



Kiribati Tablet Trial: A Summary Report

April 2019

Kiribati Education
Improvement
Program Phase III

In 2018, the Ministry of Education, in partnership with the Kiribati Education Improvement Program (KEIP) and NORC at the University of Chicago, conducted an impact evaluation investigating whether the use of pre-loaded computer tablets in classrooms in Kiribati could improve teaching and learning outcomes. The results of this are presented in summary below.

Research Questions

1. Does the consistent use of tablets, loaded with curriculum-linked content and used in a supportive and supported classroom, have a significant effect on student learning in the Kiribati context?
2. Does access to a tablet loaded with English language resources improve the level of English language proficiency among teachers?
3. Does the use of tablets loaded with curriculum-linked content support the learning of struggling readers?
4. How is the trial affecting classroom pedagogy, interactions and perceptions of learning at school?

Approach

Timing and Sampling: The Kiribati Tablet Trial (KTT) ran during the 2018 school year (February - November) and included Year 4 students and teachers from 10 public, mono-grade schools in Abaiang, Maiana, Marakei and North Tarawa. Islands were selected for inclusion, based on their isolation and limited access to resources¹, but also their relative accessibility from South Tarawa and the availability of mono-grade Year 4 classes. Of the ten Year 4 classes on the selected islands, half were randomly allocated to the treatment group² and half the control group.

Kio-kits and Support: Each treatment school was provided with one Kio-kit, which includes 40 tablets, a docking station (to house and charge the Kio-kit tablets), and a Kio-kit motherboard. The motherboard stores all pre-loaded data

and wirelessly transmits the data to each of the tablets. Each treatment school also received a teacher tablet and a wireless projector that allowed teachers to project content from their teacher tablets. Solar charging stations were constructed at each of the treatment schools, so schools could charge all the equipment. Teacher training, support (including trouble shooting of hardware issues) and monitoring was completed throughout the trial by KEIP.

The Tablets: All the tablets were preloaded with content-rich learning materials and were curated week-by-week term-by-term in keeping with the Year 4 curriculum. Student tablets were loaded with reading books, English resources (English grammar videos, vocabulary songs and games), Math resources (math concept videos, math songs and games), and talking books read by native English speakers. The student tablets were set up to work within a 20-meter radius of the docking station to ensure that they could only be used in or near the classroom. The teachers' tablets were independent and had access to the internet. Teachers were encouraged to take their tablets home and use the tablets to access resources. The teacher tablets were loaded with the same material as student tablets, additional curriculum relevant English content, resource materials, and English language resources for teachers' recreational use (audio books, videos) to promote greater language mastery.

Data collection and analysis: Baseline data was collected in February 2018 and end line data in November 2018, independently by NORC. Quantitative data was collected at baseline and end

line in all 10 schools, and included student assessments for English and math³, a teacher English assessment⁴ and a brief sociodemographic survey. Student knowledge and skills in English and maths were based on the widely used Early Grade Reading Assessment (EGRA) and Early Grade Math Assessment (EGMA). Qualitative data was collected at end line only, and only in treatment schools. Data collected included interviews with the school principals and each of the Year 4 teachers, classroom observations, focus groups with Year 4 students, focus groups with Year 4 parents and interviews with community stakeholders. All qualitative data was collected in te-Kiribati and translated to English for analysis. Data analysis was completed by NORC and compiled into a detailed report.

Key Findings

Impact on student learning

- **The use of the tablets had positive impacts on students' English reading skills.** Out of the five subtasks tested, three improved *significantly* among the treatment group. This included reading made-up words which tests knowledge of phonics, oral reading fluency (speed of reading) and reading comprehension⁵.
- **There is no evidence that the use of tablets affected students' math skills.** Out of the eight subtasks tested, more positive results on six sub-tasks were noted for the treatment group. However, statistically significant improvements were noted for only the subtask of multiplication.

