Ready for EdTech:

Developing a sustainable tablet-based learning model in public primary schools in Tanzania

A report on the Kitkit School project and its implications for improving early literacy and numeracy skills

enûma

camara education tanzania

Harnessing the Power of Technology

According to UNICEF, only 8 percent of Grade 2 pupils in Tanzania could read properly and only 8 percent could add or subtract.

2nd grade
Can read properly

8%

2nd grade
Can add or subtract

8%

> ***"...effectively leveraging the potential of education technology can be an important tool for improving learning outcomes."***
>
> 2016 MoEST Education Sector Development Plan

Early Literacy and Numeracy in Tanzania

An essential component target of the United Nations' Sustainable Development Goal **("SDG") 4** is **"ensur[ing] that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy."** According to UNESCO, 53 percent of children in low and middle-income countries cannot read a simple story by the end of primary school, and this problem is acute in Tanzania.

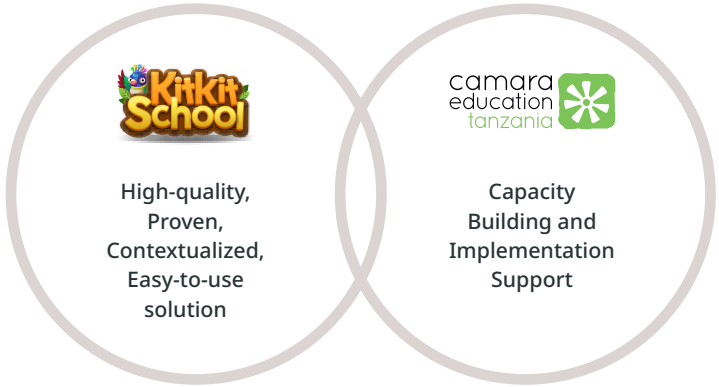
School-going children in Tanzania often do not achieve foundational learning outcomes in literacy, numeracy and life skills, all of which are essential to future performance. Results from the 2014 Primary School Leaving Examination (PSLE) in mainland Tanzania demonstrated that only eight percent of Standard II pupils in Tanzania could read at grade level, only eight percent could add or subtract, and less than one percent showed high levels of life skills including self-confidence and problem-solving.

Improving early-grade outcomes in core literacy and numeracy skills is a key part of Tanzania's long term education strategy. As explained in the 2016 Ministry of Education, Science and Technology's (MoEST) Education Sector Development Plan (ESD), and as suggested by UNESCO, effectively leveraging the potential of education technology can be an important tool for improving learning outcomes. Effective deployment of education technology interventions can make high quality teaching and learning resources available to more students. **These interventions must be feasible for government school staff, and they must be both sustainable and scalable without placing excessive stress on staff or school resources.**

Improving Learning Outcomes at Scale through Edtech

Enhancing Literacy and Numeracy learning outcome through technology in government school

Sustainable and Scalable Implementation Model



Unique Opportunity in Tanzania

Existing Proven Software

Sustainable and scalable edtech implementation requires a high-quality edtech solution. In Tanzania, there exists a world-class edtech solution, which was developed and contextualized specifically for Tanzanian learners.

From 2014-2019, Tanzania hosted the world's largest competition for tablet-based learning solutions, the Global Learning XPRIZE. Kitkit School was the grand-prize winner, an achievement that was based on results generated during rigorous field testing in Tanzania. Kitkit's demonstrated proficiency in creating early literacy and math gains for students and outpaced 198 other competitors from around the world.

Edtech Implementation Expertise

Sustainable and scalable edtech implementation also requires an implementing organization with technical capabilities, experience working with schools and proficiency in building teacher capacity. Camara Education Tanzania is dedicated to improving educational outcomes using technology. Since 2012, Camara has worked with over 500 schools and more than 3,000 educators, equipping schools with ICT pre-loaded with learning content and providing ongoing technical support to teachers as they integrate technology in teaching and learning.

Camara Education: Developing a Sustainable and Scalable Edtech Implementation Model

Camara plans to leverage the unique opportunity created by combining Kitkit School's capacity for driving learning with Camara's existing expertise in making edtech accessible to schools, teachers and learners at scale. Camara's three-phased approach calls for an initial pilot, now completed, which iterated the implementation model, followed by succeeding phases which implement the model in increasing numbers of schools, continually iterating the implementation model and building resources that scaffold and simplify implementation for schools and educators.

