Saharan Africa, READ TA ICT Partner Inveneo and their Ethiopian ICIP CoreNet are dedicated to making ICT available to rural and other underserved populations in developing countries, including Ethiopia. Using their combined experience working in both educational settings and in resource-constrained environments, Inveneo and CoreNet together developed and executed a baseline survey in May and June 2013 using modern ICT tools to capture various forms of data, both quantitative and qualitative, in six key areas important to ICT. Although the sample size was by necessity small, the CTEs and primary schools were purposefully selected to represent a cross-section of institutions in rural and urban areas in the five regions of READ TA focus. The selected sites also represented each of the seven Mother Tongue languages that are the focus of READ TA.

Overall, the survey and follow-on validation process with MOE found that CTEs, while clearly the best equipped of all school types to handle more technology, still experience significant gaps in their underlying ICT infrastructure—both human and technical—which READ TA must consider as it

plans its ICT program to help support the new pre-service teacher training curriculum that READ TA and Florida State University (FSU) plan to develop. This finding supports READ TA's conceptualization of CTEs as hubs through which to deliver this new curriculum in scalable ways that add not only reach, but also the depth necessary to affect learning outcomes. As imagined, ICT in CTEs will not only enhance lecturers' ability to deliver the curriculum, but can also be used in other educational ways, such as to extend learning time by making audio or video lessons available outside the classroom, to allow sharing of lesson plans across CTEs, and by creating cost-effective ways for students, lecturers, and international experts to maintain direct communications.

School Cluster Centers, primary schools chosen by MOE to serve as a hub of additional resources to surrounding sets of primary schools, were surveyed to see if they might act as a hub of ICT resources as well. The focus of READ TA work in SCCs from an ICT standpoint will be to test pilot interventions centered on bridging the gap in reading and writing in MT for those with disabilities in SCC Resource Centers. The intent is to see if using SCCs in resource-constrained environments by utilizing already existing resource structures can drive learning outcomes by make scarce assets more widely available. The survey found that some SSCs have stable enough power to operate technology devices, but only a few have any technology devices already in place and functioning; an even smaller minority had any ICT capacity. These low numbers and high variability tell us that careful, site-specific research will be required before the finalization of the designs of pilot interventions.

The findings from both the rapid baseline assessment and subsequent validation discussions revealed diverse scenarios that will influence how READ TA approaches the design and implementation of ICT solutions for both CTEs and for the pilot studies at SCCs. It is important to remember that the intent is not for technology to be an end unto itself, but that it should be employed for the specific purpose of furthering the goals and reach of the primary MT curriculum, and pre- and in-service teacher training that READ TA seeks to assist the MOE in developing. So, only when coupled with the insights and recommendations currently being derived and cultivated by Partners RTI, Save the Children, Florida State University, and Whiz Kids Workshop in their respective project areas can READ TA design a complete ICT portfolio for MOE review.

While READ TA's focus is certainly on applications of technology that will contribute to early grade MT reading and writing outcomes through improvements in teacher development and training, the reality is that successful ICT implementations require the right ecosystems in which to exist. Therefore, READ TA will need to consider enhancements and activities that benefit the ecosystems within CTEs and RSEBs beyond targeted hardware additions or rehabilitations in addition to directly impacting the development of preservice teacher training. The intent is that improvements to the infrastructure—both human and technical— will drive adoption and use of ICT by lecturers and students teachers, furthering the reach and depth of learning of the new preservice teacher training curriculum.

With these dependencies in mind, READ TA offers the following early recommendations in regard to technology in the context of the Ethiopia READ TA project:

1. <u>Focus on Scalable Inputs:</u>

ICT support to CTEs and schools needs to be focused on the mandate of the project to

establish/strengthen mother tongue reading faculties at the CTEs; however, ICT-related support should be designed so that institutions can make use of these supports for their broader operations as well.

2. Help Build ICT Support Capacity:

READ TA should design a tailored capacity building program for ICT planning, management and pedagogical integration. Capacity building should take into account and strengthen existing functioning models, as well as build new approaches where necessary.

3. Introduce Targeted Educational Content:

Based on the identified lack of educational content, READ TA ICT inputs will need to provide and build capacity for carefully selected, locally appropriate content and applications in direct support of the planned pre-service MT reading curriculum.

4. Tailored Equipment:

As per its program design, equipment provision under READ TA is to be moderate and targeted. Technology needed to make use of the above-mentioned content, however, will need to be provided in support of the MT reading instruction program.

5. ICT to Maximize Support for Learners with Disabilities:

Content and technologies to support the reading instruction of learners with disabilities will fill a need expressed by CTEs and schools. Small pockets of good practice and use of ICT to support learners with disabilities exist at CTEs and schools.

6. Monitoring ICT Integration:

READ TA should ensure that its activities are carefully monitored and evaluated so as to generate documented, valuable knowledge relevant for replication and scale-up. Building local capacity in monitoring and evaluation of such initiatives and sharing findings should be a priority.

1 Understanding ICT

The survey conducted by READ TA Partners Inveneo and CoreNet was a baseline assessment of the current state of ICT in Colleges of Teacher Education (CTEs), School Cluster Centers (SCCs), and Satellite Primary Schools (SSs). The survey looked at the existing ICT-related infrastructure and ICT-centric human capacity in a variety of school settings using a small sample size of each school type. The purpose was to gather a snapshot of current information to help inform READ TA planning regarding the implementation and use of technology solutions to deliver improved instruction around the teaching of reading and writing in Mother Tongue and English languages at both pre-service and in-service institutions.

The survey covered many ICT-related details and touched on the READ TA crosscutting issues of gender and inclusion. However, before recommending any type of ICT intervention in resource-constrained environments, Inveneo believes it is important to focus on understanding the existing local environment, circumstances, and gaps in the following six (6) key areas:

1.1 Power

Power is a critical and required resource for any ICT implementation. In most developing areas, economic growth outpaces what centralized power production and electrical distribution grids can support. Where grid power is available, outages, voltage spikes, and dips can quickly damage ICT equipment and their internal power supplies. Consistent power is also important for ensuring effective ICT operations. Unstable power at random times can compromise the predictable availability of ICT, affecting user uptake, capacity for use, and any beneficial affects that ICT adoption may offer.

So, for any ICT deployment, a stable power source is an important requirement, and understanding the power situation at the school level is critical. Where the grid is not available or unreliable, alternatives are needed or may already be in use. Fossil fuel-based generators are the usual default alternative, but while the initial purchase cost may be low, the high ongoing fuel and maintenance costs can cause both short- and long-term issues. Under such circumstances, it is recommended that local authorities and stakeholders consider the use of other alternative energy sources. Renewable energy can be a better solution in energy-constricted regions, and this survey takes into consideration the uptake and use of ICT and renewable energy as well.

