

Uganda Impact Study Report



Prepared by RTI International
January 2019



376

Tablets distributed

154

Coordinating Centre
Tutors trained

350

Stakeholders
trained

1,402

Classroom
observations
uploaded
since 08-01-18

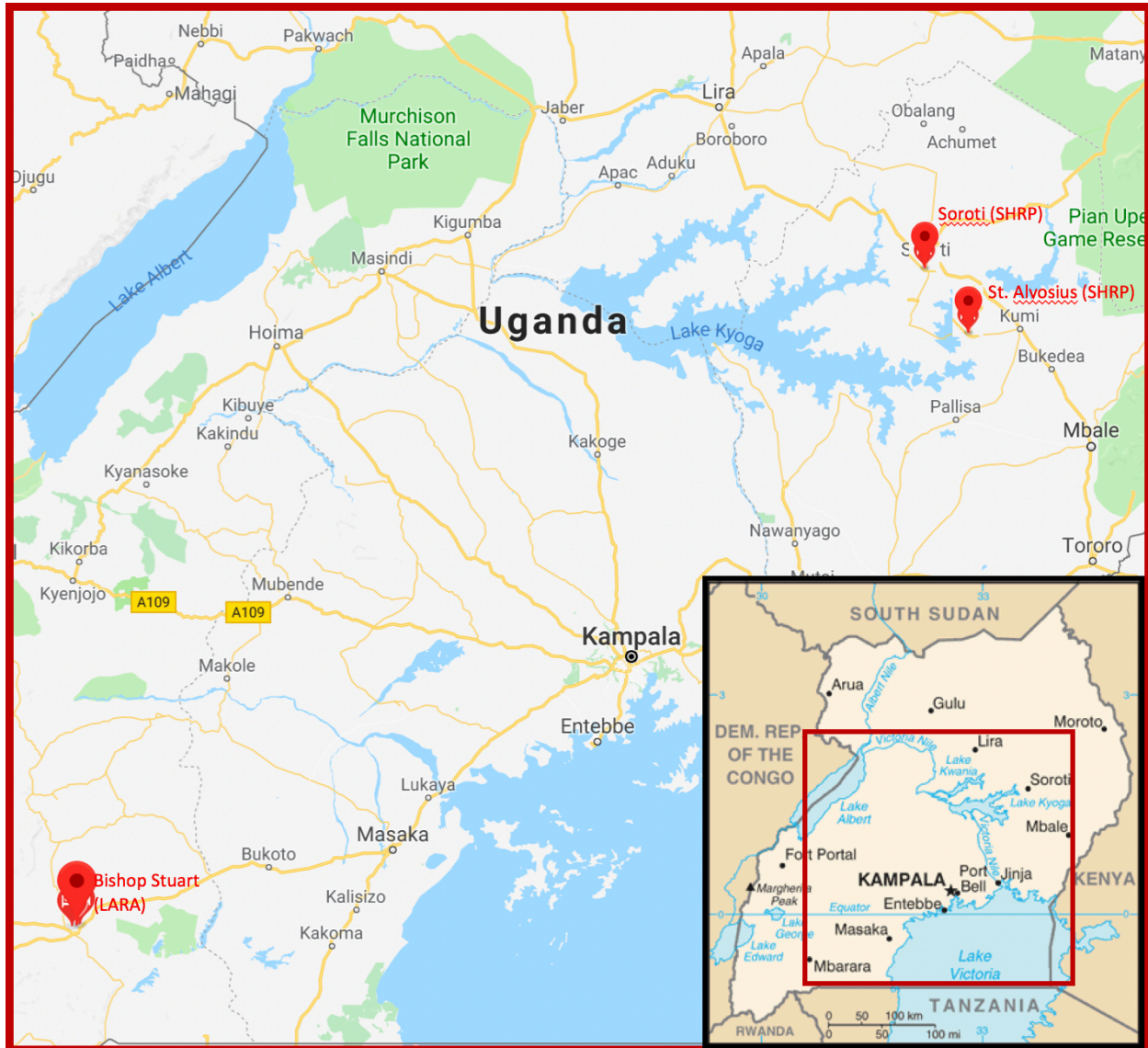
12

Tangerine support
group members led
by IT Coordinators

100%

Dashboards built
for SHRP districts
covered through the
Google Grant program

Google.org Grant Uganda Impact Study Report



Note: The map shows the locations of pilot districts.

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Abbreviations

CC	Coordinating Centre
CCT	Coordinating Centre Tutor
CPD	continuous professional development
DEO	District-level Education Officer
DES	Directorate of Education Standards
DIS	District Inspector of Schools
DPO	Deputy Principal Outreach
EGR	Early Grade Reading
EGRA	Early Grade Reading Assessment
FA	Field Assistant
GPE	Global Partnership for Education
GPS	global positioning system
ICT	Information and Communications Technology
IT	Information Technology
LARA	Literacy Achievement and Retention Activity
MEO	Municipal Education Officer
MIS	Municipal Inspector of Schools
MoES	Ministry of Education and Sports
MSS	Monitoring and Support Supervision
PDF	Portable Document Format
PTC	Primary Teachers College
SHRP	School Health and Reading Program
SIM	subscriber identification module
SMS	short message service
TDMS	Teacher Development and Management System
TIET	Teacher Instruction and Education and Training
TTC	Teacher Training College
USAID	U.S. Agency for International Development
UTSEP	Uganda Teacher and School Effectiveness Project
USh	Ugandan shilling
WHO	World Health Organization

Executive Summary

There were two aims of the Google.org-funded tablet program implemented by RTI International in Uganda. The first aim was to improve the quality of interactions between Coordinating Centre Tutors (CCTs, or “coaches” for convenience) and teachers, as well as the quantity of those interactions (increase the frequency of school visits). Globally, research in the field has shown the causal linkages between coaching and improved teaching and between teaching and improved pupil learning. During this pilot effort, which lasted approximately 18 months, we studied the added value of a digital case management tool and job aids to improve coaching activities in two Early Grade Reading (EGR) programs in Uganda. The iterative, user-centered design and monitoring focused on changes in the quality and quantity of coach and teacher interactions.

The second aim was to improve the quality of communication between CCTs and Teacher Training Colleges (TTCs), between CCTs and districts and between local stakeholders and institutions (i.e., schools, TTCs and district offices) and the Ministry of Education and Sports (MoES). This aim was to be accomplished through a Web-accessible dashboard based on the digital tools that quickly communicated school support coverage, as well as teacher and learner attendance.

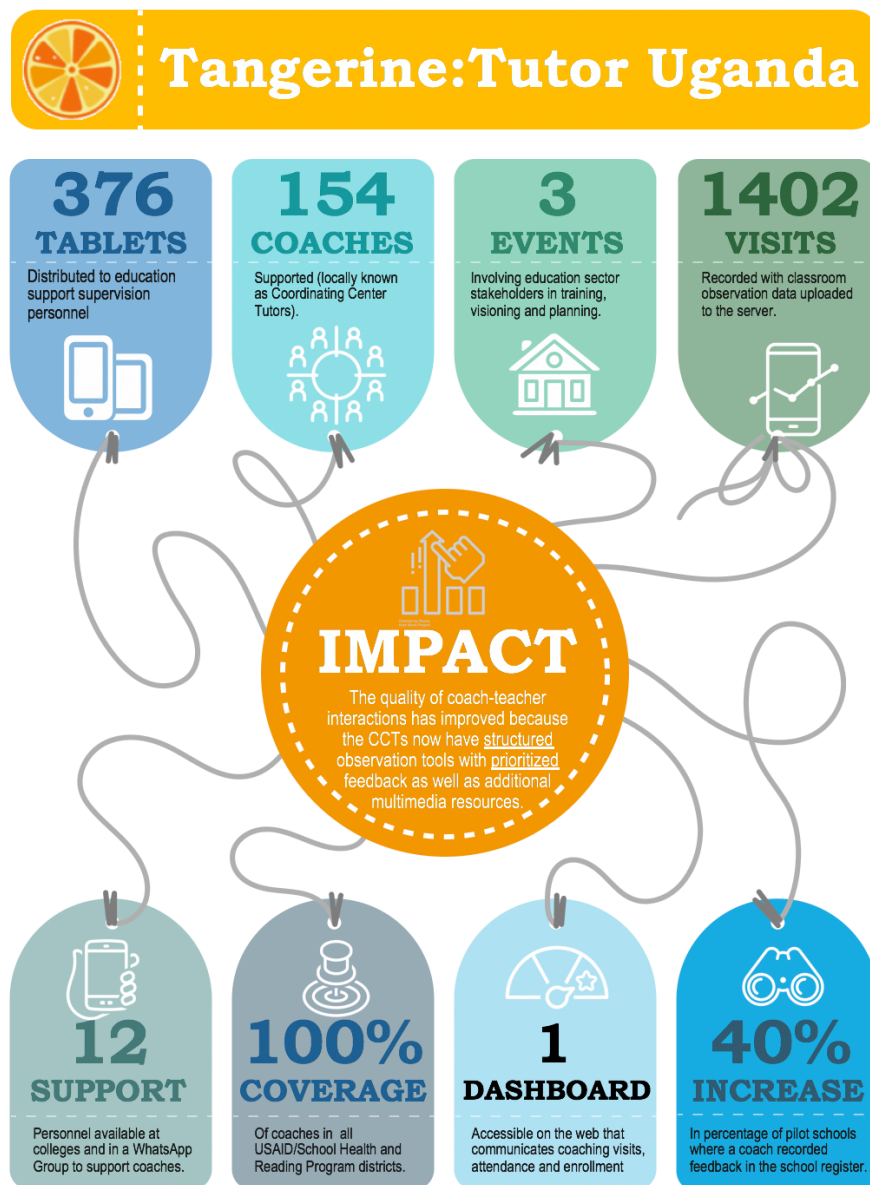
The pilot effort successfully introduced the case management tool and job aids, built a dashboard to communicate progress and trained users across four regions of Uganda. We observed many anticipated and unanticipated outcomes, as follows, as a result of introducing these tools:

- We believe that the quality of coach-teacher interactions has improved because the CCTs now have structured observation tools with prioritized feedback, as well as additional multimedia resources. This improvement in the relationship was anticipated as such. The quality of the interactions also seems to have improved because teachers believe that the feedback is more credible because it comes through the tablet. This particular pathway to impact was not anticipated as such, but it came up frequently in user reports.
- We observed a 40% increase in the percentage of pilot schools where a coach recorded feedback in the school register at the time of the visit from baseline through endline. This increase may be related to the use of the tablets and the specific feedback that they provide. There may also be an accountability aspect—because coaches know that the tablets record and transmit the data, they may take more care to record the results of their observations in the school register.
- The actual number of coach visits and schools visited did not change much, but this is unsurprising because transportation allowances were not specifically linked to digital evidence of the visits. However, many users provided feedback to us, saying that it is much less likely for a CCT to misstate reports now that the tablets can capture global positioning system (GPS) locations and can transmit date and time information for the

visits. Therefore, the number of visits reported may be actual visits, even if the number is not higher.

- Additional outcomes of the program include improved technology skills among the beneficiaries, increased engagement between coaches and the Primary Teachers Colleges (PTCs) through the technology support staff and a heightened sense of professionalism for the job of the CCTs.

The program was officially handed over to the MoES in December 2018. RTI staff are continuing to work in the context of our existing project activities to support ongoing and recurring costs of the tablets and software so that these positive experiences can continue. This report describes the inputs and processes of the Google.org grant funds to introduce, monitor and evaluate the digital coaching tools program. The following figure highlights key statistics from the Tangerine:Tutor deployment in Uganda.



Introduction

The School Health and Reading Program (SHRP) is a seven-year (2012 through 2019) systemic reform effort funded by the U.S. Agency for International Development (USAID)/Uganda. The aim of this effort is to support the Ministry of Education and Sports (MoES) to improve reading and increase crucial health knowledge in primary schools in 37 districts in Uganda. The Literacy Achievement and Retention Activity (LARA) is a five-year effort (2015 through 2020) that builds on the USAID-funded SHRP. LARA is taking the reading model from SHRP to an additional 35 districts nationwide and includes a focus on school and gender-based violence. RTI International implements both programs in Uganda and works through MoES systems to provide learners with local language reading primers and teachers with accompanying teacher guides. Teachers are trained to better teach learners how to read and how to use the reading materials. It is also envisioned that when the teachers return to their classrooms, they will be regularly supported to implement the new reading methodology. Head Teachers and Coordinating Centre Tutors (CCTs) will mainly provide this support. CCTs are an integral part of Uganda's Teacher Development and Management System (TDMS), which is an integrated delivery system for primary education reform that was initiated in the 1990s.

CCTs serve as the conduit between Teacher Training Colleges (TTCs) and schools and teachers in the classroom. One of the CCTs' roles is to support schools and practicing teachers at the school and at their Coordinating Centres (CCs). CCTs are expected to visit schools and provide support to the school and teachers in the classroom, conduct continuous professional development (CPD) training sessions and support peer-to-peer learning among teachers. In addition, CCTs mobilize communities to address important school-related issues, support school management committees and assist with pre-service training at the colleges and perform other duties. For instance, non-governmental organizations and other stakeholders often call upon CCTs to provide ad hoc support to schools.

RTI used funding from the Google.org grant, which was awarded in December 2016, to increase the quality and quantity of CCT support to schools and teachers. RTI provided to CCTs tablets with customized observation instruments, job resources (e.g., instructional videos, reference materials) and work plan management tools—notably, the Tangerine:Tutor application—to improve CCTs' support to teachers and accountability within the system in which they work.

About Tangerine:Tutor

Tangerine:Tutor is an offline application designed for Android operating systems that is an extension of the open-source Tangerine® data collection system. RTI developed—and still manages—the application. Tangerine:Tutor is designed to provide instructional coaches, tutors and other similar support staff at schools with tools to improve instructional support to teachers. Using customizable, logic-driven forms, Tangerine:Tutor can combine and analyze results from classroom observations, mini assessments and classroom inventories to generate (offline) a coaching feedback report that can be used to guide and inform conversations with teachers. Data from multiple users can also be aggregated through online syncing to a central server database from which Web-accessible data dashboards can be deployed.

Tangerine:Tutor was originally developed and used in Kenya and Malawi. Since then, RTI staff have made improvements in the code base under the Google.org grant, and the deployment of the revised tool has expanded to Cambodia, Jordan, Sierra Leone and the West Bank.

SHRP and LARA Experience with CCTs

An underlying principle of SHRP and LARA is to work through existing MoES systems in all programmatic areas; for support to teachers, this work mainly includes working with Head Teachers and CCTs. The CCTs' terms of reference require them to visit each school in their CC at least twice per school term (or six times per year). SHRP team members coordinate with the CCTs to provide reading instruction support to teachers during these visits, which also include observing lessons, reviewing and planning lessons and conducting CPD. Despite being a part of the regular government system, the funds required for CCTs to visit schools are rarely available from the government's budget. Therefore, SHRP offers a small fuel allowance to facilitate CCT travel based on field reports of visits. Although the expectations for school-level support by the CCTs are the same as under SHRP, the LARA program does not provide funds for CCTs to travel to schools.

In SHRP, working through TTCs, CCTs submit their work plans for each term to obtain half of the stipend and their final reports for the term to receive the other half of the stipend. Program Field Assistants (FAs), who are employed by SHRP, verify the school visits by CCTs and ensure that the CCTs are paid based on the percentage of schools they visit each term. Results from the 2017/2018 school year show that, although a number of CCTs diligently visited schools and offered support to teachers, a significant percentage of CCTs visited very few schools. Because CCTs are providing hand-written (on paper) notes about their visits, it is difficult to know the quality of the support that CCTs are providing. Other issues observed by SHRP team members include delays in the submission of work plans and reports by CCTs, poor quality of support provided to teachers and prohibitive costs of reprinting observation tools within the system (they are simply not reprinted).