300
students

Phase Ⅰ.
Initial Modeling

Feasibility check and initial model development in one school

Resource development for the expansion phase

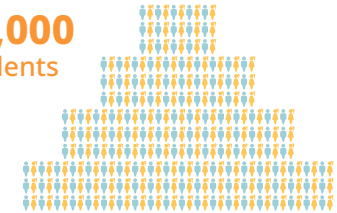
3,000
students

Phase Ⅱ.
Expansion

Development of a scale-up model and resources in 5-10 schools in rural areas

Evaluation of learning outcome and other related impacts

30,000
students



Phase Ⅲ.
Scale-up & Evaluation

Fine-tuning and implementing the scale-up model in 100+ schools over multiple years

Data-based monitoring and research evidence generation

Camara considers the following as key factors in developing the scalable model :

1. Teacher engagement and ownership
2. Teacher capacity building (technical and pedagogical)
3. Easy integration into the existing school system (least disruption)
4. Engagement and support from stakeholders
5. Resource development for expansion (ex. implementation guide, teacher training materials)

Project Overview

Project Scope

Location:	Period:	Devices:	Users:	Teachers:
Twiga Primary School, Dar Es Salaam, Tanzania	8 weeks Sep 21st - Dec 4th, 2020	100 tablets & 300 earphones	300 students (100 students from standards I, II, and III)	6 teachers trained

Tablet-based Learning Sessions

5 days a week (Mon-Fri)	Three 40 minute-sessions each day after school (12:00-15:00 HRS)	100 students per session, divided by standard	Two teachers per session

2020 Feb-Mar

27th Feb: TAMISEMI Presentation
16th Mar: TIE Review Begin

2020 Apr-Jul

Covid19 School Closure
23rd July: TIE Review Result

2020 Aug-Sep

28th Aug: TIE Approval
9th Sep: TAMISEMI Approval
21th Sep: Project Begin
28 & 29 Sep: Student Registration

2020 Oct-Dec

4th Dec: Final Field Implement
10th Dec: Final Stakeholder Meeting

Initial Modeling at Twiga Primary School

Camara Education Tanzania (Camara) implemented an eight-week pilot program at Twiga Primary School in Dar es Salaam designed to assess the feasibility and sustainability of an operations model for a teacher-led, tablet-based education initiative in Tanzanian government schools. The pilot was the first step in a long-term plan to use tablet-based learning and the Kitkit School app to provide 3R* learning support to learners in Tanzanian schools. The pilot tested, iterated, and improved a minimally disruptive operations model designed to allow teachers to independently lead program implementation.

Initial Model
Designed through discussions with the teachers

Continuous Adjustments
Based on teacher feedback while conducting Kitkit School sessions for 8 weeks

Sustainable Model
Designed by teachers to continue on independently after the project

Guiding Questions for the Iteration Process:

- Who should be participating in Kitkit School sessions? (grade level, academic performance, inclusiveness)
- What is the appropriate size of the group? (number of students per session, number of teachers per session, number of tablets needed)
- How can we provide sufficient amounts of learning time? (length of sessions, frequency of sessions, session schedule)
- How much time can teachers continue to allocate for leading Kitkit School sessions? (length of sessions, frequency of sessions, session schedule)
- How do we leverage Kitkit's digital assessment tool to collect reliable assessment data at scale?

*3R: Reading, Writing, and Arithmetics

Teacher Roles and Responsibilities:

1. Training - Participants
- a. Basic usage and maintenance
- b. Kitkit School app and pedagogy
- c. Administration of digital assessment
- d. Monitoring dashboard

2. Model Design - Collaborators
- a. Setting student selection criteria
- b. Setting session schedules
- c. Session review for model adjustment
- d. Designing the post-project operation model

3. Tablet Sessions - Leaders
- a. Student registration
- b. Session facilitation
- c. Individual learner support

4. Administering Assessments - Leaders
- a. Baseline assessment
- b. Endline assessment

The Key to Sustainability and Scalability: Building Teacher Capacity

The Teachers

Camara worked with the Twiga Primary School administration to select six math and Swahili teachers from Standards I-III to participate in the pilot. One teacher was proficient in sign language, and she worked primarily with deaf students. Teachers had varying degrees of digital literacy and experiences with digital products, but none had experience using edtech to support student learning.