1.2 ICT Hardware

Not all hardware is right for every environment or situation. Inveneo-CoreNet assessed the computers and ICT equipment as a whole and collected data on user satisfaction for the applications currently being used on this equipment. The main purpose was to obtain a general idea of the status of the ICT equipment at the locations. Inveneo also collected information from the rooms specifically dedicated to ICT equipment such as desktop computers, laptops, wireless access points or Wi-Fi, routers, servers, printers, and projectors. More details are provided under the "Types of Data Collected" section below (Section 4).

After first determining the quantity, model, operating system and working status of the computers at the surveyed schools, the next step is to evaluate key points such as (i) the performance level of the computers and peripherals, (ii) the level of energy usage, and (iii) if software applications can run on the computers. This will help to determine important factors including:

- The capacity of the hardware to run new software.
- The possibility of re-purposing existing computers for new uses or applications.
  It is important to keep in mind that repurposing can be expensive and can take time. Factors to take into consideration include viruses and pirated operating systems. Under these circumstances, there is no guarantee that new applications will work without conducting further analysis of each individual computer.
- The ability of the existing systems to support program goals and partner recommendations for use.
- The level of skills and talents needed for equipment support and maintenance.

1.3 Internet Connectivity

The Internet has become a necessary tool to access information: E-mail, videos, news, research, interactive multimedia, and communications and general outreach. Internet connectivity is also fast becoming an important tool for the implementation of ICT components of education projects. Having dependable Internet in an education setting provides access to a wide array of possibilities. For example, it can allow teachers to research topics for their classes, can provide professional development resources specific to their needs such as remote training courses, and can allow for updates to teacher curriculum and resources, to name a few.

It is important to note that while Internet connectivity may be critical for some components of a program, there are alternative ways to deliver content, which can otherwise consume significant amounts of bandwidth when viewed via the Internet. Systems can be designed so that content is available via local servers, ensuring that bandwidth use is reserved for applications that require Internet access.

Additionally, as Internet use grows, an important consideration for any location is how to manage access so that those who require access can use it effectively and those who do not have permission or are using unauthorized high-bandwidth applications are removed. Understanding how to administer user access can increase perceived and actual performance of the Internet, thereby affecting user uptake of the technology.

1.4 Human Capacity

While READ TA has a mix of implementing partners with key and relevant expertise to contribute towards the effective integration of ICT in schools, it is the ICT capacity at the school, RSEB, and MOE levels that will result in sustainability. In both CTEs and SCCs, it is teachers and lecturers with the most significant roles to play. Their ability to use the technology determines whether the ICT purchased is used at all. They also determine whether technology is used effectively and in an appropriate way in terms of driving learning outcomes and educational objectives. In addition to teachers, there are other key players who are pivotal in determining the success or failure of ICT

implementations. These key personnel include ICT trainers, ICT administrators, and ICT support staff.

For these reasons, it is important to determine the level of human capacity across a spectrum, including basic skills, training, support and maintenance, and use of ICT. Where skills are wanting, the capacity building of these skills in teachers, staff, and administrators may be necessary in order for the broader efforts to succeed.

1.5 Support and Maintenance

Related to ICT human capacity, ICT support and maintenance of both hardware and software and the system(s) with which they interact are key considerations for any long-term ICT project, and therefore a fundamental touch point in any ICT survey. While preventive and predictive maintenance seeks to catch and prevent symptoms before they result in breakdowns, proactive programs seek to lessen or eliminate the root causes and make systems available when the teachers and students need them. Technical issues with ICT are common barriers for teachers and students. These issues include slow computers, slow or no Internet access, nonfunctioning printers, outdated software and web page plugins. Technical problems can impede smooth delivery of content and can cause unexpected disruptions that can burden the learning process. Viruses, malware, spyware, and Trojans also impact proper ICT use.

1.6 Application Software

By understanding which application software is available and being used (or not used) at the surveyed schools, it is possible to get a picture of what types of ICT teachers and students may have some familiarity with, thus giving us a nominal starting point with which to work. The compatibility of computers in relation to the performance level that a specific software application requires is still unresolved by this type of rapid assessment because the survey did not test the software itself. For example, if a computer has Adobe Photoshop installed, that computer may not run this application software smoothly or poorly; it simply means that the computer is able to install it. So presence does not necessarily correlate to use. The same example applies to the installation of Internet Explorer, Google Chrome or Mozilla. Software can help people to use ICT tools to perform specific tasks – if the hardware can support it.

2 Survey Methodology

2.1 Survey Tool Design

Based on deep site survey experience, Inveneo's staff developed the baseline survey using automated tools and standard processes for ICT field data survey collection. The key tool used for this purpose was ODK Collect, a mobile application that Inveneo uses on Android-based smartphones or tablets. ODK Collect simplifies data input and collection while replacing the need for paper forms and surveys. It also provides features that can help automate data capture, thus reducing data collection time and data input errors.

ODK Collect was the starting point for collecting data and input for this baseline assessment. The survey questions and collection format were customized and tailored to meet the needs of the project. This tool rendered the survey forms used by our team into a sequence of prompts that support complex logic, repeating questions, entry constraints, and multiple languages. Data types include text, location, photo, video, and audio, amongst others.

Once Inveneo's survey questions were developed, they were shared with the other implementing partners - FSU, SAVE and WKW - to ensure inclusion of the needs of the programmatic partners before finalization.

CoreNet took the lead role in selecting the relevant survey implementers – the enumerators — to participate in Inveneo's survey training and perform the surveys. CoreNet was also responsible for arranging all the required logistics, including travel, for the enumerators to implement and finalize the data collection process in the selected schools.

Once the data was collected, the CoreNet team uploaded the survey results into the ODK Collect Internet-based online file-based system. The collected data was then downloaded from this system, processed, and analyzed at Inveneo's headquarters in San Francisco. The analysis of the survey data is the basis of this report.

2.2 School Types

As mentioned above, Inveneo conducted the baseline survey on the current state of ICT in the 5 regions covered by READ TA project, targeting the following types of schools:

- Colleges of Teacher Education (CTEs);
- School Cluster Centers (SCCs); and
- Satellite Primary Schools (SSs).

Table 1 – Number and Types of Schools Surveyed

School Type	No. of Schools Surveyed	Approximate Total in Country
College of Teacher Education (CTE)	9	32
School Cluster Center (SCC)	8	1,500 (+)
Satellite Primary School (SS)	14	15,000 (+)

* The regions surveyed are described in the section below.

2.3 Regions

Ethiopia is a very diverse country, each region with its own unique cultures and subcultures. This consideration proved to be an important aspect for choosing the appropriate schools to survey. Because of this diversity of cultures, each region is also associated with a dominant Mother Tongue (MT). Since the Ethiopia READ TA project seeks to promote MT literacy, it was essential to have a data set that included different MT languages in order to have a more complete representation of potential users.