For the SHRP and LARA program, CCTs are part of the team that trains teachers on how to use the EGR literacy model. During LARA, Program Coordinators and Program FAs share work plans for each term with CCTs to coordinate and support the newly trained teachers in schools through a number of support supervision activities (e.g., CPD training sessions, district-led support supervision). CPD training sessions are conducted at a zonal or sub-zone level at a CC for which that CCT is responsible. Together with Program FAs and Program Coordinators, CCTs identify challenges and gaps that teachers experience, and these are discussed and addressed during the CPD training sessions. Currently, Program Coordinators, CCTs and Program FAs record what occurs during CPD training sessions and the issues addressed or the challenges that teachers experience. In contrast, CCTs follow up on these challenges and engage one on one with teachers to address the challenges identified during the CPD training sessions.

We believe many of these issues could be alleviated if electronic tablets are used by CCTs to collect data.

A Framework for Monitoring and Evaluation

The process of implementing, monitoring and evaluating Tangerine:Tutor for CCTs in Uganda draws on a framework¹ developed by the World Health Organization (WHO) for digital case management tools in the health sector. The concept of Tangerine:Tutor has many parallels with digital case management tools in the health sector. For instance, a frontline worker (e.g., community health facilitator, instructional coach) makes regular visits to registered set of individuals (e.g., a pregnant woman, a teacher) to monitor behavior (e.g., adherence to treatment protocol, implementation of instructional methods), diagnose needs (e.g., fetal health, time on task) and report trends to central authorities (e.g., frequency of instructional support to district education officials, prevalence of pregnancy complications to a national health system). Because of these parallels, we looked for an existing evaluation framework that would guide data collection and reporting. WHO's framework emphasizes the following important features:

- An “intervention maturity lifecycle” (see page 2) that discusses the appropriateness of different types of monitoring and evaluation activities for the stage of maturity of the intervention. Stages range from pre-pilot and prototyping, to pilot, to demonstration, to scale up and finally to sustainable integration.
- The stages of maturity correspond to stages of evaluation, ranging from feasibility to usability, to efficacy, to effectiveness and to assessment. Understanding the stage of maturity is important in order to avoid prematurely embarking on assessments.
- The WHO framework uses a “claims-based approach” (see page 15) for evaluation that is based on a clear value proposition based on anticipated efficacy and cost effectiveness. Articulating claims helps to ensure that the data being generated are the most useful to stakeholders and to eventual scale-up efforts.

The next section further discusses these previously mentioned principles.

Tangerine:Tutor Theory of Change

This section of the report reviews the value proposition and claims² for the Tangerine:Tutor program in Uganda. Per the WHO framework, “Value propositions describe (i) which end-user needs are met by the digital health system and how, (ii) why the digital health system is innovative and (iii) why the digital health system is superior to the standard of care or status quo” (see page 14). **The value proposition for Tangerine:Tutor is that guided observation protocols with automatically generated feedback and case management summaries**

¹ We refer to this as “the WHO framework” for the remainder of this report. For more information, see WHO (World Health Organization). (2016). *Monitoring and evaluating digital health interventions: A practical guide to conducting research and assessment*. Available at <http://apps.who.int/iris/bitstream/handle/10665/252183/9789241511766-eng.pdf;jsessionid=6121543DCD4B00B12BED7B4B44572908?sequence=1>

² WHO (World Health Organization). (2016). *Monitoring and evaluating digital health interventions: A practical guide to conducting research and assessment*. Available at <http://apps.who.int/iris/bitstream/handle/10665/252183/9789241511766-eng.pdf;jsessionid=6121543DCD4B00B12BED7B4B44572908?sequence=1>

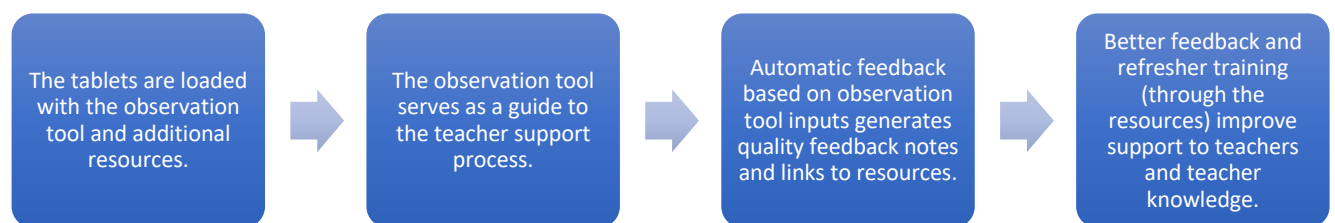
communicated to a central dashboard will improve the quality and coverage of coaching support supervision for EGR teachers.

Importantly, there are two distinct, minimum “input-to-outcome” pathways implied by the previously mentioned proposition. These two pathways are as follows: (1) **quantity and coverage** improves because of the case management tools and dashboard and (2) **quality** improves because of the structured observation protocol with feedback.

The WHO framework defines a claims-based approach as “... determining whether the digital health system being considered is merely a means of improving the quality or coverage of an intervention known to be effective, or whether it instead constitutes a novel intervention in itself, the effectiveness of which is, as yet, unknown” (see page 15).

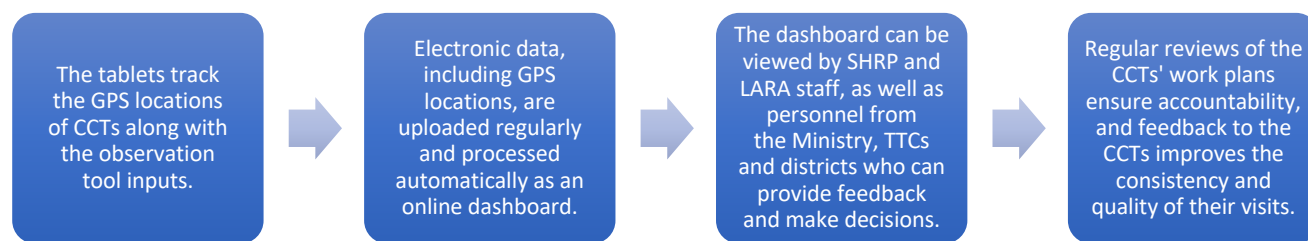
This distinction is important for this education sector work because we consider that there is already “an intervention known to be effective”—which is that of instructional coaching based on a high-quality, evidence-based curriculum and materials for the subject matter of concern. We consider that this pathway is already well established through other projects implemented by RTI, and especially in Kenya (USAID/Tusome) where Tangerine:Tutor is also being revised and reintroduced through the Google.org grant. In the case of Uganda, as in Kenya, tablets are meant to improve that existing process through the value proposition previously mentioned. More specifically, the introduction of tablets in the work of CCTs was expected to have many positive changes above and beyond the impact of the current model of coaching alone. These changes are as follows: improved support to teachers; increased CCT accountability and number of school visits; improved analytical and technological capacity of CCTs, MoES and district staff; easy access to additional resources; and reduced costs of reprinting. These changes are discussed further in the following subsections of this report.

Improved Support to Teachers. The tablets would provide the CCTs with annotated observation tools, as well as resources to use with teachers who need support with implementing the reading methodology, planning lessons and/or assessing learner achievement. In a similar large-scale reading program and Tangerine:Tutor initiative in Kenya, Curriculum Support Officers (CSOs), who serve as teachers’ instructional coaches there, reported that the tools available on the tablet and their interactions with the teachers using the tools have increased the quality of their instructional support to teachers. CCTs could observe lessons, and feedback would be generated based on responses that the CCT can share with the teacher. Increasing the quality of the visits is the major impetus for CCT tablets through the Google.org grant. The following figure is the anticipated pathway to improving the quality of teacher support.



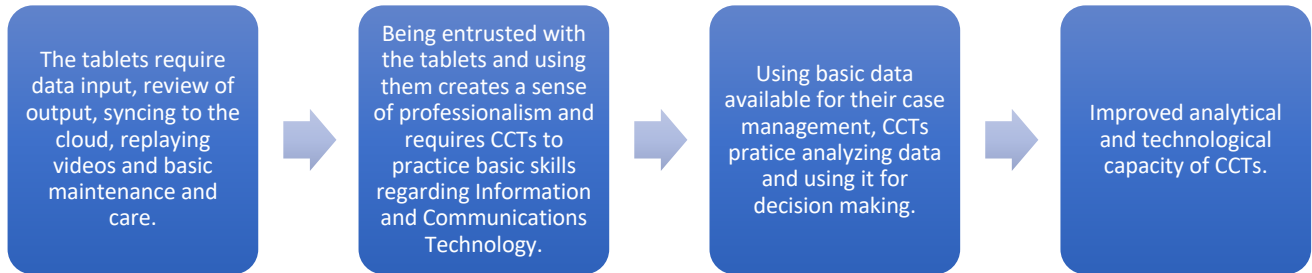
Increased CCT Accountability and Number of School Visits. With the tablets, CCT work plans and reports could be tracked and sent electronically to supervisors at the PTCs, SHRP and LARA in a timely manner, thereby allowing them to provide immediate feedback (e.g., about the type of support they are providing to teachers). Although we want to keep college supervisors in the loop and, in fact, incorporate the reading school visit plans into CCTs' overall work plans, currently we have to wire money to the Principals to send the hard-copy plans by bus or rely on Program FAs to send the plans (which takes the colleges out of the loop). The process would be streamlined by electronic submissions. Using tablets, the CCTs' school visits can also be tracked by using GPS. The use of tablets and Tangerine:Tutor by CSOs in Kenya has successfully revived an accountability structure wherein District-level Education Officers (DEOs) can better monitor whether CSOs are visiting schools regularly. As a result, school visits have increased, and there is a measurable association between school visits and student outcomes³.

There will also be lines of data or information flow from CCTs directly to districts and the Teacher Instruction and Education and Training (TIET, which is the unit responsible for teacher training at MoES) through a very basic dashboard. TIET, the Directorate of Education Standards (DES), district education staff (DEOs and District Inspectors of Schools [DISs]) and college staff will access basic data, such as the number of school visits per CCT and teacher attendance. The following figure is the anticipated pathway to improving the quantity and coverage of teacher support visits and CCT accountability.



Improved Analytical and Technological Capacity of CCTs, MoES and District Staff. CCTs (and others in the system) would become more familiar with technology as a life skill but also as a means to increase accountability and obtain timely data for decision making. The tablets would include a basic visual case management dashboard (available without an Internet connection) that shows summary data. Some examples of summary data include how many visits were conducted each month, how many visits were conducted at each school, the most frequent types of feedback and the most common issues with teachers. CCTs can also use this client-side dashboard to plan their school visits, build upon what was previously discussed and view overall trends at specific schools and across schools. The following figure is the anticipated pathway to improving the analytical and technological capacity of stakeholders.

³ Piper, B., Oyanga, A., Mejia, J., & Pouezevara, S. (2017). Implementing large scale instructional technology in Kenya: Changing instructional practice and developing accountability in a national education system. *International Journal of Education and Development Using Information and Communication Technology*, 13(3), 57–79.











Easy Access to Additional Resources. Teacher guides for reading, pupil primers and other support resources (e.g., letter sounds, orthography guides, model videos) could be uploaded to the tablet. Having a scalable process for distributing resources to CCTs may encourage production of more instructional support resources, including the development of such resources by the CCTs themselves (e.g., taking videos and photographs to share with other schools).

Reduced Costs of Reprinting. Currently, there is no money in the system for reprinting. At the schools, there are blue books in which CCTs can leave notes for the teachers and schools, but the books are often not filled in.

Exhibit 1 is adapted from a table used in the WHO framework publication. Exhibit 1 shows the way in which the WHO framework was applied to the evaluation activities for the Google.org grant in Uganda. We consider that the “Pre-prototype” phase was completed before the Google.org grant award. The existing Tangerine:Tutor implementations, notably in Kenya, established the stability and feasibility of the overall concept and helped to generate the hypothesis that the digital tools could improve the quality and quantity of coach visits. As the software was being revised under the Google.org grant, RTI staff performed additional prototyping with prospective users, including in Uganda. RTI staff conducted the pilot effort with a first user group during Term 1 of 2018, and then expanded to a larger group before Term 3 of 2018. For this larger group implementation, we considered the “Demonstration” phase, although per the WHO framework it could still be considered a pilot effort given the relatively small number of target users (less than 400). More details about the evaluation framework for the current study are provided in the following sections.

Exhibit 1: Alignment of Evaluation Framework with Stage of Maturity

	Stage of maturity (a)	Stage of evaluation (b)	Claim (c)
Early <div style="border: 1px solid red; padding: 5px; margin-bottom: 5px;">Completed through original Tangerine:Tutor application in Kenya (Prior to Google Grant)</div> <div style="border: 1px solid red; padding: 5px; margin-bottom: 5px;">Completed in Uganda post-Design Sprint during needs assessment activities and initial tablet functionality testing</div> <div style="border: 1px solid red; padding: 5px;">Completed in Uganda during first term of 2018 (February – May) with a limited user group. Efficacy was monitored during an April field visit.</div>	<div style="border: 1px solid red; padding: 5px;"> Pre-prototype: This stage includes hypothesis building, needs/context assessment, and testing of usability/feasibility and technical stability. </div>	Feasibility: Assess whether the digital health system works as intended in a given context. 	Technology: Prototypes are functional and usable. Feasibility testing demonstrates end-user acceptance and expected data integrity and validity.
	<div style="border: 1px solid red; padding: 5px;"> Prototype: During this phase, user-focused designs are created and tested, and functionality, technical stability and usability are tested in an iterative process. Ways to improve the system are examined to enhance relevance. </div>	Usability: Assess whether the digital health system can be used as intended by users. 	Intervention: Implementation protocols are utilized as intended by users. Technology: Technology withstands testing under optimal field circumstances.
	<div style="border: 1px solid red; padding: 5px;"> Pilot: This stage examines whether the digital health intervention can produce the desired effect under controlled circumstances. The pilot project is usually a single deployment. </div>	Efficacy: Assess whether the digital health intervention can achieve the intended results in a research (controlled) setting. 	Health: Health improvements (outputs/outcomes/impact) demonstrated on a small scale, under optimal circumstances, warranting further testing.
Mid <div style="border: 1px solid red; padding: 5px;">Completed in Uganda after July 2018 when the program was expanded to additional districts. Effectiveness was gauged during a learning event in December 2018.</div>	<div style="border: 1px solid red; padding: 5px;"> Demonstration: In this stage, the intervention is no longer taking place in controlled conditions but is still limited in terms of population/geography (usually restricted to a particular region or subregion). This stage seeks to understand the costs and implementation requirements needed to both deliver the intervention at high fidelity and replicate the uptake in new contexts. </div>	Effectiveness: Assess whether the digital health intervention can achieve the intended results in a non-research (uncontrolled) setting. 	Health services delivery at moderate-scale implementation in a non-research setting is determined to be: <ul style="list-style-type: none">  feasible  high quality  cost-effective  improving the effectiveness of bringing about positive change in health outcomes.



Achieved



Partially achieved

Impact Study Design

As previously described, the aim of the grant program in Uganda was primarily to improve the **quality and quantity** of interactions between the CCTs and teachers. According to the WHO framework’s “claims-based approach,” our value proposition is based on adding benefit to an already well-established intervention with proven impacts on its own. That is, we are confident that instructional reform programs that incorporate school-based coaching are more effective than those that do not. Because we are not evaluating a completely new innovation, it is sufficient for evaluation efforts to focus on outcome measures (changes in teacher behavior) and/or process and/or functionality measures (e.g., number of coaching visits, type of feedback provided).

As such, for this study, we planned to measure the quality and quantity of the interactions between CCTs and teachers and not the impacts on pupil learning. Specifically, to measure quality, we evaluated the following:

- Teacher interviews
- CCT interviews.