Training & On-site Support

Prior to launching the eight-week instructional time for the children, teachers received two weeks of hands-on training. Camara's learner-centered training allowed ample time for teachers to explore their new skills and develop confidence in their own abilities prior to leading sessions for students. The training topics included the use of technology in education, general tablet use, pedagogical frameworks for, and the use of, the Kitkit School app, assessment, and troubleshooting. Camara staff initially provided support during the Kitkit School sessions in the classroom but, as the teachers became more familiar with session management, Camara gradually reduced the on-site support, before fully handing over session management to teachers.

Co-designing with Teachers

Camara trainers facilitated collaborative design sessions during training which resulted in the further development of the pilot's design. This approach, and the demonstrated utility of the KitKit School app, helped teachers overcome initial skepticism about using tablet-based education to foster literacy and numeracy development. Adjustments made thanks to collaboration with teachers included changing planned accommodations for special needs students and adding time for students to become familiar with the tablets prior to a baseline literacy and numeracy assessment.

Students with Special Needs

Sixteen of the participating students had documented special needs and the majority were deaf. Camara trainers and teachers worked together to make accommodations to allow all learners to participate. The most significant accommodation, and the only one that required a substantial expenditure of resources, was having a teacher translate aural material from the Kitkit app into sign language which enabled the hearing-impaired students to participate and benefit.

The special needs students participating in this program were not assessed as a group, because the 16 students were spread out over three grade levels, however, Agnes Semaganga, the participating special education teacher, reported that the program was beneficial to her students.

Support for Struggling Learners

Both the pilot and the ongoing program target at-risk learners, selecting the weakest students in terms of literacy and numeracy, including special needs students. The primary purpose of this pilot was to assess the feasibility and sustainability of the operations model rather than to assess the Kitkit School app's effectiveness as a learning tool. To learn more about research evidences for Kitkit School's efficacy, please click here.

Although documenting learning gains was not the goal of this pilot, feedback was collected from teachers and students and some basic data was collected. All participating teachers provided anecdotal evidence of learning gains in literacy and numeracy for struggling learners both during the pilot and subsequently. Just as significantly, teachers, students, and Camara staff all reported greater student engagement, a new excitement around learning, and large demand from parents and children who are not part of the program. This new enthusiasm for learning has continued beyond the pilot and student attendance at KitKit sessions is substantially higher than the same students group's previous school attendance. Assessment data indicated that gains were made by students both during the pilot phase and during ongoing, teacher-led implementation.

Pre-pilot, the range of identified literacy deficits included students who were:

- Unable to read, write or identify any consonants or vowels
- Able to identify some letters and their associated sounds
- Unable to read combined letters (nga, nge, da, de, etc.)
- Unable to read complete sentences
- Able to read and write some words and simple sentences, but not read fluently

Project Implementation Resources

E-Learning Courses

Composed of 80 training videos, a number of reference documents, and interactive quizzes that cover topics including basic tablet navigation,
understanding of Kitkit's pedagogical framework and functions, project implementation tips, and more

Training Workshop

Project Design Template

Resources Developed for Easier Scale-up

Camara developed multiple resources that will enable easier implementation for future scale-ups. These resources are also available for other partners to adopt for Kitkit School projects.

Some of the developed resources include:

- 80 micro-learning videos and two e-learning courses for schools and NGOs
- Project design workshop templates
- Case study document describing implementation processes and learnings
- Teacher training manuals
- Technical guides
- Procurement channels
- Stakeholders engagement plans
- Consent forms for schools and parents

Using the above resources, Camara is providing training and support to other organizations and schools in Tanzania who are conducting Kitkit School projects including:

- So They Can - Babati & Kenya
  - Camara provided 3 on/offline training and field visits to help design an effective Kitkit School project and to support the successful launch of the project in two public primary schools in Babati, Tanzania.
  - Camara provided the training for So They Can's Kenyan office, which is preparing to launch the project in multiple schools.
- CASEE (Community Aid and Social Education Empowerment) - Arusha
  - CASEE is implementing a Kitkit School project in a government English-medium school, Enaboishu, in Arusha Tanzania. Camara provided on/offline training and field visits.