Owing to time constraints, Inveneo and CoreNet worked together to identify the areas within the target regions that were relatively accessible by car using the main roads, or by plane (from easy accessible local airports). The regions covered for the data collection purposes were:

- Addis Ababa[2];
- Amhara;
- Oromia;
- Somali;
- Southern Nations, Nationalities, and Peoples Republic (SNNPR); and
- Tigray.

2.4 School Selection

The focus of this survey was to obtain an understanding of the ICT capacities at two main types of educational institutions: Colleges of Teacher Education, where pre-service teachers receive their initial training, and School Cluster Centers, where in-service teachers turn for resources and professional development training during the school year. Satellite schools – primary schools for which an assigned SCC acts a resource hub – were added to the survey to give context by understanding the primary school teachers' everyday environments. The survey also sought to ensure a mix of urban and rural schools representative of the overall Ethiopian context.

After receiving guidance from READ TA experts around school selection, the Inveneo-CoreNet team mapped the selected schools using a GIS (geographic information system) tool. Once the survey school sample set was defined, the next step was to develop the means and logistics arrangements to reach these schools, while taking into consideration time and budget constraints. The school selection was based on factors such as: (1) time, (2) location, (3) diversity and (4) cost.

Inveneo and CoreNet designed and implemented the survey, recruited and trained the enumerators, arranged school participation and logistics to reach a wide range of representative locations in the large geographic footprint noted above.

3 Survey Implementation

3.1 Enumerator Training Methodology

The training methodology for the enumerators focused on three phases:

- Formal introductory training;
- Automated tools training for survey implementation;
- In the field training at a pilot site.

Figure 1 – Inveneo's Formal Introductory Training

[2] Addis Ababa is a city administration area.

The first phase of the survey data collection training was led by the Inveneo Project Engineer, who conducted an in-depth classroom session of the survey questions and formats that included a hands-on demonstration on how to collect and administer the survey data.

The training also covered:

- How to organize and prioritize survey workload;
- How to establish contact and gain input and cooperation with school officials;
- How to conduct the interview using an automated tool;
- How to strategically use interviewing techniques;
- How to use methods for recording responses using the survey tree format.

This formal classroom training also included required operation tasks to fulfill the job, such as survey uploading, scheduling, contingencies, and travel expenses, and is an example of the type of targeted capacity building that can occur during the process of implementing READ TA.

After the first phase of the training, the second phase included practical data input exercises using a Motorola Atrix 4G smartphone3, equipped with the Android operating system. Inveneo and CoreNet wanted the local team of enumerators to become more comfortable and familiar with these tools. The Android-based survey tool uses a combination of services including *Formhub* (an application that aims at making collecting survey data easy) and ODK Collect (as described under Section 2.1) for making site surveys faster and more accurate while integrating GPS coordinates and photos. Records of GPS coordinates will also ensure any future implementations go smoothly by creating a record of where even very rural schools are located, saving both time and resources.

Figure 2 – Smart Phone Motorola ATRIX 4G

The third phase of the training consisted of an in-the-field sample pilot site survey at the Netsanet Berhan Cluster Primary School in Addis Ababa. This phase included the 8 training workshop enumerators, CoreNet staff, and the instructors from Inveneo. When conducting this third phase of the training, the methodology focused on 4 main areas:

- Use of the digital tool and potential input issues that could arise during the data collection process;
- Identification of the correct school official to interview;
- Exposing interviewers to the most common types of reluctance encountered at a school while conducting the survey; and
- Challenges that might be experienced with the survey tools in the field and how to troubleshoot them.

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[3] The Motorola Atrix 4G includes the following technical specifications:

- Brand – MB860
- Model – ATRIX 4G
- Type – Smartphone
- Storage – 16 GB
- Network – GSM
- Other: (1) Camera – 5.0mp; (2); Battery - 540 minutes; Touch screen; Bluetooth; and GPS

Once the training was finalized, the selected enumerators were immediately dispatched to the relevant regions to conduct the survey. During the field data collection process, the enumerators regularly reported the status, findings and challenges faced while conducting the survey.

This approach to conducting the survey and collecting data proved to be a very efficient method as it was easy to use and allowed savings of both time and paper during implementation.

3.2 Enumerators and Field Survey

The enumerator selection and the in-field survey were completed with the purpose of obtaining a good quality diverse sample while at the same time meeting timeline and budget requirements. The field survey was conducted by a total of 8 enumerators that were selected by our local partner CoreNet and trained by Inveneo. Pairs of enumerators conducted most of the surveys, while a single enumerator conducted a few of the surveys. There were 2 female enumerators out of the total 8. READ TA specifically requested the inclusion of female enumerators in an industry weighted towards males to begin modeling the gender inclusive environment that is a key crosscutting area for the project. Conducting most of these surveys required traveling outside Addis Ababa, so the main transportation method used for this purpose was by private car with the exception of surveys taken in the regions of Tigray and Somali, which required air travel.

Figure 3 – Inveneo monitoring enumerators in the field

The Inveneo Project Engineer was responsible for monitoring the enumerators in the field. He was present during the first set of scheduled school surveys in Tigray to observe and provide support for any difficulties the enumerators would face.

The in-field monitoring was focused on 3 areas:

- Reinforcing the enumerators on digital data input on site;
- Supporting interviewers in need of assistance and guidance with school officials; and
- Reviewing and adjusting data input and survey flow tree to reflect the local reality in each region and school visited.

Examples of some of the key personnel that enumerators contacted include:

- Head of the Regional Education Bureau (RSEB) or designated person;
- Woreda Education Bureau (WEB);
- Dean and ICT Officer or lecturer at the College of Teacher's Education (CTE);
- Dean and ICT Officer of special needs colleges;
- Principal and ICT support teacher at the Primary School Cluster Center;
- Principal and ICT support teacher at the Satellite Primary School within a cluster.

3.3 Data Analysis and Results

The survey data analysis was conducted in 5 phases:

1. Data validation;
2. Partition of responses into more homogeneous sub-groups (the 6 key ICT areas);
3. Data coding (conversion of nominal and ordinal scale data to a numerical score);
4. Analyzing ordinal and nominal data; and
5. Exploring elaborate relationships (e.g. examining relationships between a substantive item and a demographic item).

The data collected from the survey was then uploaded into a database, coded, and partitioned for manageability. Once this process was finalized, it was queried based on the various topics, emerging patterns, and data variances. The main finding and results from the survey are in the following sections.

4 Types of Data Collected

The standard data set captured at each school provides a wide range of key information that could be used to create a general profile about the current ICT situation at each school surveyed. This information can be utilized for project implementation planning purposes and to make informed assumptions for those types of schools not captured during the survey.

The information collected included specific core ICT data such as access to electricity, Internet connectivity, Internet usage, student to computer ratio, schools with radio sets, computers with DVD players, projectors in use, and virus control among others. Inveneo and CoreNet also looked at relevant non-ICT data such as current services for people with disabilities, and facilities construction materials (e.g. what is the roof made of? What are the walls made of?). This data could provide significant insights for future ICT interventions.