To measure quantity, we evaluated the following:

- The number of CCT visits to schools during the term
- The percentage of government schools visited in the CC
- The percentage of schools receiving two or more visits during the term.

Other research questions

- Does the level and quality of communication between CCTs and teachers colleges and with TIET, the districts and DES increase as a result of the tablets?
- What other benefits result from using tablets?
- What are the drawbacks of using tablets?
- What would need to be in place in order to expand the tablet program nationwide?

For the roll out of the SHRP pilot, 6 districts, 2 colleges and 22 CCTs were selected for initial roll out at the beginning of the school year in February 2018. The districts, colleges and CCs are as follows: Kumi, Budaka, Katakwi, Kibuku, Kumi, Pallissa, and Serere Districts linked to 2 TTCs. For the pilot effort for LARA, the Mbarara District with 10 CCTs was selected.

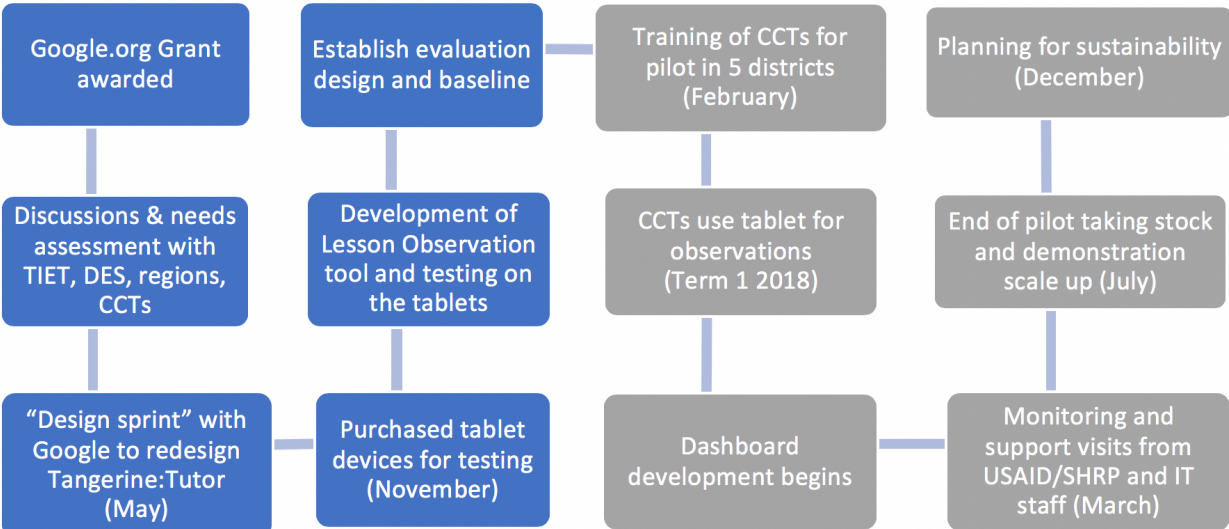
Sample selection: For SHRP, one of the 33 program districts (i.e., Kumi) was randomly selected. The other districts were selected based on proximity to the Kumi District for ease of training and roll out and to minimize the number of teachers colleges during the initial roll out. The 6 selected districts (i.e., Budaka, Katakwi, Kibuku, Kumi, Pallissa and Serere) fall under two core PTCs (i.e., St. Aloysius and Soroti) and contain 22 CCTs. For LARA, the pilot effort will occur in the Mbarara District at the Bishop Stuart core PTC with 10 CCTs.

Implementation and Data Collection

Consistent with prototyping models, including the WHO framework guidance, implementation followed an iterative, consultative model that incorporated feedback from users at several points. As shown in the timeline diagram (**Exhibit 2**), a Design Sprint occurred in May 2017 in Nairobi. This effort involved Google.org and Google representatives, implementing staff from RTI’s headquarters and RTI program staff from the Kenya Tusome project and Uganda SHRP.

This was a first opportunity to articulate a vision for improving the existing Tangerine:Tutor software to further support coaches with their work. During July 2017, SHRP staff conducted needs assessment activities with CCTs in Uganda, and these prospective users participated in an initial tool development and process mapping activity. During February 2018, pilot users completed an initial training session. SHRP staff conducted regular monitoring visits throughout the pilot effort. Findings from this initial roll out were fed into revisions of the tools and systems at the end of the term (in May). During July 2018, Uganda SHRP implemented a training session about Tangerine:Tutor across representatives from all 37 SHRP districts, targeting 170 CCTs and staff from 18 colleges. During December 2018, the project implemented a final handover of Tangerine:Tutor on tablet devices to MoES and collected final user feedback data.

Exhibit 2: Timeline of Activities



Note: Blue = 2017 grey = 2018.

Needs Assessment

In Uganda, the RTI SHPR team carried out several initial needs assessment activities to gauge interest in and perceived usefulness of the Tangerine:Tutor application, based on the design specifications that emerged from the design sprint. First, the team conducted a feedback exercise during a project regional meeting in July 2017, and then surveyed PTC staff about their expectations and recommendations. Detailed feedback from these exercises are included in **Annexes 1a and 1b** of this report.

Some of the stated expectations emerging from these interviews were that stakeholders would like better means of communication between CCTs and their PTC supervisors, including sending reports from coaches and also work plans. CCTs also reported that having the opportunity to record photographs of classrooms and audio files during teachers' instruction and that having additional reference materials on the tablet would help enhance their work. At this stage in the Tangerine:Tutor redesign process (post-design sprint), the SHRP team's intention

was to include features that would make it easier to share audio and video recordings and monitor basic work planning on the tablets. However, it was never the intention to be able to share individual work plans or reports directly with supervisors other than through the dashboard (an aggregation of all coaches' visits, after they have occurred) or to have supervisors be able to communicate directly back to coaches through the application. The SHRP team took note of these concerns to plan training activities for which we could co-create processes and workarounds that use tablet features to improve communication (i.e., through WhatsApp, e-mail or another means).

All of the planned features of Tangerine:Tutor, such as tracking coach visits, assessing the quality of teaching, tracking attendance and conducting basic calculations of the schools visited, were expressed as useful features during this needs assessment. This information contributed to the redesign of Tangerine:Tutor throughout 2017.

User Testing

On November 22, 2017, a small team consisting of three CCTs, one Deputy Principal Outreach (DPO), one official from MoES, one Program FA and three SHRP staff used the new prototype of Tangerine:Tutor to observe Primary 1 lessons in three classrooms near Shimoni core PTC. Overall, the six test users who were not SHRP staff rated the tool as “highly usable” and viewed it as a valuable coaching resource.

The most popular features among the users were the automatic feedback and the detailed step-by-step observation protocol. One area of concern that several of the test users expressed was the inflexibility of the tool—there was no way to capture when teachers added elements to the lesson or modified those in the teacher guides.

In addition to requesting some basic modifications to the tool, the team identified the need to make the feedback less overwhelmingly negative for teachers who skip many of the steps (which would result in a long list of feedback about each missed step). Additionally, the team expressed concerns about the lack of power and connectivity. The team considered the overall navigability of the tool to be adequate. They, however, eagerly anticipated the ability to move between sections of the tool, as well as the ability to resume observations after accidentally exiting the tool, which had not yet been implemented.

This team of user testers suggested that the CCTs would benefit if a portion of the training focused on caring for, handling and troubleshooting basic problems (e.g., freezing, battery drain) that could arise when using the tablets. The team also indicated that the lack of power might compromise the safety of the tablets because CCTs might have to charge at charging stations in the trading center. The team also noted that the CCTs need support regarding the coaching observation methodology. Although this training has been provided multiple times, there are new CCTs (and tutors who are caretaking CCTs); therefore, the team said that a walkthrough of the steps in the teacher guides would be beneficial.

The team agreed with the process that the TIET and the PTCs will collect signed commitments from the CCTs upon receiving the tablets. Individual cases of loss or theft will be investigated to

determine responsibility. A team member suggested that if the DPOs do not see any uploads from the CCTs after two school terms, then they should move the CCTs back to college residency and be replaced.

The team further agreed that to protect teachers' privacy, teachers should be identified by their role, grade and subject—not by their names. The team was concerned that the tool could cause a shift away from the clinical feedback encouraged among the CCTs—first asking the teacher “what do you think went well” and “what could be improved.” The team said the teacher guides must be available because they can provide teachers with concrete examples of the steps they have left out.

The team also requested an “Additional Comments” section that CCTs can use to describe other aspects of the lessons. The team expressed concern about the cost of data, but viewed this amount to be much less than the cost of transport to the college to submit work plans and reports. The team also raised concerns about network coverage at the CCs. The CCTs participating in the small team also asked whether there could be a tool for days when the CCTs reach a school and there are no literacy lessons (e.g., sports day), perhaps a tool for documenting other activities and for planning?

Lastly, the team expressed their excitement about the potential to use the tablet to record videos and audio of teachers while they conduct their lessons and share videos with the teachers about key skills.

Specific individual feedback from the team was quantified in terms of key user-centered design criteria: learnability, efficiency, error rate, satisfaction and value. This effort corresponds to the “Usability” stage of evaluation for early prototypes, according to the WHO framework. The remainder of this subsection summary findings; the testing team's detailed feedback is included in **Annex 2** of this report.

Learnability—Is the Tool Easy to Use (*based on staff observations and individual testing team feedback*)? The testing team said the tool was straight-forward to use, and it was easy to follow the behaviors, as noted in the tool, that occurred during the lessons. Two team members noted that using the tool was easy to learn because they own smartphones, and one team member said having used the old, paper-based version of the support supervision tool was helpful. The team members said they experienced difficulties with the following items when using the tool: it was difficult to return to the previous page; the tablet was not very sensitive, so it took longer to respond when the buttons were tapped; and the tool was difficult to use when the teacher went off script.

Efficiency—Does the Tool Allow Users to Accomplish Task Quickly and Effectively (*based on individual and group feedback*)? Five out of the six testing team members who were not SHRP staff said they would use this tool rather than a paper form or notebook, mainly because the tool provides automatic feedback and because it is easy to use—users just simply tap “yes” or “no” to answer the questions. The team members also liked that the tool automatically records the observation and feedback. One team member said they would use their notebook and this tool to record areas not captured in the tool.

Error Rate—Does the Tool Have Low Incidences of Errors and Is It Easy to Recover (based on use in the field and Tangerine data)?

One testing team member said he accidentally exited the tool and lost everything; he wished that there was a Resume button. Four team members said the tool became difficult to follow because the teacher they were observing was following steps out of order. Two team members said it became difficult when the teacher went off script entirely. One team member noted that using both her notebook and the tool helped to address aspects of the lessons that were not included in the teacher guide.

Satisfaction—Was Using the Tool an Overall Positive Experience (based on individual and group feedback)?

When the testing team members first attempted to use the tool in the morning of the day of user testing, they said that they were “eager,” “excited” (because of the time-saving aspect of the tool), “scared,” and “motivated” and that using the tool was difficult. However, the three team members who said they were “scared” during the morning walkthrough later stated that they felt “good,” “comfortable,” and “not at ease, but fairly ok” with using the tool in the classroom. During the survey in the afternoon, the team members who had previously reported during the morning session that they were “scared” to use the tool said that they now felt “very good,” that the tool “will be easy to use,” and that the tool “eases my work.” These responses during the afternoon survey suggest that there will be a fairly brief adjustment period before users are confident with using the tool during school visits.

Value—Does the Tool Effectively Support the CCTs and Teachers? How Can the Tool Be Improved (based on individual and group feedback)?

All of the testing team members said that the tool could help improve teachers’ performance because it clearly identifies their strengths and weaknesses and provides clear guidance about which steps must be improved. The team members said the features that they liked best about the tool from a coaching perspective were the step-by-step walkthrough of teaching steps and the automatic feedback. Some of the team members said they disliked that there was no place in the tool to address lesson elements that teachers modified or added.

Based on this activity, the development team improved the digital tool design. For example, the issue of feedback was addressed by introducing a color-coding system to prioritize feedback, shortening the feedback sections and inserting an instruction to “select two areas from the below list to give teachers feedback on.”

Pilot Roll Out and User Training

After further revisions to the tool and the purchase of tablets, the first group of pilot users were convened to learn how to properly use the tablets. The pilot user training involved a total of 78 participants, including 33 CCTs. The remaining 45 participants were SHRP program staff and government stakeholders. The pilot user training took place in February 2018.

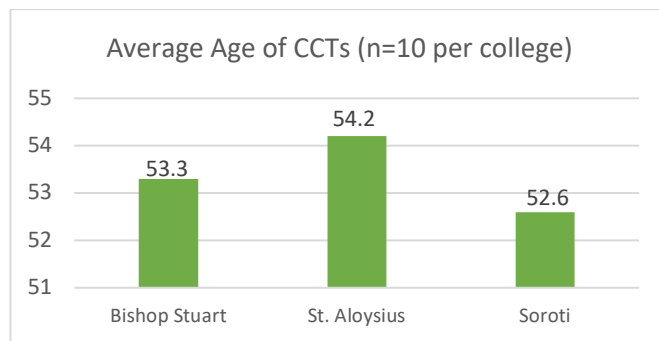
Early in the day of the training, a training facilitator asked the participants to use a piece of paper and write down some information about themselves (e.g., age, role, reporting college) and then answer the following three questions:

- Have you ever used a tablet similar to the one we are introducing here?
- Are you comfortable with using technology?
- What are one or two of the most common issues that you discuss with teachers during feedback sessions.

The key findings from this rapid survey, which was completed by 46 of the participants (of which 30 were CCTs), are summarized in **Exhibits 3 through 5**.

The 30 CCTs who attended the training were 31% female and 69% male. The average age of the entire group of CCTs attending the training was 53.4 years but ranged between 40 and 60 years (**Exhibit 3**). The average age of DEOs and Municipal Inspectors of Schools (MISs), attending the training was 49.4 years. The average age of the Information Technology (IT) staff at the teachers colleges who attended the training was 32.6 years.

Exhibit 3: CCTs by Age and College



Out of all of the CCTs attending the pilot user training, 12 said they had used a tablet before (and 6 said they use a smartphone; **Exhibit 4**). Out of the 30 CCTs, only 8 said they were uncomfortable with technology; the average age of this group who reported being uncomfortable with technology was 57 years, with the highest age being 60 years.

Based on the findings, there was little difference in the comfort levels of the participating CCTs and the remainder of the participants, and there were no major differences between the male and female CCTs regarding their responses (**Exhibit 5**).