Camara plans to make the training and project implementation resources available for many schools and organizations to design their own Kitkit School projects and facilitate simple, rapid implementation. These resources will be further improved and updated as more project develop.

Stakeholder Engagement at All Levels

Camara developed a flexible operations model intended to allow for iteration based on input and feedback from government and community stakeholders. In order to make this intervention sustainable, it was necessary to achieve buy-in at all levels from the stakeholders who will be responsible for post-pilot implementation of 3R learning support using the Kitkit School app. Camara drafted an initial implementation plan but intended that all stakeholders would offer input and collaboration as the implementation plan was improved. This approach allowed for continuous pivoting and iterations as the pilot progressed.

Government stakeholders collaborated with Camara to select a pilot school with a high percentage of struggling learners. TAMISEMI (also known as the "President's Office Regional Administration and Local Government offices" or "PO-RALG") and the Tanzania Institute of Education ("TIE") offered input and approval. Government stakeholders participated in the selection of Twiga Primary School as the pilot school. Twiga was chosen based on its high proportion of struggling learners.

Government and community stakeholders provided important input regarding the operations model throughout the pilot phase. Meetings for local stakeholders were held both before and after the project. Both meetings generated actionable feedback from local government officials, parents and school leadership. All parties expressed eagerness for the project to be expanded to more students and schools.

Stakeholder Meetings

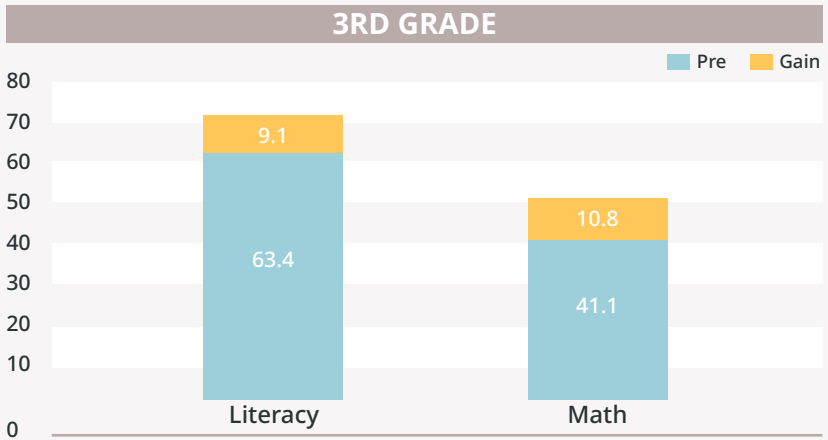
- TAMISEMI
  - 27th February, 2020: Project presentation
  - 28th August, 2020: Project approval
  - May, 2021: Project monitoring visit to Twiga primary school
- TIE
  - 23rd July, 2020: Curriculum approval
- District Authorities in Temeke
  - Received support during the school selection process and facilitated discussion with schools
- School Committee
  - 21st September, 2020: Received guidance on the project, inputs on project design, and oversight
- Parents Meeting
  - August, 2021
- Education Sector Stakeholders Meeting
  - August, 2021

A TAMISEMI representative conducted post-project monitoring onsite. After observing ongoing Kitkit School sessions, which were independently implemented by the school and interviewing teachers and students, TAMISEMI recognized the feasibility and sustainability of the project and offered advice on further increasing parental engagement. TAMISEMI also invited Camara to present their pilot results at the Tanzanian education sector stakeholders meeting.

Data-based Monitoring and Evaluation at Scale?

Camara trained the teachers on how to use Kitkit's built-in assessment tool for pre- and post-tests. While the tool is based on assessment strategies contained in USAID's EGRA and EGMA, the tool provides a few additional advantages; Unlike oral assessments like EGRA and EGMA, the digital assessment can be administered to multiple children simultaneously by a single administrator and its ease of administration makes it possible for a faster rollout, potentially saving a great deal of time and cost. It also reduces the risk of errors in the data collection process as the data are automatically collected.

Camara was able to establish that regular assessments and data collection can be achieved by the teachers. The ease with which teachers were able to use Kitkit's digital assessment tool and data collection function in this pilot establishes the possibility of meeting the needs for data-based monitoring and evaluation for schools and regions when scaling up.
To read more about Kitkit's digital assessment tool, click here.