4.1 General School Information

Relevant information captured in the survey include:

- School location, including town or nearby town using GPS coordinates for mapping purposes (since there are generally no addresses);
- School contact information, including administrator(s) name(s) and phone number(s) for follow-up questions and;
- Description of the school including pictures of the main entrance for future reference and easy identification (since there are generally no addresses);
- Sketches of the school campus, roof materials, building materials and general condition of the buildings.

4.2 Campus ICT-related Infrastructure

As previously mentioned, the supporting infrastructure of each school will be a driving factor in the cost of the ICT implementations. Most issues, even intractable ones like lack of power can be

overcome, but it's important to have a general understanding of the supporting infrastructure before plans are made. This can aid in true cost analysis for different types of ICTs.

Data collected included:

- Power availability – refers to existing power available. How is that power generated; how dependable is the power system on a daily, weekly and monthly basis?
- Internet availability - is Internet is available? How "good" is the Internet connection?

4.3 Current ICT Equipment & Status

The Inveneo-CoreNet team collected detailed information about the current status of ICT equipment in the selected schools, including the operational status of this equipment using a 1 to 5 scale of functionality. Additionally, the team was also able to capture information about the location and distribution of the ICT equipment to better understand its current use and potential networking requirements.

The ICT equipment and technologies surveyed include:

- Desktop Computer(s)
- Laptop(s)
- Wireless AP/WiFi
- Router(s)
- Server(s)
- Printer(s)
- Copy Machines
- Projectors
- Overhead projectors
- DVD/VCR Players
- TVs
- Tablets
- CD/Tape players
- Radios
- Amplifier /speakers
- School Website
- Multimedia

4.4 Disabilities & Special Needs

A focus on enhancing education for people with disabilities is a major crosscutting theme for the project. Depending on the Partner's focus, this can mean different things. For the ICT Partners, it can entail finding ways to use technology to support the training of teachers of reading and writing at both the pre-service and in-service levels. This could include such examples as using technology to scale the delivery of in-service training content on differentiated learning or the use of software that allows the sight-impaired to access and share learning materials.

The successful application and implementation of these special technologies can have a significant impact. They can make classrooms more inclusive, make learning facilities more accessible, and allow the customization of teaching methods, learning content, and techniques to be more inline with learners' needs.

The data collected during this initial assessment included information on the numbers of students and teachers with disabilities and/or special needs, as well as the current status of special ICT-related tools that are accessible to these students and teachers to supplement their educational experience. By agreement, other partners such as SAVE and FSU, included more detailed data and analysis on

these issues in their respective baseline reports, which will supplement ICT planning once such planning is underway.

5 Analysis & Validation of Findings

Owing to time constraints and the rapid assessment nature of the survey, the sample size of schools for the baseline survey was necessarily small. Despite this fact, the survey was able to provide enough baseline information regarding the current ICT environments and infrastructural challenges for the respective school types to inform early thoughts on how ICT planning should move forward. The task of data gathering will be a continuous one as infrastructure around ICT and ICT itself changes quickly. There will also be a need to conduct more in-depth site-specific survey for any school or institution that READ TA will directly support.

As part of the information gathering and validation process, READ TA presented the following findings of this ICT Baseline Assessment to a broad gathering of Ministry of Education representatives from across the country. These participants of the READ TA Baseline Assessment Consultation Meeting held in Adama, Ethiopia, on November 21-22, 2013, represented a cross-section of the MOE and diverse points of view. They came from various departments and directorates, including teacher professional development, curriculum development, RSEBs, CTEs, administration, special needs education, gender, and ICT, to name just a few. They also represented various linguistic areas from across Ethiopia and both rural and urban demographics and interests.

This rich representation proved quite helpful in rounding out and better informing READ TA's understanding of the ICT landscape in Ethiopia's CTEs and School Cluster Centers, the focus of READ TA's ICT efforts. The feedback and comments garnered from the proceedings in Adama are presented here with responses on a topic-by-topic basis and are clearly identified. It should be noted that most of the direct feedback discussed below came from the ICT breakout workshop held on Friday, November 22, 2013. The workshop was a small group deep dive into ICT, attended by a self-selected group of participants whose interests and/or MOE roles touch on ICT.

Below are some key findings and relevant points by school type.

5.1 Colleges of Teacher Education

After a review of the six key areas described in Section 1, of the school types surveyed, CTEs clearly have the strongest and most ICT-friendly environment. This is an important finding because it supports READ TA's initial conceptualization of CTEs as hubs through which to deliver the new pre-service teacher training curriculum in scalable ways that add not only reach, but also the depth necessary to affect learning outcomes. As imagined, ICT in CTEs will not only enhance lecturers' ability to deliver the curriculum, but can also be used in other educational ways, such as to extend learning time by making lessons available continuously and by making new material or software more widely available to a larger user group, while also allowing cost-effective direct communication between lecturers at different CTEs and between lecturers and READ TA international experts.

As noted earlier, this activity was merely a rapid assessment, so it is understood that the nine CTEs surveyed are not necessarily representative of the 32 CTEs in existence. Indeed, the findings indicate

a broad range within the CTEs that confirm READ TA's belief that site-specific surveys will be needed before solution design can begin. Despite this, the survey of the nine CTEs below did provide helpful insights as described below.

Table 2 – CTEs Surveyed by Region

Colleges of Teacher Education (CTEs)		
CTE Name	**Location**	**Region**
Gondar CTE	Gondar	Amhara
Woldiya CTE	Woldiya	Amhara
Dr. Abdul Mejid Hussain CTE	Jijiga	Somali
Sebeta College of Special Needs	Outskirts of Addis Ababa	Oromia
Jimma CTE	Jimma	Oromia
Asella CTE	Asella	Oromia
Hossana CTE	Hossana	SNNPR
Adwa CTE	Adwa	Tigray
Kotebe CTE	Addis Ababa	Addis Ababa

5.1.1 Power

Of the 9 CTEs surveyed, all had grid power. However, none of the CTEs was able to report zero outages; in fact, outages were significant in both number per week and duration per outrage. Below are the main highlights of the findings:

- All of the CTEs surveyed are on grid power;
- Five out of the 9 CTEs surveyed use generators as a backup when the grid is unavailable;
- Out of these 5 CTEs using generators as a backup, 2 CTEs reported that fuel is availability is an issue. The other 3 CTEs reported always having fuel available.
- Four of the 9 CTEs surveyed that reported the highest number of outrages per week, had no generators or other alternative power sources to back up their grid power systems.