Exhibit 4: Tablet Use Among CCTs

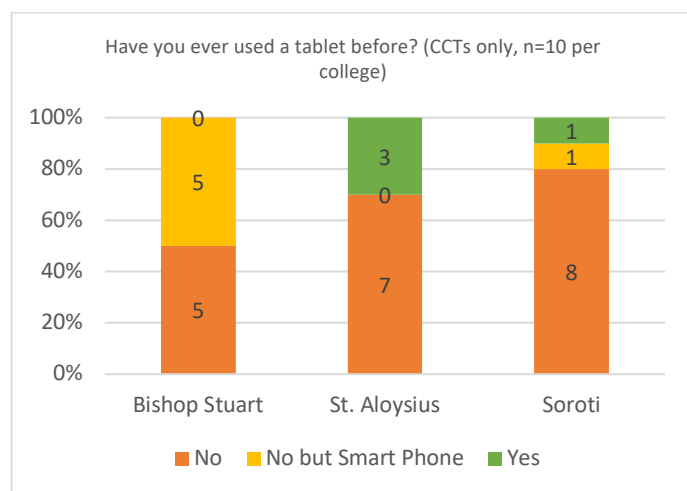
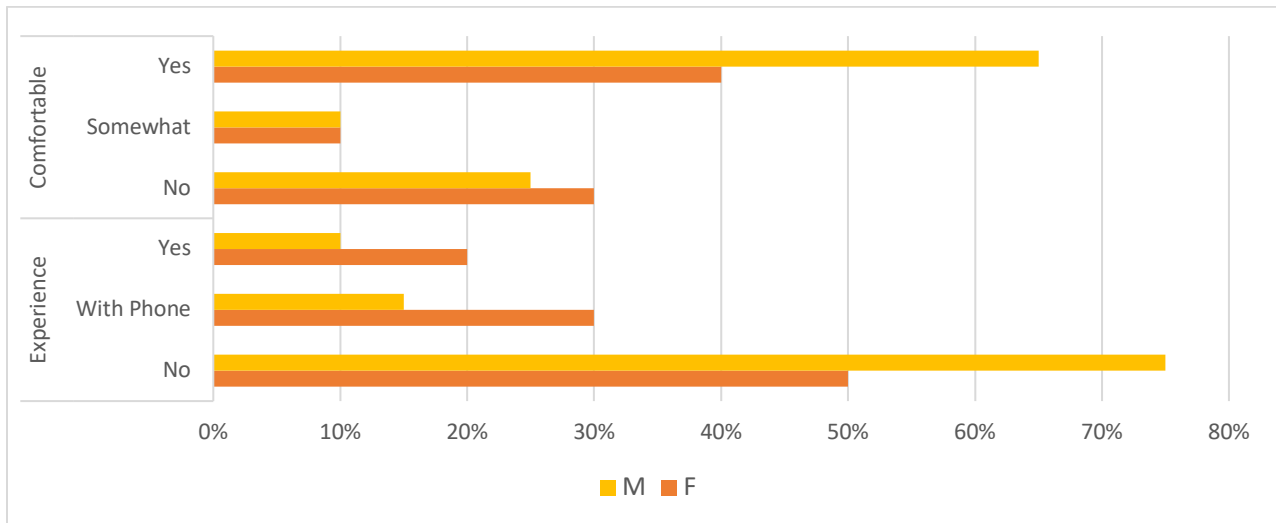


Exhibit 5: Responses by Gender



The training program included a “live” classroom observation, during which pupils from a Primary 3 classroom came to the training location and a teacher conducted an English lesson from the books while the CCTs tried to follow along and record their observations in their tablets (**Exhibit 6**). After the simulation, the group of CCTs discussed feedback, compared their observation inputs and continued to practice in small groups. This exercise was useful in monitoring the application design because we could observe the usability of the tablets and the software in conditions similar to the intended use case.

Exhibit 6: CCTs Participated in an Observation Simulation During Training



Two important additional activities took place during the pilot user training: (1) a breakout meeting with staff from each of the three PTCs to plan a way forward to support the CCTs and (2) a meeting with district officials to talk about the dashboard. Both activities are further discussed in the remainder of this subsection of the report.

Training IT Staff. One individual from each of the three participating PTCs was invited to the training and to serve as the IT specialist who would provide support to CCTs about using the tablet technology. During this breakout meeting, program staff met with these three PTC IT staff to obtain feedback and set expectations for the type of support that they could provide. All of the IT staff said that they were comfortable with using the tablets and Tangerine:Tutor, although they would appreciate it if more manuals or troubleshooting tips were available. The three individuals agreed that they could serve as a point of contact for the CCTs to

- Be “on call” for the CCTs when they are experiencing technical difficulties with the tablets.
- Share common questions and concerns in the WhatsApp group so that common questions can be answered at once.
- Maintain a spare tablet in case any CCT needs to exchange a damaged tablet or has lost his or her tablet.
- Practice using the tablet and Tangerine:Tutor to be familiar with functionality and be prepared to answer questions.
- Advise the program about any upcoming events during which the CCTs are expected to all attend so that we can take advantage of that opportunity to do updates and conduct refresher training as a group.

As a result of this breakout meeting, the WhatsApp group was created. For the remainder of the pilot user training, the IT specialists were encouraged to start playing the role of technical facilitator rather than as participants.

Dashboard Discussion. During the pilot user training, facilitators also introduced to the participants the idea of a Web-accessible data “dashboard” based on the information that coaches enter into the tablets. The participants suggested some items that they would like to see added to the forms in Tangerine:Tutor, some of which are already available, such as the following:

- Attendance and enrollment
- Pupil data (e.g., by gender)
- Learning outcomes
- How many CPD training sessions and community mobilizations CCTs conduct
- Additional questions about leadership and support from Head Teachers’ involvement
- Whether the zonal Head Teacher performed support supervision.

We suggested that these items could be integrated after the pilot effort for later expansion. The participants agreed to add the following basic information to the tablet-based forms in Tangerine:Tutor:

- The number of schools visited and possibly the percentage of visits according to the expected total
- The number of schools where Head Teachers have provided support

- Mapping of schools visited.

An important consideration for the design was that whatever dashboard is created must be available on the tablets because that may be the only technology available to them. Therefore, the design must be responsive, legible on a tablet screen and light enough to load using mobile data plans. Because we are not tracking teachers' names, we should determine how best to handle "visits" versus "observations."

As a result of observing the usability of the application during training, the RTI development team made several updates to accommodate users' needs, such as making the font size much larger because the user demographic regarding age is relatively older and many use reading glasses.

Monitoring

In April 2018, a team of five SHRP staff based in Kampala and two Program FAs spent four days (i.e., April 17 through 20) in the Google.org grant catchment area districts of Budaka, Kumi, Pallisa, Serere and Soroti. One objective of this visit was to interview 8 out of the 22 CCTs and to observe them while they used the tablets and Tangerine:Tutor to support teachers in the classroom. RTI SHRP staff also interviewed teachers college and district staff who had been involved in the pilot training and also received tablets.⁴ At the time of this monitoring visit, the dashboard was not yet in use.

Additional objectives of the visit were to

- Continue the **feasibility** and **usability** components of the evaluation and begin gathering data regarding **efficacy** (see **Exhibit 1**, evaluation matrix).
- Support Information and Communications Technology (ICT) staff and CCTs with tablet use.
- Monitor the early uptake of and barriers to using the tablet and/or tool.
- Conduct surveys and interviews about the usability and impacts of the tablet and/or tool.

The main outcomes of interest for this monitoring activity were increases in the quantity and quality of support from the CCTs to teachers. After reviewing data uploaded at the time of the visit, there appeared to be an increase in the number of CCT visits to schools when compared with the previous school term (even though the dashboard, which is the mechanism for accountability, is not in place).

As far as improved quality of support, the findings were mixed. Most CCTs were mindful and shared the Tangerine:Tutor-generated guidance to support the teachers; others delivered guidance in a harsher manner than necessary (not a tablet issue) and did not know how to use the generated feedback but resorted to somewhat generic comments as was done prior to using the tablet. In general, the findings at this midline of the pilot effort indicated:

⁴ Although the research plan initially included interviews with teachers and Head Teachers, it was clear that the CCTs had not interacted closely enough with school staff such that they were familiar with the tool and how it could support teacher and schools. The IT support person from Soroti teachers college was also not available during the visit.

- CCTs said they are comfortable with using the tablets and believe that they make it easier to conduct their work. Although most CCTs are providing the tablet-based feedback to the teachers during the feedback session, some clearly do not understand the linkage between the observation and the generated feedback (i.e., what the colors mean). That issue must be addressed during the roll-out training.
- TTCs have been able to provide support to all CCTs in their catchment area. At one training college, IT staff helped the CCTs upload their own data. Since then, the CCTs have been able to do this on their own. At another college, the college IT staff provided support to the CCTs, but they simply uploaded the information without teaching the CCTs how to perform this task on their own.
- The Tutor tool itself (the structured observation tool that automatically generates relevant feedback) has great potential to support CCTs and others who provide assistance to teachers who cannot possibly be familiar with all variations of literacy-related lessons.
- College and district staff are also supportive; however, because no specific data dashboard or planning tools are available to them, these college and district staff are using the tablets only as a means of communication (i.e., telephone, short message service [SMS] and e-mail [in one instance]).
- In all cases of the CCTs visited (8 out of the 22 CCTs in the pilot), we saw evidence that they had used the tool to support teachers. In fact, before the visit, we could see that data from all 22 CCTs had been uploaded from their tablets to the server. CCTs were, in general, enthusiastic about the tablets and Tangerine:Tutor.
- All of the CCTs, district officials and college officials surveyed reported that they were able to charge their tablets. Charging time varies from less than 1 hour to 4 hours, and the cost of charging at a commercial charging station is 500 to 1,000 in Ugandan shillings (US\$; between approximately \$0.15 to \$0.30 in U.S. dollars); however, transportation to the charging location can triple the price. The time between charging ranged from every day to once per week (see **Exhibit 7**).

Detailed interview findings are included in **Annex 3** of this report. As a result of the pilot experience, the RTI development team made additional updates to the design and content of the tablet observation tools and feedback (e.g., making sure attendance only needs to be entered once).

Exhibit 7: Data Regarding Tablet Charging and Costs (Midline Pilot Monitoring)

College	CC	How Often Do You Need to Recharge Tablet?	Where Do You Recharge Your Tablet and How Much Does It Cost?	How Long Does It Take to Fully Charge?	Have You Successfully Uploaded Data on Your Own?	Where Do You Access Internet? How Much Does It Cost?
St. Aloysius	CCT Atatur	Once per week	At a shop in town; 500 Ush* per week	4 Hours	No. ICT staff came and uploaded the data.	Not applicable
St. Aloysius	CCT Mukongoro	Every 2 or 3 days	At a shop; between 500 and 1,000 Ush per time; solar charge 1,000	1 Hour or less	No (ICT staff did not visit; but data appeared to be uploaded).	Not applicable
St. Aloysius	CCT Pallisa Township	Twice per week	Use a generator; 500,000 Ush per charge	Not applicable	No. ICT staff uploaded the data.	Not applicable
St. Aloysius	CCT Iki	Once per week	No cost—charge from home	1 to 2 Hours	No.	Not applicable
Soroti	CCT Kateta	Every 1 or 2 days	No cost—solar charger at the CC	2 Hours	Yes.	Not applicable
Soroti	CCT Pigire	Every 2 or 3 days	At a shop; 1,000 USh for charging; 3,000 USh for transport from the CC	3 to 4 Hours	Yes.	Buy data on a personal subscriber identification module (SIM) card, insert into tab

Note: \$1 U.S. dollar equals approximately 3,600 USh.

Demonstration Period Expansion and Follow-Up Training

Based on the feasibility and lessons learned during the pilot training and monitoring activities, the program was expanded to four regions (i.e., Northern, Eastern, Western and Central) to cover a total of 154 CCTs. Over three weeks (see **Exhibit 8**), SHRP teams, supported by Program FAs and college ICT support staff, trained 299 CCTs, Principals, DPOs, DISs and MISs to use the Samsung Galaxy A6 tablets that they received from their respective teachers' colleges and Basic Education Department. Training included the following topic areas:

- CCT reflection and remapping updates
- Overview and purpose of the tablets
- Basic functions and use of the tablets
- Security and care of the tablets
- Using the Tangerine Tutor lesson observation tool, including feedback

- Uploading data from Tangerine Tutor
- Using the online dashboard with district- and CC-level data
- Using the tablet-based coaching tools (e.g., Papaya, coaching videos, teacher guides, camera)
- Using subscriber identification module (SIM) cards and troubleshooting.

The use of Program FAs to keep CCTs in small groups proved to be a highly effective strategy because it ensured that the CCTs received individualized attention, while enabling facilitators to maintain a decent pace of delivery.

Exhibit 8: Participant Details for Expansion of the Training Program

Location of Google.org Grant Tablet Roll Out	Date	Expected Number of Participants	Actual Number of Participants	Men	Women
Western region	July 24–26, 2018	82	78	58	20
Northern region	July 31–August 2, 2018	79	72	59	13
Eastern region	July 31–August 2, 2018	86	88	58	30
Central region	August 7–9, 2018	73	61	36	25

At all four training venues, the participants reported notable increases in their comfort level when using the tablet-based technology. On a scale of 1 to 5, with 1 being “very uncomfortable...” and 5 being “very comfortable...,” the participants rated their comfort level, on average, as 0.83 points higher after the training than before, which is a substantial improvement, given the brevity of training and the substantial gap between the tablets and any technology to which the participants had previously been exposed. Details by region are presented in **Exhibit 8**.

Exhibit 9: Participants' Comfort Level with Technology (Expansion Training)

Region	Average Pre-Test Score	Average Post-Test Score	Notes
Eastern	3.5	4.2	Pre-test: 13% (3 out of 24 non-pilot CCTs) said that they are “very uncomfortable” with technology. Post-test: 0 participants (0 out of 24 non-pilot CCTs) said that they are “very uncomfortable” with technology.
Western	3.2	4.2	Pre-test: 24% (8 out of 33) said that they are “somewhat” or “very uncomfortable” with technology. Post-test: 8% (2 out of 26) said that they are “somewhat uncomfortable,” and 0 participants said that they are “very uncomfortable” with technology.
Northern	3.3	4.0	Pre-test: 30% (16 out of 53) said that they are “very uncomfortable” or “somewhat uncomfortable” with technology. Post-test: 6% (3 out of 55) said that they are “very comfortable” or “somewhat uncomfortable” with technology.
Central	3.2	4.1	Pre-test: 27% (14 out of 53) said that they are “very uncomfortable” or “somewhat uncomfortable” with technology. Post-test: 9% (5 out of 56) said that they are “very uncomfortable” or “somewhat uncomfortable” with technology.

In the Eastern region, some participants were part of the pilot effort and were being trained a second time. Of the CCTs from non-pilot areas, the average pre-training score was 3.5 and post-training score was 4.2 (13% of the participants said that they were “very uncomfortable [with technology] at first,” but none of them remained “very uncomfortable” with technology at the end of the training). Of the CCTs that had already attended the pilot training earlier in the year, they rated their comfort level with technology, on average, to be 3.8 at the start of this second training and rated their technology comfort level, on average, to be 4.6 by the end. Because 61% of CCTs who participated in the pilot training stated that they were “comfortable with using technology” (the scale for the pilot was only “yes,” “somewhat,” and “no”), and this is the second time they were trained, it is not surprising to see a high average score regarding their comfort level with using technology.

The average age of participants in Central and Western regions was 51 years, which is just slightly younger than the age of the participants in the pilot group (53 years). Over all training sites, 32% of participants reported that they had “never used a smartphone or a tablet before.” At the Central region training, more female participants (45%) reported being “somewhat comfortable” or “very comfortable” with using technology than the male participants (38%) who provided the same responses. Unsurprisingly, the participants who said that they have “used a smartphone or a tablet before” reported a higher comfort level with using technology at the beginning of training, as shown by Central region data (**Exhibit 10**).