Average Learning Gains After 8 weeks of Kitkit School Use
Scores of 3rd Graders Measured By Kitkit's Assessment Tool

Potential for Learning Impact

Anecdotal Evidence

Given the proven track record of Kitkit School*, Camara focused primarily on developing a sustainable and scalable implementation model. While this project was not designed to be a rigorous study on the learning outcomes, the anecdotal evidence collected by Camara does hint at a potential for substantial learning gains at scale. Camara plans to incorporate more robust documentation of learning outcomes during the next phase of the project.

Teachers reported anecdotal evidence of gains in literacy, numeracy and student enthusiasm, including an attendance rate of 98%. These gains were observed during the pilot and in the ongoing, teacher-owned implementation period. Both teachers and students reported high levels of student engagement, when compared to the same students' attitudes during normal instruction. There was ample anecdotal evidence of renewed enthusiasm for learning on the part of students. Student attendance for Kitkit School sessions was substantially higher than the same cohort's previously documented school attendance.

Teachers further reported that Kitkit School enabled students to access a much greater depth and variety of learning materials than they do during regular classes. Second grade teacher Khadija Mani explained that her students were more engaged because the Kitkit School app allowed them to learn in multiple ways including through songs, videos, and stories.

Digital Assessment Tool and Data Collection

At the conclusion of the pilot period, assessment results demonstrated gains in both literacy and numeracy. Kitkit's digital assessment tool was used to evaluate whether learning gains had been achieved. Because pre- and post-assessments were affected by adjustments to the operations model, only the third grade received both assessments.

Assessed students made measurable gains in letter identification, phonemic awareness, and vocabulary. Evidence of improvements in counting, number identification, and math operations skills were also collected. These "struggling learners" showed noticeable improvements in the short 8-week period. The results suggest a great potential for improving 3R in the future interventions with longer time period and improved operation model.

* Kitkit School demonstrated the highest learning gains in the 15-month, rigorous randomized controlled trial during the Global Learning XPRIZE competition (2019), and it proved its efficacy in a number of projects implemented by various organizations in Sub-Saharan Africa. You can read more about our case studies from here.

“Some students had attendance problems but since the introduction of Kitkit, students are attending classes and studying hard”

Batuli Bwagunzo Ahmed

Twiga Primary School Teacher, P3

*“I teach deaf students, as well as students with no hearing disabilities. The truth is all my students **find Kitkit very fun** because, in **Kitkit, students are learning using pictures, words, stories and videos.** Student’s enjoy using a lot of materials that are not found in their normal classes”*

***“I advise other teachers who have never used Kitkit before that Kitkit has a lot of potential** because students can learn on their own. **Rather than the usual method where you have to ask a student to do something and they are worried about making mistakes, which makes it harder to learn,** Kitkit shows them when they make mistakes and the student correct themselves without stress.”*

Agnes Aidan Semaganga / Teacher, P3

*“Children like different games within Kitkit. For example, there is a math game **they learn through songs.** There is a particular song, "Angalia Nyota," the way it is sung engages students. The songs in Kitkit get children interested and help them enjoy learning. The Kitkit program is full of resources like **photos, videos, stories.** Kids like it since **they are learning through many different ways**”*

Khadija Mani / Teacher, P2

Conclusion

After the project, Twiga Primary School received 50 of the 100 tablets Camara used during the project. Its teachers are now independently conducting Kitkit School sessions three times a week during after school hours with a new cohort of 150 students from grade 1 through 3.

The feasibility and sustainability of Camara's Kitkit School implementation model is demonstrated daily at Twiga Primary School, where instruction is ongoing. Camara's teacher training proved effective despite the government primary school teachers having little or no prior edtech experience. The anecdotal evidence and collected learning data indicate the potential for struggling learners to make great strides in literacy and numeracy skills, as were the cases in other Kitkit School projects. The tablets have proven simple to maintain and no devices have been broken or lost.

The next planned steps for Camara are to solicit funding to expand the pilot to 5-10 rural schools and to continue to refine the implementation model based on the evaluation of outcomes during this expansion. The resources developed during the Twiga pilot, including teacher training videos, e-learning courses, design templates, and teacher's manuals, are expected to make teacher training and stakeholder engagement more efficient during the expansion. Schools will be selected in partnership with the TAMISEMI, and schools with high proportions of struggling students will be targeted for inclusion.

For more information on Kitkit School, contact: kitkit@enuma.com