Inveneo was particularly surprised that there was very little or no uptake of renewable energy within the sample. Electricity, which is almost a given factor in schools for many developed and transition countries, is lacking in many of Ethiopia's schools, making it almost impossible to use ICTs in schools (particularly those located in rural areas). Although out the scope of READ TA, the use of alternative, renewable energy can sometimes help resolve this issue.

Consultation Meeting Workshop Feedback & Response:

Power: Is it a problem?

The discussion on power at the CTEs generated a good discourse and valuable feedback. In general, the participants agreed that all of the CTEs are connected to grid power of some kind (i.e. main grid, hydropower). The survey revealed discrepancies in power stability between CTEs, but did not uncover the underlying reasons for it. Despite the fact that the entire group agreed that power was not a significant issue for CTEs, there was a subset of participants who noted that issues were more severe at newly established CTEs, often in more rural areas, and especially those receiving

hydropower. Though in the minority, these participants did feel that power was a significant issue for them. This is worth noting as it signals a high level of variability within CTEs in terms of power able to support ICT use and will require closer study.

In addition, the discussion was unable to uncover what the participants defined as "significant" as it relates to ICT. Many of the CTE deans reported the existence of back-up generators, but, when asked, none was able to confirm whether these generators powered ICT hardware used for learning during periods of instability. From a usability and dependability standpoint, if back-up generators or alternative power sources do not power ICT available to teachers and lecturers, then power is indeed an issue from an ICT perspective for READ TA. The provisioning of power is clearly out of READ TA scope, but must be considered. Participants did note that power is the responsibility of the RSEBs and this issue should be raised with them.

Back-Up Systems

The discussion on power naturally evolved into one on back-up power sources and the protection of ICT from power interruptions. Most ICT hardware is designed to operate on a consistent electric grid. Since ICT hardware is designed to a minimum cost base in a highly competitive market, it represents the first weak point in most ICT deployments. Fluctuating grid power supply causes 'wear and tear' on these components. This leads to operating conditions where the hardware cannot perform, crashes or eventually fails. Electrical grid power presents the most common types of power problems, which are spikes, electrical noise, sags, and surges.

The initial solution to main power problems is to install some form of Uninterruptible Power Supply (UPS) protection, which may or may not be the most suitable and sustainable approach. Participants noted that UPS units, devices designed to ensure a continuous power source long enough for ICT to be powered down without harm or for standby power to start, are actively in use in CTEs. While the use of UPS does address the issue of power instability resulting in damaged equipment, it does not resolve issues of ICT usability owing to its temporary purpose.

A power conditioner is a better approach as it provides protection against surges in power just as a surge protector does, but a power conditioner also maintains a continuous voltage fed to the computer during temporary voltage reductions, such as a brownout. This is referred to as conditioning. Power conditioners also can filter electromagnetic interference emanating from a power source and can smooth the rhythmic cycle of alternating current.

5.1.2 ICT Hardware

The presence of hardware is the next useful indicator of an ICT-accepting environment. Indeed, all CTEs do have some sort of ICT present, mostly in the form of desktop computers, laptops, printers and projectors. Of the 9 CTEs surveyed, 100% reported having desktop computers. Even though students (i.e. teacher trainees) at the CTEs have access and direct interaction with technology, the computer to student ratio is extremely high at all CTEs.

The most commonly used computer manufacturer in the CTEs surveyed is Dell, especially for desktops. The most common Dell model types, unless produced recently, have high power consumption profiles, and Inveneo believes that is likely that the majority of desktops currently in CTEs are not the low-power types Inveneo and CoreNet most often recommend. High-power

consumption ICT can lead to very high power costs, including the fuel used for the back-up generators. The power profiles of computing peripherals such as printers were also generally not models designed for energy efficiency or resistance to dust, heat, and moisture. Inveneo recommends that any new equipment employed in the future be power-efficient and chosen for affordability and resistance to the heat, dust and humidity commonly found in CTE environments.

There are now a range of devices that are affordable, high performance, robust and highly power efficient – with up to 10 times lower power draw and longer lifespans.

They include:

- LCD monitors
- Desktop computers that are ultra low power
- Rugged, low-power laptops
- Tablet computers
- Projectors with long lasting LED light source

All CTEs have desktop computers, but only on average at a ratio of 1:100 (1%) per students in most CTEs. The very low ratio of students to computers is an important finding. In some CTEs, ICT is reserved for administrative use. Adding new, general use computers to the CTEs is not within the scope of this project, so interventions will require improving access through the existing systems and a focused approach to ICT interventions in the classroom and in shared access facilities to be used by reading faculty at CTEs. The most common complaint about the existing computers was that the systems were too slow, which is typically caused by aging equipment, viruses and/or poor maintenance, a topic to be covered later.

Table 3 – ICT Hardware to Student Ratio at the CTEs Surveyed

CTE Name	Desktops	Laptops	Printers	Projectors	Approx. # of Students	Est. Student to Desktops Ratio
Gondar CTE	92	0	1	2	10,823	118
Woldiya CTE	39	0	1	1	1,200	31
Dr. Abdulmajid Hussein CTE	21	1	1	2	1,709	81
Sebeta CTE	30	0	1	0	800	27
Jimma CTE	25	0	1	0	2,452	98
Asella CTE	32	3	2	1	3,245	101
Hosana CTE	17	0	1	0	1,686	99
Adwa CTE	92	0	19	1	700	8
Kotebe CTE	25	2	0	1	11,000	440

Consultation Meeting Workshop Feedback & Response:

While no workshop participants objected to the finding regarding the student to computer ratio at CTEs, one surprising fact that they revealed is that at some CTEs all lecturers are provided a laptop by the college. The survey did not reveal this very important piece of information despite asking about laptops in CTEs. It may be that these laptops are considered personal laptops since they travel with the teacher, and the survey did not ask about personal devices.

It was clear, however, that distribution of laptops to lecturers is not the case at all CTEs. There was no indication of who makes these decisions and upon what the decisions are based. Participants also noted that some teachers have personally-purchased laptops and that some are even financed through the college via payment plans drawn from the lecturers' salary. This information may indicate that the teachers have a higher level of ICT awareness than anticipated and is a strong indicator for the potential success of new ICT interventions in certain locations. This is an important point at CTEs because lecturers delivering the anticipated new curriculum on how to teach MT reading and writing will likely be targeted end-users of any ICT interventions.

In response to the existence of low-powered computing solutions, the participants were interested in hearing more because despite their interest and experience, most were not aware that such equipment exists. This is not uncommon as low-powered computing is not a widely marketed product. However, they are very appropriate and beneficial products in resource-constrained environments, such as Ethiopia.

5.1.3 Internet Connectivity

The Internet situation at the CTEs surveyed is equally strong with 8 out of 9 CTEs reporting Internet connectivity. The only CTE that reported a non-existent Internet connection was Dr. Abdul Mejid Hussein in Jijiga, but it was understood to be on its way. Only two (25%) CTEs reported Internet speed as being too slow. This was an impressive outcome when seen in light of the power situation.