Exhibit 10: Participants' Technology Use

Question	Comfort Level				
	1	2	3	4	5
<i>Have you used a smartphone or a tablet before?</i>					
No	100%	50%	32%	7%	0%
Yes	0%	50%	68%	93%	100%
Total number	2	12	19	14	6

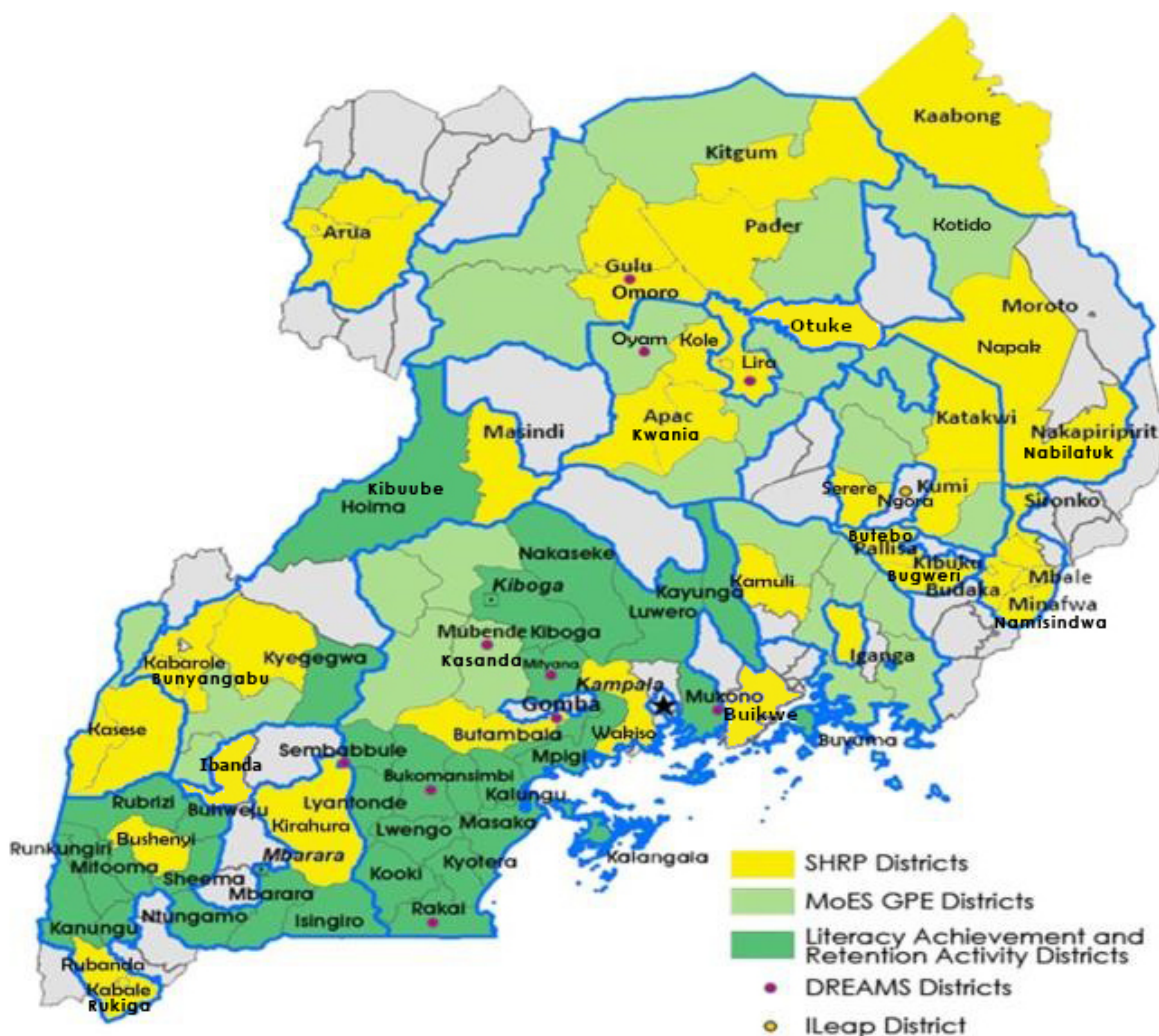
Focus group meetings were then held with 11 CCTs to further measure efficacy. The participants described the advantages, challenges and ways in which the tablets enable the CCTs to provide better support. (Detailed notes from these focus group meetings are presented in **Annex 4** of this report). To summarize, all of the participants agreed that the tablets enable them to provide better support, and they provided some examples about all of the intended features of the tool. The features discussed included the step-by-step guidance, automatic feedback and additional resources included on the tablet (letter sounds practice, teacher guides, model videos).

The participants also said that the tablets are helping them provide better support because they offer many other advantages, such as the opportunities to record videos during lessons and share those videos with others, improve their ICT skills and access tools such as a calculator or the Internet to search for the information that they need. According to several comments from the CCTs, their support has improved because their own skills regarding literacy and letter sounds are improving, their feedback is more focused, the forms in Tangerine:Tutor helps them to focus on what is important, and they have more time to observe the important items instead of taking notes about everything.

The participants also mentioned ways in which they believe the coaching model is helping to improve teacher effectiveness. The participants said that teachers are now taking supervision and feedback more seriously because the tablet captures what they have done and because the feedback is visible in the tablet and can be shared more widely. Sometimes the feedback about the lesson includes time to review the video from the lesson that shows exactly what the teacher did so the CCT can provide constructive feedback about how to improve. Sharing the video among teachers also helps them see additional and specific examples of teaching practices. Additionally, now that CCTs are also capturing attendance and enrollment data (for teachers and pupils), teachers are paying better attention to this information and are keeping records more diligently. Finally, the tablets have improved the job of the coaches because they now have fewer materials to carry (teacher guides are in a digital format), and there is now more visibility of their work and efforts with MoES.

As of August 2018, all SHRP districts have been reached through the digital coaching support program (**Exhibit 11**).

Exhibit 11: Map Highlighting SHRP Districts in Uganda



Final Tablet and Tangerine: Tutor Handover and the Reflection and Learning Event

The purposes of the Reflection and Learning Event (**Exhibit 12**) were to highlight all of the accomplishments realized over the past two years and to plan a way forward, communicating the importance of full ownership of the tablets and tools and proactive management of the next steps by MoES. Unlike previous events, this was not designed as a training event for tablet users (although the SHRP project organizers also used the event as an opportunity to raise awareness about the dashboard’s functionality to MoES staff and how to access it). Instead, this event was an opportunity for feedback and planning by the individuals who will be responsible for supervising the tablet users. The participants included Principals from the TTCs (11), DEOs, (21), DPOs (3), DISs (21), MISs (11), Municipal Education Officers (MEOs; 6), PTC IT staff (2) and CCTs (2).

Exhibit 12: The Opening Slide from the Presentation Deck for the Final Grant Event

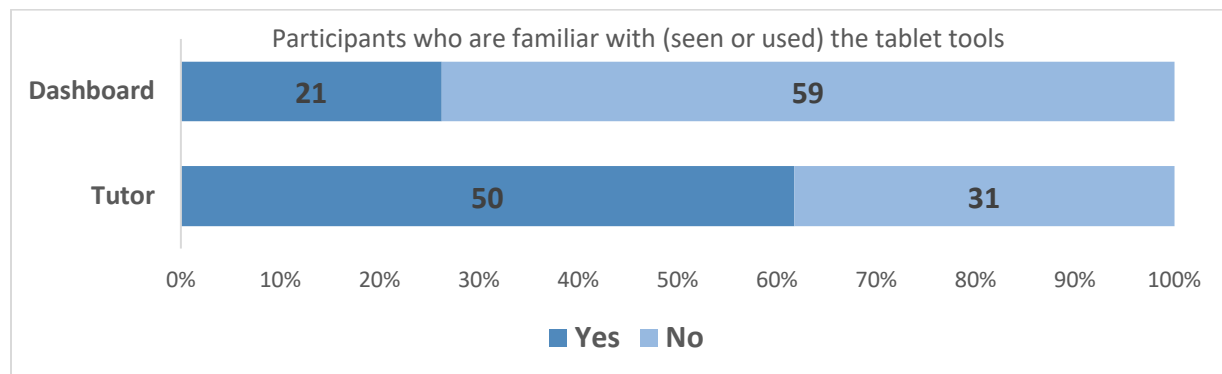


In the hierarchy of the Ugandan system, quality assurance of teaching in primary schools is the responsibility of districts, but through CCTs who are employed by the government as part of the PTC staff. DISs are responsible for school quality in terms of infrastructure and other basic inputs. The tablets were only distributed to CCTs, DPOs, Principals at the colleges, IT staff at the colleges, DISs, MISs, DES regional staff, BE and TIET. However, it is important that everyone understands the reasons why

the tablets are being used, how they should be used, and what data are available through the online dashboard. The USAID/Uganda SHRP project will be closing out in 2019, and the Google.org grant ended in December 2018. Therefore, another aim of the event was to communicate the entire “handover” of the tablet program to MoES and plan for continuing needs while there was still time to potentially seek support elsewhere.

During the morning session, a short survey was distributed to participants to understand their background. As shown in **Exhibit 13**, some of the participants were familiar with the two main tools that had been developed by the program: Tangerine:Tutor on tablet devices and the reporting dashboard visualizing data collected by using Tangerine:Tutor during CCT school visits.

Exhibit 13: Familiarity with the Tools



This information was mainly used for tailoring the presentation content to the needs of the participants. The results were unsurprising because some of the people who were invited were not expected to be users of the tools, but rather people from within the Ugandan education system who will be important for future sustainability and use of Tangerine:Tutor and the dashboard.

During this event, the speakers reminded the participants of the goals, objectives and history of the tablet program and emphasized the importance of carrying it on independently after the SHRP, LARA and the Google.org grant programs have ended. During a question and answer period, many participants reacted to the opening presentations with the following questions and comments:

- An MEO shared that this innovation encourages a lot of transparency and communication, and they can see a lot of improvement in their schools since using the tablets. Because CCTs are empowered through the use of their tablets, MEOs would like to know if they will have tablets too.
- One person familiar with the Tangerine:Tutor noted that it fit very well with their existing system of support supervision with the pre and post observations, but some aspects of the tool could be improved
- The CCTs said they are comfortable with using the tablets, but reporting is a challenge. The IT staff played an important role with coaching, but the CCTs need to know to whom they can contact if that person is not available.
- The participants appreciate the innovation because data can be accessed immediately and used for planning, but said that more tablets would be needed for any additional CCTs, district officials and college officials hired or any new districts brought on board.

These statements illustrate the purposes of the event and the work that was to be conducted during the afternoon session, which involved identifying challenges and developing solutions to continue the work.

This final event was also an opportunity to gather additional information about perceived effects of the tablet program on instructional change in Uganda during the Demonstration phase of maturity (see **Exhibit 14**). During the event, the participants were placed into groups and asked to reflect on the following questions:

- How have the tools changed the coaching process?
- Is using the tools an improvement?
- Did we accomplish what we set out to do?
 - Did we improve teacher support?
 - Did we professionalize the role of the CCTs?
- When using the tool, what has been most useful?
- When using the tool, what has prevented more positive impacts?

The participants reported that using the tools is an improvement when compared with how CCTs were working before. The group members agreed that the objectives had been achieved to some extent, but existing problems are hindering more positive impacts. A sample of the specific feedback provided by the participants for the different questions are summarized in Exhibit 16 in terms of general positive and negative aspects of the tools. Parentheses are used in Exhibit 16 to indicate multiple instances of the same response.

Exhibit 14: Feedback About Changes Introduced by the Tablets

Question	Feedback
What are some positive changes related to teaching quality?	<ul style="list-style-type: none"> • More teachers have been supported to implement EGR and frequency of CCT school visits has improved (5). • Systematic/step-by-step guidance improves adherence and consistency with the lesson delivery model (9). • Additional references, videos and letter sounds are readily available (3). • There are automated summaries of the feedback and consistent feedback is provided (2). • The attitudes are positive toward supporting teachers more objectively. • Evidence is instantly provided, so this can be used to improve teaching. • Resources are handy and can be used to improve lesson preparation. • Interactions between the supervisor and supervisee have increased.
What are some positive changes related to coaching duties?	<ul style="list-style-type: none"> • Reporting is harmonized, uniform and accurate (5). • CCTs can generate more authentic reports (4). • It is easy for CCTs to share information, and work is easier (e.g., time management of lesson, reduced paperwork) (4). • The reports are timely and access to information is easy (3). • Evidence-based reporting is provided, and the process is transparent (2). • There is an improved commitment among CCTs to work (2). • There is capacity building for CCTs. • CCTs are acquiring ICT skills.
What are some challenging aspects of adopting Tangerine:Tutor and the dashboard?	<ul style="list-style-type: none"> • Inadequate ICT skills are hindering impact (2). • Access to electricity for charging is limited (3). • Network connectivity is a problem (2). • Understaffing of CCTs is an issue (2). • The tools are limited to the subject of reading and are just for instruction to the lower grades (2). • The mindset of teachers can be a problem. • There are an insufficient number of tablets available. • The safety and security of the tablet are an issue. • Some CCTs cannot access the reporting dashboard.

Note: Parentheses in the Feedback column refer to the number of times the statement was expressed

Also, the final activity of the day was to make specific suggestions about what could be done to sustain the program after the direct support has ended. Participants were placed into groups in

which they suggested an action plan for sustaining the use of the tablets for instructional support. Most of the groups made specific suggestions (see **Exhibits 15 and 16**). We placed the main suggestions into two categories: (1) further development and maintenance of the software tool and (2) ways to expand the hardware and program in general. For example, the participants mentioned that more training on using Tangerine:Tutor and the dashboard effectively is needed for all education stakeholders, and specific CPD about different aspects of the tools is needed for the CCTs. These types of training sessions require joint planning among Principals, DEOs and MEOs.

Regarding further development and maintenance of the software tool, the main suggestions from the groups are to

- Improve the dashboard to include surveys gathered by the MEO and provide the ability to filter by person (either by name or by title).
- Install and design other tools to support instruction.
- Install and update antivirus software.
- Customize the device to monitor all subjects.
- Share the tool with Head Teachers.
- Integrate all of the tools on the tablets (including those used by DISs under Global Partnership for Education funding).

Regarding ways to expand the hardware and the program, recommendations included the following:

- Integrate the use of tablet into college work plans and budgets.
- Integrate EGR activities into the district plan.
- Provide back-up tablets.
- Procure more tablets by colleges and districts.
- Find an electricity supply to solve the problem of where to charge the tablets.
- Find stronger network points for uploading (DISs and Principals) and install wireless Internet at each Core Primary Training College.
- Improve performance of the tablet by removing irrelevant applications and automatic updates; ensure that the GPS works.
- Disseminate good practices (e.g., recorded videos of teachers demonstrating good practices) to the entire school.
- Ensure that DISs and MISs work jointly with CCTs to provide support supervision.
- Standardize the tool across the country so that they are uniform.

Regarding the question of expectations, concerns still remain about the workload for CCTs and inadequate funding for transportation to schools. However, the groups agreed that support should continue from the PTC and the CCTs at the current frequency, regarding use of the tablets. CCTs should take responsibility and ownership of the program, continue to use the

tablets and demonstrate a good culture of providing feedback. The CCTs should still continue to share data in a timely manner and to use the reflection journals and blue books. Note: Blue books are hard-cover blue composition notebooks that are provided to every teacher and Head Teacher to record reading-related support activities.

Exhibit 15: Group Members Developing Their Suggestions for Sustaining the Program



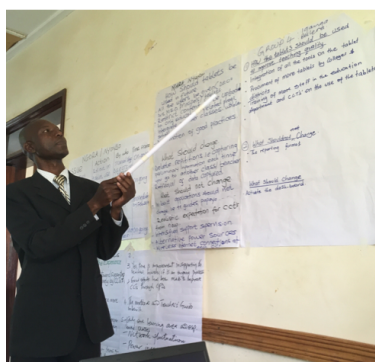
Exhibit 16: Group Members Reported Their Suggestions to All Participants

Realistic expectation of CCTs

- Continue support supervision using tabs
- Timely sharing of data
- Demonstration/catchup for others in the use of tabs.
- Identify model HTs to support others
- Follow up on recommendations and good practices

Way forward

What needs to be done	By who	When
Sensitisation Training	CCTs, IT personnel, FA	Dec. 18 - May 19
Integrating tablet use in our w/plans	Heads of Inst/ Dept	Ongoing
Acquiring more tabs	MoES, LG Colleges	Dec. 18 - April 19 (Termly).
Review meetings	All	Termly



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ISSUE	Action	By who	Time Frame
1. New staff not trained on tablet use.	Roll-out on tablet use	Trained staff BIS, CCTs, IET (SHRP STAFF)	On-going
2. Limited Knowledge on ICT upgrading	Conduct cpdrs	ICT Staff (SHRP)	On-going
3. Intergration (to include other stake holders)	upgrade of the system	MOES (SHRP)	Immediate by Feb 2019
4. Maintenance and replacement of tablets.	BUD: Budgeting	DEO, ME of COLLEGES	On-going

Findings and Conclusions

Tablet Effects on the Quality of Coaching

RTI is still working (across projects) to determine the best way to measure the quality of coaches' visits, given that this is highly dependent on individual personalities, capacities and the changing contexts of classrooms and lessons. For this project, the plan was to use the blue books as a way to compare quality before and while using the tablets. The assumption was that this could be done in the context of regular and grant-specific monitoring activities during which SHRP Program FAs observe reading lessons and check the blue books to view the types of feedback that the CCTs are leaving for the teacher as a record of their visit.