Even more impressive was the fact that the eight CTEs reported using Internet for professional development activities, and seven CTEs reported Internet use to keep up with current events and to do research. These preliminary survey findings showed that Internet access appears to be used at CTEs in useful, educational ways and not just for entertainment purposes. Case studies performed at CTEs which look at actual usage scenarios and patterns will help further validate these early findings

Consultation Meeting Workshop Feedback & Response:

Two factors are important for the ability of the Internet to serve as an effective tool. The first largely depends on the quality and reach of the underlying telecommunications infrastructure. Users will not be able to achieve the full benefits offered by ICTs unless the telecommunication infrastructure is extensive and affordable. The second is that local Internet access management is important ensure that those who are authorized to have access get the best experience.

While Internet access itself does not seem to be a problem, attestable connectivity and quality was a topic of discussion. As use rises, some CTEs are beginning to encounter issues common to uptakes

in use, including stable bandwidth capacity. It was clear that there is human ICT capacity at the CTE and RSEB levels as participants were able to engage in discussion of topics such as traffic shaping and the administration of access prioritization, as well as Fair Use policies. Indeed, it was the participants in the workshop who brought up that the fact that the computers they do have are not networked locally on Local Area Networks (LAN) as a problem. A LAN can increase the effectiveness of ICT by connecting computers and servers at a site into a networked system, allowing broader access to networked peripherals, such as printers, and to content hosted locally. A LAN will also work in the absence of broader Internet access allowing it to function regardless of outside connectivity.

While generally outside of the scope of READ TA, except in the case of Reading Faculties, participants voiced a desire that CTEs be connected to one another so that they could share resources and information. Suggestions were made to create a Virtual Private Network to connect the CTEs to enhance information sharing and inter-CTE communications. Participants were interested that such a thing could possibly be done as part of their regular ICT plans.

5.1.4 Human Capacity

Human capacity exists at the CTEs, but the survey revealed that it is stretched across many responsibilities within ICT. Each CTE does have an ICT department head at a minimum. However, any people are tasked with maintaining and supporting ICTs who are not necessarily trained for this area of responsibility.

Additionally, all of the CTEs surveyed reported having ICT studies instructors. Five CTEs out of nine reported having ICT administrations, but, interestingly, CTEs with ICT administrators reported more computers with poor performance. This may simply be that those familiar with ICT may be more likely to understand what good performance is compared to what they experience.

Six CTEs reported having ICT volunteers from VSO (Volunteer Service Organization).

Consultation Meeting Workshop Feedback & Response:

All participants agreed that there was a lack of ICT maintenance and support capacity at the CTEs. As partly revealed by the study, many CTEs have "ICT Staff" who are actually volunteer teachers in subject areas who, as the workshop participants described, are given additional training in basic ICT. All acknowledged that this basic training was insufficient to provide true ICT capacity. Some CTEs are fortunate enough to have ICT Specialists or Technicians, but some must depend on the RSEB technician whose duties cover more than specific CTEs. The shortage of ICT human capacity in general in Ethiopia is also apparently driving a movement of personnel out of CTEs and RSEBs because ICT skills are in such high demand that trained personnel are quickly hired away. Again, while generally out of scope of READ TA, this reality is a point of consideration as the project works with MOE to design possible trainings to enhance READ TA's ICT program.

Indeed, despite being told that READ TA is not likely to directly support general ICT trainings, the entirety of the group repeatedly brought up skills gaps and trainings at all levels as their top recommendations. The tops recommendations of the group included:

- Training RSEB technicians so they can support CTEs both directly and through trainings

- Advanced training to ICT technicians in CTEs
- Basic/Advanced trainings for CTE staff and teachers who often lack basic digital literacy skills
- Computer training in MT
- ICT Management training for the highest level of CTE administrators

5.1.5 Support and Maintenance

While CTEs all reported having some type of ICT support, Inveneo was not able to determine the capability level of the ICT supporters. They were, however, able to determine that not all the machines were properly working and therefore maintenance of ICT equipment is an issue. A common complaint across the CTEs was that computers and laptops are very slow. In some cases, it is likely to the point where it makes tasks, both administrative and student work, very frustrating to complete. Where ICT is in place and the performance of these systems is the main problem, viruses and malware infection are likely culprits. This is an area that needs to be addressed before any new ICT solutions are implemented in the current environments.

While it was noted that addressing these issues generally at the CTE level might be beyond the scope of the READ TA project, having access to working computers is an important enabling tool for the teachers and students. However, it may be possible that as READ TA resolves issues touching computing resources directly used by the program through the proper training of personnel for the specific purpose of maintaining READ TA interventions, the same training and technical approaches can be used more broadly at the CTEs and RSEBs.

For example, one of the key recommendations from workshop participants was capacity building and technical interventions around virus removal and prevention and general system maintenance. READ TA will need to ensure the operability of project-related equipment by giving such training; these ICT staff will then be prepared to execute the same skills across their broader ICT assets.

5.1.6 Application Software

The CTEs have infrastructure in place for ICT projects that could support the teaching capacity for early childhood reading. However, even though pre-service teachers receive training in the use of ICT for teaching, this training is mainly focused on basic ICT skills. Productivity (Microsoft Office) software was found on almost all of the current systems used for administration and for students, and it was typically a subject in the school curriculum. There seemed to be little software, however, available for educational and/or reading improvement. A variety of browsers were found with Internet Explorer being the most heavily used.

Consultation Meeting Workshop Feedback & Response:

All participants agreed that there was a lack of content and software for education and that increased access to focused materials would improve teachers and students skills. In fact, a recommendation for increasing the availability of educational software was mentioned numerous times throughout the breakout session in different contexts. Some of the more advanced CTEs did mention using the Internet for classes, such as math and chemistry, but they seem to be in the minority. More in-depth

research will be required to see what types of software applications might aid READ TA's goal of improving reading and writing in MT and English.

5.1.7 ICTs for People with Disabilities

Of the CTEs, six of nine reported having students or teachers with disabilities or special needs, but only two reported having ICT intended to help those with disabilities. Very little use of ICTs was noted in interviews and most CTEs reported wanting more. Much of the current equipment was in need of repair.

Consultation Meeting Workshop Feedback & Response:

Discussions with workshop participants validated the data. All agreed that there was a lack of access to ICTs designed to improve teaching and learning capacity for either teachers or students. One of the participants from Debre Birhan, which specializes in Special Needs Education, noted that even at institutions with such a specialty equipment is scarce. It was enough of a concern from this cross-section of participants that their number one top recommendation was that READ TA should help create more opportunities for those with disabilities to access technology.

5.2 School Cluster Centers

School Cluster Centers are primary schools have been chosen to serve as a hub of additional resources to surrounding sets of primary schools. SCCs are the focus of READ TA for this very reason – that they might act as a hub of ICT resources as well. The focus of READ TA work in SCCs from an ICT standpoint will be to test pilot interventions centered on bridging the gap in reading and writing in MT for those with disabilities in SCC Resource Centers. The intent is to see if using SCCs in resource-constrained environments by utilizing already existing resource structures can drive learning outcomes by make scarce assets more widely available. Some SSCs have the appropriate ICT-ready infrastructure, but an even smaller minority had any ICT capacity. These low numbers and high variability tell us that careful, site-specific research will be required before the finalization of the designs of pilot interventions.

Unlike the robust conversation that the Consultation Meeting was able to support for CTEs, feedback regarding primary schools of any type was muted for several reasons. Owing to time and the volume of both interest and feedback, the workshop breakout session was primarily focused on the CTEs. They represent a significant portion of the project and because as a system they have the strongest ICT infrastructure. Also, the CTE ICT planning and implementation will begin in this project year, while the design of pilot interventions for SCCs will follow, allowing more time for additional data gathering to be reviewed at a later date. For these reasons, only the findings of the baseline survey are reported here as the participants generally agreed with them without feedback other than to agree that much work remains to be done.

Table 4 – School Cluster Centers (SCCs) Surveyed per Region

SCHOOL CLUSTER CENTERS (SCCs)		
REGION	**SCC NAME**	**LOCATION**
Amhara	Atse Bekafa Primary	Gondar
	Dil Chibo Primary	Bahir Dar
	Etege Menen	Dessie
Somalia	Ahmed Gurye Primary	Jijiga
	WelWel Primary	Jijiga
Oromia	Obey Primary	Wolisso
	Dosha No. 2 Primary	Adama
	Biherawi Primary	Shashemene
	Sebeta Model Primary	Sebeta
SNNPR	Adarash Primary	Yirgalem
Tigray	Maria Luiza Primary	Adwa
	Soloda Primary	Adwa
	Kindeya Primary	Axum
	Megabit 18	Axum

5.2.1 Power

Of the 14 SCCs surveyed, only one is not on grid power. Most of the SCCs reported that outages were significant in both number per week and duration per outrage. Only two of the SCCs surveyed reported having generators and using them as a backup when the grid is unavailable. Both SCCs using generators as a backup, reported that fuel is often unavailable and expensive. None of the SCCs had other alternative power sources.

5.2.2 ICT Hardware

The presence of hardware at the SCCs is considerably low in comparison to the CTEs. Three reported not having any ICT at all, while the others reported having only a few desktops and printers. The average number of desktops computers per SCC averaged only one or two per school, except for the Sebeta Model Primary School that reported having 13 desktops.

The few desktops computers that currently exist at the SCCs are mainly used for office and administrative tasks. Teachers and students generally do not have direct interaction with technology, except at the Sebeta Model Primary School where there is a resource center with desktop computers and Internet access for student use.

5.2.3 Internet Connectivity

Internet connectivity is common at CTEs, but rare in the SCCs and non-existent SSs. Of the 14 SCCs surveyed, only three reported having access to Internet. With the exception of the Sebeta Model Primary School, which has Internet in its Resource Center, the other two SCCs that reported Internet access use it mainly for office related work such as sending and checking e-mails.

5.2.4 Human Capacity

Out of the 14 SCCs surveyed, only one (Dil Chibo Primary School in the Amhara region) reported having one ICT volunteer. The remaining 13 SCCs do not have any kind of ICT support. The lack of human ICT capacity is a concern in terms of the deployment of any long-term ICT effort.

5.2.5 Support and Maintenance

Given the lack of ICT at SCCs, it is not surprising that there is little capacity or need for support and maintenance. It is clear that the SCCs need more ICT resources, and when this happens, it is important to think about the proper support and maintenance frameworks.

5.2.6 Application Software

Of the 14 SCCs surveyed, only three reported having any type of educational software, and none of them reported having any disability software. The very few desktops use Microsoft Office, which makes sense given that they are used for office and administration work only. While some Internet browsers are installed on some desktops, the lack of Internet access makes them useless.

5.2.7 ICT for Enabling People with Disabilities

Of the SSCs, five of nine reported having students or teachers with disabilities or special needs with 3 of those schools using disability tools, such as Braille printers, tape recorders, and recorded instruction to increase accessibility for their students and/or teachers. Since the goal of READ TA is to see how ICT might enhance the learning outcomes for those with disabilities in the areas of reading and writing in MT, further empirical research of how these ICT are used beyond this initial baseline assessment is necessary.

5.3 Primary Satellite Schools

Of all the school types surveyed, the SSs present the most challenging results, as ICTs are almost non-existent. The purpose of surveying some satellite primary schools in each region was to provide a counterpoint to what might be found in the SCCs. Teachers work every day in the SSs, but only occasionally visit SCCs for in-service trainings, so it was important to understand the circumstances of their everyday teaching environment including the presence of ICT or ICT-enabling infrastructure.

Owing to the low presence of ICT and ICT-enabling infrastructure at the primary schools visited, this report does not offer an exhaustive summary or analysis. The power situation alone – with only seven of eleven reporting access to the power grid with outages significant in both number and duration – hints at the unlikely presence of ICT in any real numbers. Four of the schools had neither access to the power grid nor generators. This means that 36% of the sample surveyed operates on a daily basis without any kind of power; the use of ICTs by these SCCs is non-existent. Where hardware was present (5 of 11 schools), there was on average only one computer and one printer reserved almost exclusively for office and administrative use with Microsoft Office as the sole software installed. Understandably, given the low ICT penetration, the survey found little human ICT capacity and virtually no need for support and maintenance infrastructure.

Conclusions & Recommendations

The appropriateness of technology is contextual and situational. There are a many interconnected factors that contribute to both the types of technology selected and how that technology is leveraged. This is especially true in determining how targeted ICT solutions can supplement the education processes which result from READ TA, a project focused on delivering better outcomes in Mother Tongue (MT) reading and writing in the early grades. The findings from both the rapid baseline assessment and subsequent validation discussions revealed diverse scenarios that will influence how READ TA approaches the design and implementation of ICT solutions for both CTEs and for the pilot studies at SCCs. It is important to remember that the intent is not for technology to be an end unto itself, but that it should be employed for the specific purpose of furthering the goals and reach of the primary MT curriculum, and pre- and in-service teacher training that READ TA seeks to assist the MOE in developing. So, it is only when coupled with the insights and recommendations currently being derived and cultivated by Partners RTI, Save the Children, Florida State University, and Whiz Kids Workshop in their respective project areas can READ TA design a complete ICT portfolio for MOE review. With these dependencies in mind, READ TA offers the following baselines assessment conclusions and statements, including some basic early recommendations in regard to technology in the context of the Ethiopia READ TA project.