Visitor's book: Every school in Uganda has a book that is used for recording visits and entries are typically strictly enforced.

Blue book: This hard-cover blue composition notebook is provided to every teacher and Head Teacher to record reading-related support activities. A blue book is used instead of photocopied copies of observations or feedback forms because reproduction is often cost prohibitive. When a Head Teacher or CCT provides support to the teacher, this support (along with recommended actions) should be recorded in the blue book.

Baseline Information about Quality. At baseline, a review of SHRP staff notes regarding the CCT's feedback in the blue book for **Term 1 in 2017 (Exhibit 17)** found that most of the staff notes were not specific enough to judge the quality of the CCT and teacher interaction (e.g., "the teacher and CCT had agreed to action points as per the challenges identified" or "areas of weakness were noted"), a quarter of the staff entries specifically mentioned that the CCTs'

feedback in the blue books was very general (i.e., “they are not focusing on the teaching of reading, but are general issues of what transpired in the classroom”).

Looking at the actual entries that were recorded, only 2% of them provided reading-specific guidance (3% in pilot area schools and 2% in non-pilot area schools) and not enough details were often provided to act upon. Some examples of this type of feedback include that learners

- Must come up with their own organizer, from which they will use to write a detailed copy [of their write up] on Day 2.
- Must be provided more opportunities to read by themselves.
- Must be supported during writing activities by making page markers in their books.

Other relevant guidance included noting the need for teachers to consistently assess learners (overall 2%), to do more lesson planning and to be more prepared in general (overall 2%) , to follow the teaching steps (overall 1%) and to give specific reading-related guidance (2% overall). Adding these four categories together, results indicate that 16% of pilot schools supported by CCTs with tablets received this type of relevant feedback compared with 7% from non-pilot area CCTs. Other feedback was more general in nature (e.g., “the teacher’s work should be displayed”) or a comment (e.g., “the teacher was well prepared,” “the teacher needs support”).

Exhibit 17: Term 1—2017 Blue Book Teacher Support Entries at the Schools

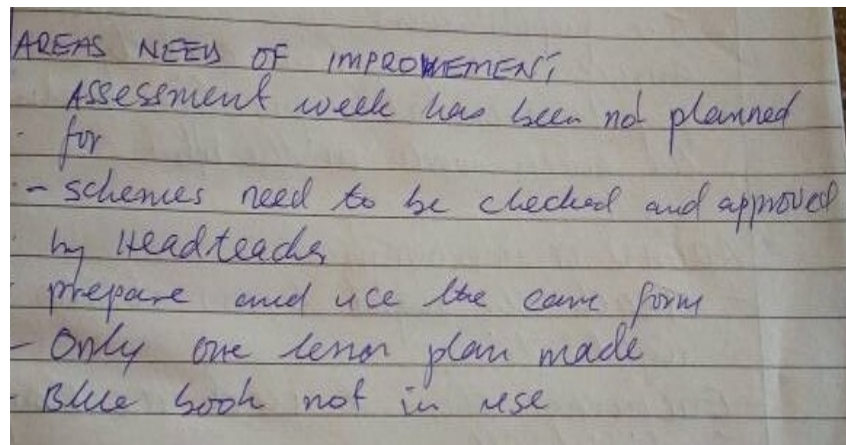
Guidance Provided	Total		Pilot		Non-Pilot	
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Learner assessment	76	2	27	6	48	2
Lesson planning and preparation	80	2	18	4	62	2
Following the teaching steps	31	1	12	3	19	1
Specific reading-related guidance	70	2	15	3	54	2
General support (areas not previously mentioned)	178	5	45	10	133	4
Comments (without recommendations or advice)	313	8	33	7	280	9
No blue book or no entry in blue book	2,873	78	287	63	2,586	80
No support provided (as noted in the blue book)	73	2	17	4	56	2
Total	3,694	100	454	100	3,238	100

Source: SHRP Field Assistant Monitoring

SHRP staff regularly go out with district and college teams to observe reading lessons. During these visits, the Program FAs also check the blue books to see what types of feedback the CCTs are leaving for the teachers as a record of their visits.

Before distribution of the tablets and Tangerine:Tutor, the SHRP team conducted a review of the CCTs' feedback from two schools in the pilot area (one in the Pallisa District and one in the Kumi District). The review found that at the Pallisa school, the CCT was more likely to leave general comments about the Primary 3 English lesson than about the

Exhibit 18: Example Entry by a CCT About Improvement Areas



reading lesson. In addition, their comments about areas for improvement for the teacher were general (**Exhibit 18**). Areas of weaknesses noted by the CCT included, for example, classroom displays, reflective practice on the part of the teacher, or that schemes of work were missing or not had not been approved by the Head Teacher. In the Kumi school, the CCT noted an area of weakness as “reading with fluency” or “reading ability of learners” without providing any specific comments about how to improve fluency.

Endline. Given the limitations in comparing the quality based on written comments, the endline comparison is limited to whether there was any feedback at all. The SHRP team conducted a comparison of the same term (i.e., Term 3) in 2018 with 2017. During **Term 3 in 2018**, out of 680 schools that received CCT visits, 353 (52%) had evidence of feedback recorded in blue books. In comparison, during Term 3 in 2017, out of 723 schools that received CCT visits in the sample, 271 (38%) had evidence of blue book entries. This increase from 2017 to 2018 could be due to the use of Tangerine:Tutor on tablets, which survey responses suggested provides more clear and consistent feedback. Apart from this quantitative data, the feedback gathered from users (e.g., user stories from CCTs and IT staff, reactions from district supervisors and other stakeholders) relative to the pilot effort and the expanded demonstration sample (no other sources are available to assess teacher quality independent of the coach visits and feedback) is that use of the Tangerine:Tutor has resulted in the following:

- More relevant feedback tailored to the lesson because the tablet summarizes and prioritizes the feedback for the CCT to provide to the teacher, based on data entered during the observation and from the student assessments that CCTs conduct.

- More perceived credibility of the feedback. For instance, a video captured on the tablet can be used as evidence to illustrate a particular point during the feedback session between the CCT and teacher. Therefore, the feedback is considered to be more credible and more objective to teachers than just the CCT's opinion.
- Use of the tablets has also improved the quality and relevance of coaching because the tablets provide additional materials—letter sounds practice and videos.

Quantity

The reporting dashboard by which Tangerine:Tutor use might contribute to improving the quantity (i.e., frequency, regularity and coverage) of coaching visits was not fully implemented during the grant period. SHRP introduced the dashboard in July 2018 during the expansion training, but users said that it was very slow to load on local Internet connections. To keep the download size minimal, the data visualized for the dashboard were limited to a few key summary counts and simple, black and white graphics. Therefore, there was only one term (i.e., September through November 2018) during which the dashboard could have been used, but thus only a limited number of users had even had access and opportunity to use it at this stage. Nonetheless, there is some anecdotal evidence that using the tablets is perceived as contributing to the accountability of CCTs, possibly not in terms of more visits, but in terms of more *honest* and *reliable* reports.

Quantity Measure at Baseline. Program FAs who are based in the districts and regularly visit the schools, collected the baseline data regarding the quantity of CCT visits to schools. While conducting routine monitoring activities for the program, the Program FAs were asked to verify CCT visits to the school. Specifically, the Program FA compared the electronic data collection form that he or she completed during school visits against the school's visitor's book, which the CCT used to record the date of his or her visit. The Program FAs visited both pilot and non-pilot schools from late February through late July 2017.

Exhibit 19 shows CCT visits to schools, comparing CCTs in all 165 program CCs: those in the 22 pilot CCs and 143 in the non-pilot CCs. Overall, during Term 1 in 2017 (a three-month period), 41% of schools were visited by CCTs. This percentage was significantly higher in pilot CCs where 61% of schools had reported being visited by CCTs. In line with this finding, all of the measures of the quantity of the CCT school visits are more positive in the pilot CCs already at baseline (see the highlighted cells in Exhibit 21). For reference, the average number of government primary schools is 20.6 for the pilot CCs and 22.7 for the non-pilot CCs. There is a common perception that the ability of a CCT to reach all of his or her schools (or a larger proportion of his or her schools) is dependent on his or her caseload; however, the evidence does not corroborate this perception.

The differences in the quantity and quality of CCT visits during the pilot CCs, which performed much better, compared with non-pilot CCs were unexpected. The SHRP team had randomly selected the initial district (i.e., Kumi) and the related CCs, whereas the other districts and CCs were included because of their proximity and home TTCs. Although the SHRP team had previously considered the Soroti PTC to be more organized and proactive when it comes to

following up with CCTs, there does not appear to be any specific factors that would lead to this higher level of performance (there are other seemingly “higher performing” colleges). Endline results also suggested, as somewhat expected, that the later in the term a Program FA visited a school, the more likely it was that a CCT visit had also taken place at the same school. In both pilot and non-pilot schools, the visits started at the end of February and ended in late July.

Exhibit 19: Term 1—2017 CCT Visits to Provided Support to Program Schools

Indicator	All Program CCs (N=165)	Pilot CCs (n=22)	Non-Pilot CCs (n=143)
Percentage of schools visited	44	61	41
Percentage of schools visited 2 or more times	22	40	19
Percentage of CCTs who did not visit any schools	4	0	6
Percentage of CCTs who visited more than half of schools	66	68	41
Percentage of CCTs visiting between 90% and 100% of schools	15	18	7
Average number of schools	22.4	20.6	22.7

Source: SHRP Program Field Assistant Monitoring

During the school visits by the Program FAs during the baseline, they verified the visits by the CCTs by reviewing the school’s visitor’s book and the blue book. Findings show very low use of blue books; overall, blue book support to verify school visits was found in only 20% of the schools.

Quantity Measure at Endline. Exhibit 20 compares the CCTs’ support to schools during Term 3 in 2017 (pre-tablet use) and Term 3 in 2018 (post-tablet use). Exhibit 22 shows a large discrepancy between the number of schools visited, as reported in the database, and from the Program FAs’ direct reporting. This discrepancy might mean that there are tablets that were not uploading data or data could have been mis-reported in the schools list. The other data point—the percentage of CCTs visiting schools—is more aligned between the tablet data and data from the Program FAs. Both data points indicate a decrease in CCT support visits after the tablets were introduced.

Exhibit 20: Comparison of CCT Support Visits to Program Schools

Term 3	2017 (Baseline) (Percentage) from Program FAs Data (Sample)	2018 (Endline) (Percentage) from FA Data (Sample)	2018 (Endline) (Number) from the Tangerine:Tutor Download (Percentage)
Schools visited	46% of schools	42% of schools	885 out of 4,081 schools=22%
CCTs visiting schools	89%	115 out of 144 CCTs=80%	134 out of 166 CCTs=81%

It is possible that tablet use decreases the quantity of school visits because CCTs were now spending more time with one teacher. At least one CCT said in a survey that because the

classroom observation tool on Tangerine:Tutor is longer than their previous paper-and-pencil tool and because attendance data must now also be entered, they have to spend much more time at any one school than before. In contrast to these quantitative data, anecdotal evidence for interviews with individual CCTs suggest that their perception is that frequency has improved because the tablets and tablet resources are helping to make the work easier and their use has helped to increase the commitment among CCTs to work and improve accountability and communication between CCTs and their superiors.

Other Effects

The design of the overall Google.org monitoring and evaluation initiative in Uganda also assumed that, apart from the quality and quantity improvements, there might be other positive effects.

Technology Skills. As shown by the baseline data from the pilot training experience, the target user group is relatively older in age and is inexperienced with technology. During training programs, self-reported comfort levels regarding the rapid adoption of the technology (referring specifically to tablets or smartphones) indicated a relatively high comfort level among the users before the training had occurred; however, observations of the individual participants during the training session suggested otherwise. Many participants struggled with basic functionalities (e.g., turning on the tablet, unlocking the home screen), as well as with more advanced features such as changing settings. This lack of experience with technology results in their slow and uncertain use of the survey tool compared with what they could do on paper. This issue is probably mostly due to the age of the participants and their reluctance to use technology; however, poor eyesight or other physical impairments related to aging could also be a factor. During both training events, SHRP staff personally provided some reading glasses, and the “accessibility” settings were used to increase the size of fonts and the sensitivity of the touch-screen response. During the training, the facilitators distributed tablets to the participants so they could practice using the technology. By the end of the practice, the participants’ skills had improved. Monitoring data, which SHRP staff gathered through interviews with the participants, also suggested that many of them appreciated the opportunity to become more familiar with technology and that their comfort level had improved through use. The participants are becoming users of the Internet, calendar, calculators and other in-built features of the tablet devices.

Accountability. The participants’ opinions expressed during focus groups and the final learning event repeatedly raised questions about the degree to which improved accountability might be due to tablet and Tangerine:Tutor use. It is difficult to establish a linkage between accountability and increased quantity of visits or better quality feedback. However, according to the existing literature on how coaching improves teaching and learning outcomes more broadly, it is likely that any increase in teachers doing what is expected of them in the classroom or coaches doing what they are expected to do in terms of support supervision is an improvement. There are many ways in which the Tangerine:Tutor might affect behaviors related to accountability. For instance, teachers are more regularly filling out attendance data because someone is now

asking to review the information. In addition, Tangerine:Tutor uses GPS data and time stamps to track school visits. Therefore, CCTs' observation data might be more honest because they cannot be faked as easily anymore. Plus, CCTs might more actively supervise teachers because the data are shared with district officials.

Conclusions

The Google.org grant has been instrumental in supporting an education service delivery intervention from the Pre-prototype phase through the Demonstration phase. We have used this important opportunity to carefully test our assumptions and claims with increasingly larger user groups and to improve the service accordingly. The WHO framework for digital case management tools commonly in the health sector provided a structure for evaluating the intervention according to its stage of maturity. This effort was the first deployment of Tangerine:Tutor in Uganda, and only the second field deployment of the new version of Tangerine:Tutor developed under the Google.org grant. Based on the findings and detailed summaries of the events and activities described in this report, the SHRP team suggests the following conclusions regarding the introduction of Tangerine:Tutor to support teacher instructional practices for reading in Primary 1 through 3 in Uganda:

- **Feasibility**—This digital education service delivery product (i.e., a tablet with Tangerine:Tutor and other relevant job resources) can work as intended in the Ugandan context and even for older populations with limited experience with technology previously. However, many opportunities for capacity building are required, and the inclusion of local IT specialists who can be on call for troubleshooting and facilitating updates was an important component of the Tangerine:Tutor deployment model in Uganda. Users accept the model and trust in the integrity of the data as entered and transmitted to the central server and for visualization on the dashboard—in fact, more than the SHRP project team had anticipated.
- **Usability**—Tangerine:Tutor and the tablets are used as intended by the CCT users, who have also proactively discovered other ways that these devices can be useful beyond the custom tools provided for coaching interactions. The simplicity of the design of the revised Tangerine:Tutor facilitates use as intended by the CCTs who complete the observation instrument. Both the hardware and software also withstood the environmental conditions in Uganda; there were no issues reported beyond those related to ongoing development. Tangerine:Tutor relies on interoperability with the Web browser and operating system and can be affected by updates to these systems; therefore, it remains to be seen whether any issues will arise in the future. Additionally, it is difficult for some users to find reliable sources of electricity and Internet. These were, however, not barriers to using Tangerine:Tutor and the tablets during this pilot because the core functionality of the software works without Internet access.
- **Efficacy**—In the controlled setting of this pilot intervention, this digital support product for CCTs appears to be improving the quality, accuracy and credibility of the coach visits, even if not their average quantity. The strength of the evidence is modest, mostly

based on self-reports from the participants, but some documented evidence suggests that CCTs are providing feedback more often when they visit schools. The ultimate effects on education outcomes or teacher performance were not measured during this study. However, participants identified several ways in which they believe teachers are changing their instructional practices because of the digital tools introduced. Based on the underlying model of coaching, which draws on a robust international evidence base, it is reasonable to conclude that any improvement in coaching interactions is an improvement in teacher effectiveness. Especially in a situation in which CCTs focus on providing support in a specific subject area (i.e., reading instruction) where teachers' and coaches' experience is still emerging, the ability to identify and provide accurate and consistent instructional support is highly likely to improve teaching. Additional research is needed to validate this conclusion, although the absence of baseline information or an equivalent control group will make this a challenging task.

- **Effectiveness**—The SHRP team did not yet have the opportunity to conduct any monitoring activities since moving into a fully uncontrolled environment. However, the project did expand the population of users and maintained evidence of efficacy during initial monitoring activities. In addition, the SHRP team has not determined cost effectiveness of the intervention, and it may be that it is still relatively costly when compared with the changes that it brings about. However, until it is possible to deduce the effects of this intervention among a range of inputs for teachers and schools on teaching behavior and then extrapolate the costs of *not* transforming coaching support with digital tools, it will be difficult to answer this question. Moreover, the value of many of the unintended effects, such as professionalizing the coaches' role, building individual technology skills and improving communication, cannot be quantified.

RTI remains committed to exploring the ways in which the impacts of education sector interventions can be measured by using mixed methods. With continued presence in Uganda even after the Google.org funding period has ended, the RTI team hopes to identify more opportunities to further support the users and monitor the effectiveness of the tablet intervention.

The Google.org grant funding has directly benefitted the Ugandan education system in the many ways as described in this report. Additionally, the value proposition of Tangerine:Tutor has been strengthened thanks to a more stable code base and user-centered design. These improvements are already making it easier for Tangerine:Tutor to be adopted in other countries, for an even larger impact.

From this experience, we have developed the following recommendations for other countries to consider before conducting on a pilot effort of Tangerine:Tutor:

- **Ensure stability of products before testing.** Even though user-centered pilot efforts are, by design, meant to be iterative and test products before they have been fully completed, the products must be stable and functional before they are introduced to the users. If the technology is being introduced for the first time to a very inexperienced user group, then the group cannot be in a position to identify and distinguish “bugs” from

incomplete features from intended usability. Similarly, although the user group can describe challenges and needs of the technology, it might be difficult for them to extrapolate or imagine how a product could be improved. The SHRP team found this to be the case with the dashboard design. Therefore, the user-centered design must strike a balance between presenting a product for use that is already functional and introducing features gradually that improve on observed user experiences.

- **Build capacity for providing ongoing support and maintenance to individuals in districts.** Identifying the appropriate champions who can provide technical and methodological support will increase the chances of continued use, which is the intended objective. This support can be a relatively light touch and even provided in a virtual manner, with some support staff connected to users and others connected to users by telephone, but knowing who to call in case of a malfunction or questions can be the difference between occasional use and full-scale adoption.
- **Ensure the integrity of the data without the need for data cleaning.** If the goal is to use data to aggregate and report to higher levels, then it is critical that the data are accurate. During this pilot effort, the SHRP team built into the questionnaire a statement of confirmation that flags the record as being valid (from the user's opinion). Responses to this statement allowed the team to filter out test or practice observations and those that were started but not finished for whatever reason.
- **Include supervisory staff, and eventually school-based staff, in the design and use of the tools.** This recommendation is important for sustained use of the product so that it is not viewed as an externally driven tool that can be ignored once the project has ended. The coach supervisors and Ministry of Education must be convinced of the value of the tools and the credibility of the data that they generate—even if they are not the direct users. The coach supervisors and Ministry of Education must be in a position to hold coaches accountable for properly using the tools, and this can only happen if they know how the tool works.

Annex 1: Needs Assessment Data

1a. Tablet Feedback from CCTs (from the Regional Review Meeting with the Northern Region Coordinating Centre Tutors [CCTs])—July 2017

The following questions were asked to CCTs and their responses are provided as follows:

1. How do you envision using the tablet during your work?
 - Ease the workload.
 - Acquire more technology skills.
 - Accountability for covering work in time.
 - Quick communication and reporting.
 - Improved assessment.
2. What should the tablet do and what should it have to better support teachers in the classroom?
 - Communicate, share and compare good practices.
 - Take photographs of good and bad practices, which can help encourage improvement among teachers.
 - Reporting capabilities.
 - Recording capabilities.
 - Lesson demonstrations (videos).
 - Documentations of good practices.
3. What are your fears or concerns about using the tablets?
 - Power outages.
 - Communication limited at the interest of the donor.
 - Expensive (risky to carry the tablet all of the time).
 - Power outages (a real risk in some Coordinating Centres [CCs], where access to power is in another town or trading center.
4. Think of your past experience with technology in the field. Did it succeed or fail? Why?
 - A teacher used a tablet in Primary 1 and Primary 6 to demonstrate different types of teeth by using images. This use was successful because it is still being employed to date.
 - Technology has been successful when we have small training sessions of individuals to use it.
 - Technology has failed because too few people are given access, the procedure for getting the technology from college administrators is too long or difficult, people are not well trained, there is no access to power and the technology cannot be stored safely, there is a lack of spare parts or a high maintenance cost, there is no one around who can fix the technology and the technology is monopolized by administration.
5. What support do you expect when using the tablets?
 - Get information from the Internet.
 - Ease of communication.
 - Storage of data.
 - Capturing data and artifacts.
 - Reporting and uploading information.
 - Tracking teachers.
 - Typing and editing.
 - Video recording and playing.
 - Cost reduction (send reports, no transport costs).
 - Saves time.
6. Think of a time when you helped a teacher improve his or her teaching. What changed? Why?
 - Teachers' level of preparation has increased with CCT support.
 - Teachers' time on task has increased.
 - Teacher attendance has improved, and they have increased marking and displaying pupil work.

1b. Primary Teachers College (PTC) Staff Opinions About Collecting Data by Using Tablets—July 2017

Items	Responses
How can the gadgets support the CCT with his or her work?	<ul style="list-style-type: none"> • Saves time and makes work easy. • Producing artifacts for reference and capturing information for evidence. • Developing and sharing work plans with the college. • Searching for information that can be shared with others. • Sending information to the college, district, RTI offices and the nation. • Saving bulky information. • They will ease storage of information. • It will aid timely feedback.
What data can be collected by using the gadget?	<ul style="list-style-type: none"> • Learners' assessment and assessment reports. • Teachers' performance. • Information about the number of lessons taught and lesson plans made by teachers. • Teacher and learner attendance. • Monitoring reports. • Number of teachers supported. • Learner enrollment. • Number of schools. • Number of visits. • Number of pupils supported. • Support supervision reports by CCTs and inspectors. • Teachers use of the Early Grade Reading (EGR) materials during teaching and learning. • Evidence of pupil book ratio.
(a) How can the tablet best be used?	<ul style="list-style-type: none"> • After the CCT has received proper training on how to use it, provide training to the users regarding best practices to save battery life, protect against viruses and ensure overall tablet security. • Storage devices. • Analytical tools, if fitted with appropriate programs.
(b) How can it be protected against?	<ul style="list-style-type: none"> • Providing protective cases, bags, covers, jackets and/or a waterproof cover. • Each tutor to have his or her own tablet. • To be used by knowledgeable people. • Using the correct charging gadgets. • Keeping it in a cool and dry place that is away from direct sunlight. • Keeping it out of the reach of children. • Being laminated.
• Damage	
• Loss	
• Theft	<ul style="list-style-type: none"> • Insuring the gadgets. • Keeping it in a lockable room. • Avoiding lending it to irresponsible persons. • Make the CCT accountable for the loss. • Get a secret code. • Sensitizing the CCT to be very careful with the tablet.
	<ul style="list-style-type: none"> • Engraving the gadget with RTI and college logo or names. • Keeping it in a lockable room. • Avoiding exposing it when not in use. • Keeping the gadget in a safe place. • Make the CCT accountable for the loss.

Items	Responses
	<ul style="list-style-type: none"> • The user should have a password so that it cannot be operated by another person.
How can the information be shared?	<ul style="list-style-type: none"> • Through the Internet. They need to have wireless Internet and either a 3G or 4G modem port. • E-mails. • WhatsApp messages. • Telephone calls. • Creating a Web page. • Facebook. • Have a group chat of CCTs and administrators. • Get a group code. • Through staff meetings and continuous professional development training sessions.
What measures should be put in place to ensure that the gadgets are used for the intended purpose?	<ul style="list-style-type: none"> • Regularly monitoring the usage of the gadget and periodic checks by the Deputy Principal Outreach (DPO). • Not sharing the gadget by staff. • Have agreed-upon rules and regulations by RTI and persons receiving the gadgets. • Reports to be sent twice per month • Users should be thoroughly trained regarding what the gadget should be used for. • Should be directly connected to School Health and Reading Program (SHRP) offices so that it can be tracked all the time. • Through installation of a global positioning system (GPS).
Apart from EGR primers and teacher guides, what other materials can be included on the tablet?	<ul style="list-style-type: none"> • Letter sounds and names. • Demonstration lessons. • Real class lessons. • Pictures of other instructional materials that teachers can look for. • Analytical or statistical program to analyze and cross-reference information that is entered. • PTC curriculum. • Thematic curriculum. • Relevant texts that can assist users with conducting research about EGR. • Educational messages. • Report formats or forms • Work plan templates.
Is there a standard form for support supervision? If “yes,” what are its components?	<ul style="list-style-type: none"> • Yes, <ul style="list-style-type: none"> a. Preliminary information (e.g., name, date, class, school, district). b. Areas to retain or strong points (explain how good the lesson has been). c. Areas to improve or weak points. d. Supervisor’s name: Signature: e. Teacher’s name: Signature: • Clinical supervision tool, which includes the following: <ul style="list-style-type: none"> a. Pre-observation. b. Observation. c. Post-observation.

Annex 2: User Testing Feedback

1. Learnability—Is the Tool Easy to Use (based on staff observations and individual feedback)?

Test users said the tool was straight-forward to use, and it was easy to follow the behaviors, as noted in the tool, that occurred during the lessons. Two test users noted that learning to use the tool was easy because they own smartphones, and one test user said that having used the old paper-based version of the Monitoring and Support Supervision (MSS) tool was helpful.

The test users said they experienced difficulty when they tried to return to the previous page (“we look forward to the non-linear design of tutor 3.0!”). Two users said the tablet was not very sensitive, so it took longer to respond when the buttons were tapped. Two other test users said the tool was difficult to use when the teacher went off script. Otherwise, the test users said they understood all questions. The responses from the six test users who were not SHRP staff are as follows:

Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
1. This tool was easy for me to figure out the first time I used it.	3	3	—	—
2. After today, I would be comfortable with using this tool again.	3	3	—	—

2. Efficiency—Does the Tool Allow Users to Accomplish Task Quickly and Effectively (based on individual and group feedback)?

Five out of the six test users who were not SHRP staff said they would use this tool rather than a paper form or notebook, mainly because the tool provides automatic feedback and because it is easy to use—users just simply tap “yes” or “no” to answer the questions. Test users also liked that the tool automatically records the observation and feedback. One test user said they would use their notebook and this tool to record areas not captured in the tool.

Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
3. This tool took longer to complete than a paper form or using my notebook.	—	—	3	3
4. I would be willing to use this tool during lesson observations without my notebook.	—	6	—	—

3. Error Rate—Does the Tool Have Low Incidences of Errors and Is It Easy to Recover (based on use in field, Tangerine data)?

One test user said he accidentally exited the tool and lost everything; he wished that there was a Resume button. Four test users said that the tool became difficult to follow because the teacher was following steps out of order. Two test users said it became difficult when the teacher went off script entirely. One test user noted that employing her notebook and Tangerine:Tutor in parallel helped to address aspects of the lessons that were not included in the teacher guide and thus did not have related items in the classroom observation tool.

Questions	Very Difficult	Somewhat Difficult	Somewhat Easy	Very Easy
How difficult was it to ...				
1. Turn on the tablet?	—	—	2	4
2. Open the program?	—	—	1	5
3. Start a new observation?	—	1	—	5
4. Select a school	—	—	2	4
5. Enter information from the observation?	—	—	3	3
6. Access and read the feedback?	—	—	4	2

4. Satisfaction—Was Using the Tool a Good Experience (individual and group feedback)?

When the test users first attempted to use the tool during the morning session, they said that were “eager,” “excited” (because of the time-saving aspect of the tool), “scared,” and “motivated” and that using the tool was difficult. However, three test users who said that they were “scared” during the morning walkthrough later stated that they felt “good,” “comfortable,” and “not at ease, but fairly ok” with using the tool in the classroom. During the survey in the afternoon, the test users who had previously reported during the morning walkthrough that they were “scared” to use the tool said that they now felt “very good,” that the tool “will be easy to use,” and that the tool “eases my work.” These responses during the afternoon survey suggest that there might be a fairly brief adjustment period before users are confident with using the tool during school visits.

Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
5. I felt happy and at ease when using this tool.	2	4	—	—
6. I felt frustrated when using this tool.	—	—	1	5

5. Value—Does the Tool Effectively Support the Coordinating Centre Tutors (CCTs) and Teachers? How Can the Tool Be Improved (individual feedback)?

All of the test users said that the tool could help improve teachers’ performance because it clearly identifies their strengths and weaknesses and provides clear guidance about which steps must be improved. The test users said the features that they liked best about the tool from a coaching perspective were the step-by-step walkthrough of teaching steps and the automatic

feedback. Some of the test users said they disliked that there was no place in the tool to capture lesson elements that teachers modified or added.

Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
7. This tool gave more helpful information to the teacher than the other paper tools that I have used.	2	4	—	—
8. This tool was not as useful to me as a paper form or my notebook would be.	—	1	3	2
9. Many of the items on the tool do not seem important.	—	—	2	4
10. Most of the questions were important to the lesson.	1	5	—	—
11. The teacher understood the feedback from the tool.	—	6	—	—
12. I understood the feedback from the tool.	2	4	—	—

Specific to the MSS tool itself, digitizing the tool for Tangerine:Tutor was an important opportunity to review the tool (previously used on paper) and ensure that it was still meeting the needs of the program. The following information is the result of a number of brainstorming meetings, participatory exercises and feedback from the program staff.

The Right Tools for the Job?