READ TA believes that the findings show that CTEs have the basic infrastructure, human skills, and teacher capacity to absorb more technology than is currently available on campus. They are relatively well positioned in ICT to eventually integrate and manage ICT successfully, but there remain some significant gaps. Both the administrative and technical personnel that touch ICT, whether directly or tangentially, will need support in how to manage and properly employ not only the resources that READ TA may eventually contribute, but also those that they already have. There is a wide range of both ICT human and technical capacity across the CTEs that will require further close study, through both site-specific surveys and individual case studies, but every CTE could benefit from READ TA enhancements that can drive improved MT reading instruction specifically and beneficial ICT use generally.

While READ TA's focus is certainly on applications of technology that will contribute to early grade MT reading and writing outcomes through improvements in teacher development and training, the reality is that successful ICT implementations require the right ecosystems in which to exist. Therefore, READ TA will need to consider enhancements and activities that benefit the ecosystems within CTEs and RSEBs beyond targeted hardware additions or rehabilitations in addition to directly impacting the development of preservice teacher training. The intent is that improvements to the infrastructure—both human and physical— will drive adoption and use of ICT by lecturers and students teachers, furthering the reach and depth of learning of the preservice teacher training curriculum that READ TA seeks to develop.

The baseline assessment brings READ TA to conclude that in the primary schools, both SCCs and SSs, the infrastructure for power and Internet connectivity, as well as physical building conditions present significant challenges even before addressing teacher ICT skills and capacities. The wide variety of conditions will require a site survey before any ICT interventions can be planned for any of these schools. The READ TA intention was to test pilot interventions of ICT that might enhance learning outcomes for students with special needs. This intent coupled with the ICT findings make it

likely that any schools chosen will need to fill very specific requirements in order for READ TA to obtain useful data and positive results from any pilots attempted.

Early Recommendations

Given the conclusions and dependencies noted above, READ TA offers the following early recommendations regarding its programmatic activities for ICT:

1. Focus on Scalable Inputs:

Any READ TA-provided ICT support to CTEs and schools needs to be focused on the mandate of the project to establish/strengthen mother tongue reading faculties at the CTEs and related capacity for pre- and in-service teacher professional development. However, ICT-related support, e.g., strategic technology planning support, sustainability analysis or hands-on training, should be designed so that institutions can make use of these supports for their broader operations as well. For example, training on hardware maintenance could not only take place one time in-person, but include detailed trainee and trainer manuals, as well as screencasts on critical maintenance activities that could then be re-used across the institution at other points in time.

2. Help Build ICT Support Capacity:

READ TA should design a tailored capacity building program for ICT planning, management and pedagogical integration. Capacity building should take into account and strengthen existing functioning models, as well as build new approaches where necessary. The latter may be particularly relevant at the newly established CTEs with less ICT adoption maturity. Capacity building programs need to be comprehensive and systematic, yet modular to maximize personalization based on existing expertise in each site. For example, at a CTE with an existing sustainable support relationship with an RSEB, the approach should be carefully reviewed and strengthened to fill gaps and maximize efficiency in support provision. This may include focusing capacity for initial troubleshooting and first level support to be situated at the CTE, and capacity for higher level support to be situated at the RSEB.

3. Introduce Targeted Educational Content:

Based on the identified lack of educational content, READ TA ICT inputs will need to provide and build capacity for carefully selected, locally appropriate content and applications in direct support of the planned pre-service MT reading curriculum. As an example for the targeted content recommended, READ TA should consider content to support phonemic awareness among teacher trainees; to support practice of critical instructional routines for reading, such as letter blending or segmenting; or to allow for deeper learning and extension in MT reading instruction, through access to international reading research and reference materials.

4. Tailored Equipment:

As per its program design, equipment provision under READ TA is to be moderate and targeted.

Technology needed to make use of the above-mentioned content, however, will need to be provided in support of the MT reading instruction program. The ICT support package will need to be tailored to meet the needs of individual institutions given the large disparity in equipment, content and capacity between CTEs. New equipment should be carefully selected to minimize power and maintenance needs, and technologies that enhance equipment life cycle (UPS/power conditioners) included. Given the large demand on the few existing technology resources for basic computer skills training and other administrative functions, locally developed, shared and agreed-upon access policies and guidelines will need to be put in place to ensure that READ TA inputs are exclusively used for their intended purpose to maximize impact of the MT reading program. Illustratively, READ TA will produce professional instructional videos on key aspects of reading instruction. Technology will need to be provided to play back and integrate this content as part of the CTE reading coursework in relevant locations, e.g., in classrooms assigned for reading instruction by CTEs.

5. ICT to Maximize Support for Learners with Disabilities:

Content and technologies to support the reading instruction of learners with disabilities will fill a need expressed by CTEs and schools. Small pockets of good practice and use of ICT to support learners with disabilities exist at CTEs and schools. READ TA should carefully examine those existing experiences, strengthen and expand them as appropriate, and help document and share good practices across institutions. Support to CTEs and schools in meeting the needs of a diverse student population need to be tailored given regional disparities in disability profiles. Examples of applying technologies in direct support of reading instruction include audio companions to written text, screen readers, magnifying toolbars, or braille embossers.

6. Monitoring ICT Integration:

Given that the use of ICT for teaching and learning, and for reading in particular, is a new and emerging field in Ethiopia, READ TA should ensure that its activities in this field are carefully monitored and evaluated so as to generate documented, valuable knowledge relevant for replication and scale-up. Building local capacity in monitoring and evaluation of such initiatives and sharing findings should be a priority.

About the ICT Partners

Inveneo, Inc.

Inveneo is a not-for-profit social enterprise working to bring ICT tools to the organizations that need them most—those working in rural and remote parts of the developing world. Inveneo designs and delivers integrated ICT solutions, including low-power-consuming hardware and open source software and connectivity, that are designed to be sustainable in these settings. Our clients are primarily NGOs, governments and private sector organizations that deliver critical education, relief, healthcare, microfinance and other services to underserved communities. In addition to designing sustainable ICT solutions, the Inveneo Certified ICT Partner (ICIP) Program trains and certifies in-country ICT entrepreneurs to be capable of installing and supporting projects in low-resource settings. More detailed information about Inveneo and the ICIP Program may be found at www.inveneo.org.

CoreNet Technologies

CoreNet is a locally owned Ethiopian ICT company, headquartered in Addis Abba. CoreNet has ICT expertise in professional scientific and technical activities, specialized design activities, web portals, Geographic Information System (GIS), training, computer consulting and computer facilities management, wireless telecommunications activities, data processing hosting and related activities, software publishing, printing, and repair of computers and peripheral equipment. CoreNet is a member in good standing in the ICIP (Inveneo Certified ICT Partner) Program and was chosen as Inveneo's partner on the Ethiopia READ TA project due to their specific experience, track-record, and personnel in the educational sector and educational ICT project management, as well as their past work with the Ethiopian Ministry of Education on other ICT for Education projects.