MSS Goals	Tool Characteristics
To provide pedagogical support to the teacher	<ul style="list-style-type: none"> Measures time spent on specific steps (time spent singing a song versus calling on learners to read) Provides comprehensive feedback to an observer and teacher about missed steps Captures specific steps for that day or lesson Includes observations of learner behavior, learners' response to questions, learners engagement with the book (looking at 2 or 3 specific learners) Teacher questioning: what types of questions do teachers ask? What feedback do teachers give to learner responses? Actual material use (e.g., time spent reading from the book)
To provide feedback to the program regarding the uptake of the materials and methodology and for reporting	<ul style="list-style-type: none"> Some way to measure and interview teachers about their level of comfort and engagement with the materials? Evidence of school ownership of materials Content coverage: where in the curriculum is the teacher? (which week?)
To encourage immediate practice by teachers post-training	<ul style="list-style-type: none"> Follow up by Information and Communications Technology staff through meetings and Coordinating Centre visits (funded by program) Follow up by Program Field Assistants after training (troubleshooting and practice)
To encourage collaborative learning among teachers and with the Head Teacher	<ul style="list-style-type: none"> Ability to recall notes, feedback and action steps from previous visits Post-observation questions about how reading teachers in the school work together as a team (to prompt action on this) Post-observation questions to measure, monitor and encourage Head Teacher support

Many additional questions that were raised are as follows:

- How can we balance a tool of realistic size with what needs to be done?
- For informing the program, what quality of data do we expect? As a result, how useful are the data to us?
- How does this tool relate to the blue book?
- If we remove questions about lesson plans and schemes of work or thematic curricula, are there implications?
- Do we still want to capture data on the classroom environment and materials?
- Do we want to limit exploration of language diversity in classroom to Early Grade Reading Assessment (EGRA) ?
- What can we pull from this for the school inspection tool used by the Directorate of Education Standards?
- In addition to being a diagnostic tool, should Tangerine:Tutor also include monitoring data, or should it be used just for basic data collection?
- Because there are limited opportunities to sit with individual teachers, how can we focus feedback session to provide support to the teacher then and there?
- How much are teachers using local language to teach literacy in Primary 4? How can we use the tool to measure this?
- If the teacher has “fallen behind,” what guidance can we give (in terms of feedback) on how to catch up?
- Are their “indicator behaviors” that the tool can look for that provide evidence of larger concepts and best practices?
- How can the tool support changes in teachers’ attitudes and beliefs (and in turn, their practices)?

Key Challenges Experienced by MSS Teams and Suggested Causes

These challenges may not be addressed with the tool itself, but they should be kept in mind and in conversations going forward.

Challenges	Potential Causes
No shown connection between letter sounds and how to decode words in lessons	<ul style="list-style-type: none"> • Not clear to teachers in training (over emphasis on letter sounds session) • New concept for many teachers • Low value placed on concept • Teachers do not understand how letter sounds can be used to “deconstruct” a word
Teachers do not allow for learner practice	<ul style="list-style-type: none"> • Low value on learner practice • Too much time on “I do” and no time left for “you do” • Against tradition • Against beliefs about what a “good” classroom sounds like (Quiet!)

Challenges	Potential Causes
Teachers do not refer to materials in their planning and teaching	<ul style="list-style-type: none"> • Low reading culture even among teachers • Exam focused instruction (commercial exams guide drilling) • Low understanding of how to summarize steps • Interpretation of the thematic curriculum as “teach in LL”
Head Teachers and teachers show little interest or uncaring attitudes	<ul style="list-style-type: none"> • Looking for the easiest path • No big picture vision of students’ reading and learning
As an observer, I believe that a lot more needs to be done (that I did not cover all the gaps)	<ul style="list-style-type: none"> • Huge gaps between where some teachers are and where we want them to be • I am the only support that this teacher will get
Head Teachers do not know the methodology, so they cannot give constructive support	<ul style="list-style-type: none"> • Attitude of “too busy, too big or it is not my job” • Not physically at the school • No monitoring or accountability from the district

Annex 3: Midterm Monitoring of the Pilot Effort

Coordinating Centre Tutor Support and Use of the Tablet

Coordinating Centre Tutor (CCT) 1 found the tablets and Tangerine to be easy to use, although he has not uploaded the data yet. He says that it took him approximately three weeks after the training to feel comfortable—after the third school visit. We observed the support from CCT 1 to a Primary 3 teacher during an hour-long literacy lesson. To collect enrollment and attendance data, he asks the Head Teacher (although he should be verifying the records). October 2016 was the last time when CCT 1 filled in the Primary 3 teacher's blue book. CCT 1 says that the last time he was at the school, he focused on Primary 4.

CCT 1 is abrupt. The feedback session that followed the lesson was somewhat uncomfortable because he shut down input from the teacher and Head Teacher who are also there. When it comes time for CCT 1 to provide feedback, he provided some feedback, but nothing from the tablet. When we suggested that he provide feedback from the tablet, he says, "yellow one was segmenting; others were green," but the teacher has no idea what yellow or green mean. His statement, "our machine tells us that segmenting is a problem," indicates that he may not understand the feedback and its linkage to what he observed and tapped on the instrument.

CCT 2 commented that she could provide better support to teachers because they can capture pictures and videos to show to the teachers. This real evidence is important because some teachers can become defensive (which is likely to be more of a rapport issue that may not be solved by the tablets). CCT 2 suggested that using Tangerine:Tutor reduced the amount of writing. She also noted that it should not be necessary to enter school enrollment data before every observation—even at the same school. CCT 2 said that the tablet was not difficult to use; however, she still used a notebook to write notes at the same time. It took her two months to have some level of comfort with using the tool. Although her comfort level with technology has increased as a result of the pilot effort, she is still not very comfortable with the tablet (cannot go back into the lesson). She uses the device for telephone communication (no e-mail or WhatsApp, has not connected to the Internet).

We observed CCT 2 while she was providing support to a Primary 3 hour-long literacy lesson. Her last observation in the teacher's blue book was from August 2016. CCT 2 could use the feedback form the tablet, although she did not read the script exactly. In one case, the script said, "you gave learners a chance to practice on their own or with a partner, but not many." However, she read the following: "you gave them a chance alone, but not with partners." CCT 2 talked about the importance of "you do."

CCT 3 said that he believes that the tablets were very useful because they contain all of the steps for the lessons, and it even provides feedback. He still experiences challenges with taking pictures (we went over that). Although he says that his comfort level with using technology has greatly increased (he had not used a touch screen before), he has not used the Internet and does not feel comfortable with using the Internet for tasks. We observed CCT 3 while he was

providing support during a Primary 2 literacy lesson. CCT 3 was writing notes on a slip of paper (he did not have time to get his notebook). CCT 3 could not conduct the pre-conference and review the lesson plan on tablet because the tablet did not appear to have been updated. CCT 3 understood the generated feedback (e.g., what the colors meant) and used it to provide feedback to the teacher.

CCT 4 likes the simplicity of tapping “yes” or “no” on the tablet. Initially, CCT 4 said she thought the print was too small, but the update improved on this. CCT 4 wants to include the name of the teacher, to inform follow up, although we agreed that doing so could be a privacy violation. CCT 4 said that her Information and Communications Technology (ICT) skills have improved and that she also takes photographs of good lessons to share with other teachers and during continuous professional development training sessions.

When CCT 4 has issues with the technology, she said she can call the ICT Officer at the college for support. At first, she was nervous about the tablets, but she describes herself now as “very composed.” CCT 4 estimates that by her third observation she felt comfortable with using tablet and tool. She continues to use her notebook and the tablet to make notes about the classroom environment and class management and to complete continuous assessment forms. CCT 4 commented that teachers are convinced that the tablet sends observation data directly to the Ministry of Education and Sports, so CCTs now take observations very seriously. CCT 4 reported that she has almost never uses the Internet. For work, she only occasionally uses e-mail to send reports to the college.

We observed that CCT 4 prioritized getting enrollment numbers and ended the pre-observation conference without checking teachers’ blue books or lesson plans. In fact, the entire observation was delayed because CCT 4 was waiting for the Head Teacher to perform daily attendance. The ICT staff supported CCT 4 with scrolling through the tablet. ICT staff said that the CCTs are “over-refreshing” the tool.

CCT 5 said that the tool is very easy to use, and she likes how it helps her to gauge feedback by providing color-coded scores and guiding her regarding areas for counselling. CCT 5 liked that the tool also helps her track the work that she has completed by time, location and date. CCT 5 noted that the way the tool is ordered, she can fill it out in real time, but that she also uses a notebook to collect observations about classroom management and the school environment itself. CCT takes photographs of lessons, but less so now because doing so seems to drain the battery (she later noted “battery life” as a disadvantage of the tablet). CCT 5 requested that items be added to the tool about classroom environment. Because she practiced on her own at home, CCT 5 said she was very comfortable with using the tool at the school from her first visit. Before using the tablet, CCT 5 said that she had used “small phones.” She agrees that using the tablet has greatly increased ICT capacity.

CCT 6 said that the Adobe Acrobat Portable Document Formats (PDFs) in the teacher guide and the letter sounds video are the most valuable assets on the tablet. He said that the tablet is be flexible and it is easy to move between the tool, teacher guide and camera. CCT 6 noted that the tool needs Primary 4 and that it is annoying to re-enter enrollment and attendance data for

every single teacher observation (when observing multiple teachers while at one school). CCT 6 notes that some of the steps are more applicable to Day 1 than Day 3 (although steps are listed under both days in the teacher guide). CCT 6 said he still uses notebook to collect “big picture” observations, but said he believes that the tablet reduces blue book use for him. CCT 6 said that he was a bit scared to use the tablet at first, but that the guide (a single-page laminated handout) and the ICT specialist helped him adjust. In 10 days, CCT 6 said that he was fully competent with using the tablet. CCT 6 said that he has used the Internet before to access subject matter information and send e-mails.

CCT 7 said that he likes the easy access to teacher guide. He also said he likes the limited writing and that the tool uploads straight to the college (although we know that this is not occurring yet, not even close—even the School Health and Reading Program [SHRP] does not get direct uploads). CCT 7 said that he believes that the tool makes him better with evaluations because Tangerine systematically guides users through the lesson procedure. CCT 7 said that he still uses a notebook to record non-literacy lessons. He sometimes shares videos during the feedback session and says that teachers are especially responsive to this. Although CCT 7 has never used the Internet (he said he watched a YouTube video once since receiving the tablet), he said that he was comfortable with using the tool after two or three observations.

CCT 8 said he looks for the areas of feedback highlighted in red for the feedback session because this helps him focus so he does not overwhelm the teachers with remarks. CCT 8 said that he has struggled to get his SIM card to work in the tablet, but we found that restarting the tablet helped. He also said that he has not mastered the process of accessing previous records on Tangerine:Tutor, so continues to use a notebook for back-up documentation of the observation. CCT 8 said that he completed a training session about computers before, but he had not practiced since being at the university. He said that he rarely uses the Internet (only to e-mail reports), but that he is now comfortable with using the tablet.

College and District Representatives’ Opinions About the Tablets and Tangerine

Teacher Training College (TTC) Deputy Principal Outreach (DPO) 1 (Supervisor of the CCTs): He is very supportive of the pilot effort. From his perspective, before the tablets were being used, the comments and feedback to teachers were irrelevant and not tailored to the lessons. Now we are on the correct track regarding the steps and the method. Because there is no dashboard in place, he has used the tablet only for communication (telephone and short message service [SMS]; he put in a SIM card). He noted that the college ICT staff could move around and help the CCTs update the application and upload the data. He would like it if the tablet could be used to help him conduct performance reviews (putting his tasks on the tablet).

TTC DPO 2 (Supervisor of the CCTs): The TTC DPO 2 said the tablet and tool are user friendly and meet the basic elements of providing supervision during reading. He said that each observation item contains a competency—it is a comprehensive guide for CCTs to provide specific analytical supervision. The TTC DPO 2 said he wants to see more space for additional comments to capture those issues that do not exactly fit the tool items. The TTC DPO 2 said that he appreciated that the global positioning system (GPS) function discourages forging and

that the dashboard (when released) will improve interaction with CCTs, ICT, the District and Ministry of Education and Sports. The TTC DPO 2 said we need to fully develop the system at the pilot level before disseminating it to the other colleges. He also noted a need for conducting continuous research to support the sustainability of the tablets because it would create points of review and joint planning.

District Inspector of Schools (DIS) 1: The DIS 1 said that the tablet has helped him with supervising teachers, but the tablet needs Primary 4. The DIS 1 complained that CCTs upload the data to the college (which is not the case), but so far there has been no feedback. The DIS 1 requested that recently recognized community schools be added to the list on the tablet (from the remapping exercise). The DIS 1 also requested that District-level Education Officers (DEOs) be more engaged in using Tangerine:Tutor.

DIS 2: The DIS 2 said that she appreciates the program, saying that it goes straight to “teaching and learning.” Her tablet had not been updated, and she is still waiting for the dashboard. The DIS 2 uses the tablet for e-mails and to capture pictures and videos (Note: She was one of the few who had previous experience with using a touch screen). She believes that the usability of Tangerine:Tutor and the tablets could be improved by combining it with other tools in use in the district. This district is also part of a Global Partnership for Education (GPE) and Uganda Teacher and School Effectiveness Project (UTSEP) pilot for inspectors (area inspectors and associate assessors). This GPE and UTSEP pilot that involves using tablets for school inspections to collect a variety of information, including pupil:teacher ratios and the number toilets. She noted that the content of the program tool was much more focused and shorter than the GPE’s Directorate of Education Standards tool which is reported to have too much content. She also agrees with the DIS 1, saying that the DEOs should be more engaged in using Tangerine:Tutor.

Annex 4: July 2018 Expansion Monitoring Activities (11 Participants)

Question 1: Do you believe that the tablet enables you to provide better support? What are some advantages of using the tablet and Tangerine:Tutor?

Response: Everyone responded “yes” to whether they believe that the table enables them to provide better support, and they provided the following specific examples:

- Kachango District: The tablet enables us to check step by step whether the teacher is using the teacher guide, to correct errors and to also videotape areas for improvement.
- Kachango District: The tablet encourages schools to take records of attendance. Teachers are now marking registers more frequently because they know we ask for them.
- Kachango District: The tablets are also helpful for personal use (e.g., calculator, calendar). We are very up to date.
- Budaka District: The tablet helps us coach ourselves and teachers about letter sounds.
- Kalalaka District: The tablet summarizes observations, which is helpful in providing focused feedback.
- Mukongoro: The tablet helps us to know where to focus [our efforts] when giving feedback, and it highlights what the teacher did well. We can also take video clips to share with the teacher later during post-conferencing.
- Mukongoro: We can now search for additional content and information on the Internet.
- Iki: The tablet helps us capture good practices that we can share with other teachers we supervise. It also makes it, so teachers take supervision more seriously because they know that the tablet captures everything they do during a lesson.
- Pallisa Township: The tablet is a good tool for monitoring [because it makes] sure that supervision actually happens. We are also able to share best practices with other teachers.
- Pallisa Township: Tablets narrowed the gap between Coordinating Centre Tutors (CCTs) and the Ministry [of Education and Sports]. There is more visibility.
- Kobolwa: The tablet and the tool force the CCT to check on the enrollment and attendance of learners and teachers, which gives a better picture of the school. Previously, we only did lesson observations and did not look at other issues at the school. The tablet improves teachers’ effectiveness because data are shared more widely.
- Atatur: Having a tablet makes life a lot easier than carrying materials. For instance, we would be carrying teacher guides for Primary 1 through Primary 4.

- Atatur: The tablet has also built our [Information and Communications Technology] knowledge as CCTs.
- Kameke: We have more time to actually observe the lesson instead of focusing on taking notes. We only take note of a few things we want to use during the feedback session with the teacher.

Question 2: In your opinion, what are some disadvantages of using the tablet?

- Kameke: [Regarding] the “yes” or “no” questions, we would like more room for explanations.
- Kadama: The tool takes longer. We now have to spend long hours at one school, so we fail to meet the targets set for us.
- Kachango: Some teachers are concerned. Charging [the battery] is a problem in some areas without electricity.
- Kalalaka District: Security is an issue. Keeping the tablet safe is a little challenging. We cannot leave it at home because we are scared our children may damage it, so we end up moving it everywhere we go, which is also not safe.
- Mukongoro: It may not provide accurate information sometimes. For instance, we cannot enter zero when we find a teacher without a lesson plan.
- Pallisa Township: Uploading information is a challenge due to poor network.

Question 3: What would need to be in place in order to expand the program nationwide?

- Mukongoro: Access to other technology that would allow sharing of best practices is lacking. For instance, [there are] no projectors at [Coordinating Centres] CCs and no provision for [Microsoft] PowerPoint.
- Kalalaka District: Tablet training.
- Kameke: The government should first make sure that all CCs have personnel. We have many vacant CCs.
- Atatur: More review meetings.