¹ Other than classroom-level resources like posters, blackboards and teachers' books. Internet connectivity and grid electricity were also not available in selected schools.

² The five treatment schools: St Paul (Abaiang), Abitabu (Maiana), Nikierere (Marakei), Tahiti (Marakei) and Neintebwara (North Tarawa).

³ Of the 261 students surveyed at baseline, 202 were surveyed at end line (attrition rate of 22.6%), 36 new students were surveyed at end line.

⁴ 14 teachers were surveyed at end line (8 treatment, 6 control), 12 of who were surveyed at baseline.

⁵ For made-up words, students in the treatment group were able to read 4.8 more words in a minute than the control group, while the impact for oral reading fluency was 5.1 more words in a minute. For reading comprehension, students in the treatment group answered correctly 0.53 more questions than their counterparts in the control group.



KTT Student Test Results

Key:

-  Positive trend of statistical significance ($p < 0.1$)
-  Positive trend
-  Negative trend

English Sub-Tasks

Impact

- | | |
|----------------------------|-----------------------------------------------------------------------------------|
| 1. Familiar Word Fluency |  |
| 2. Made-up Words (Phonics) |  |
| 3. Oral Reading Fluency |  |
| 4. Reading Comprehension |  |
| 5. Listening Comprehension |  |

Math Sub-Tasks

Impact

- | | |
|---------------------|-------------------------------------------------------------------------------------|
| 1. Missing Number |  |
| 2. Addition 1 |  |
| 3. Subtraction 1 |  |
| 4. Multiplication 1 |  |
| 5. Measurement |  |
| 6. Addition 2 |  |
| 7. Subtraction 2 |  |
| 8. Word Problems |  |



Impact on Teacher English language proficiency

- **Assessments suggest teachers in the treatment group improved their skills in reading, writing and speaking (but not listening).** However, the small sample size means this finding cannot be taken as conclusive. Teachers felt that the tablet helped them improve their English language skills.

Impact on struggling readers

- **There was no impact on struggling readers.** Conflicting trends were observed in the oral reading fluency, made-up words and reading comprehension subtasks when data was split based on performance at baseline.

Effect on classroom pedagogy, interactions and perceptions of learning at school

- **Tablets and project resources were used in class.** This finding was confirmed through classroom observations and surveys with both students and teachers. It suggests that teachers used tablets and projectors to organize class and content.
- **Stakeholders had positive views of the tablet trial and the use of technology in class.**
 - Parents reported improvements in their children's English language skills, and an increase in children's interest in going to school.
 - Teachers reported being satisfied with the KTT; 75% preferred using the tablets as a teaching resource over the resources used in the previous school year.
 - Students reported enjoying using the tablets and said that the tablets helped them better understand words in English.
 - Principals and community members also had positive views on the trial.
- **Maintaining the Kio-kit system was often a challenge for schools.** Charging the tablets was challenging

when there was poor weather. Connectivity between the docking station (where the motherboard is located) and tablets was sometimes compromised by the fact that the docking station would be housed outside the classroom (i.e. in the teachers' office).

Facilitating factors

- The **KTT successfully addressed two critical pre-conditions that have hampered other tablet trials:**
 - Tablet content was curated so there was correspondence with the curriculum.
 - Teachers incorporated student tablets and other project resources in class activities. Teacher training most likely played a vital role in this.
- The **KTT had staff dedicated to curating the tablet content, training teachers, and overseeing every aspect of the program;** replicating this level of dedication at scale or in other contexts could be challenging.

Unintended outcomes

- **An improvement in how students use mobile devices owned by the households was noted.** Given the importance of computer literacy, this outcome should be considered in future programs.

Conclusion

Any future tablet trials or programs in Kiribati should consider the different effects found for English and math in the KTT, the facilitating factors, identified limitations⁶ and the unintended outcomes outlined above. The positive impacts for English suggest that an appropriately curated and supported tablet program would help promote English learning across Kiribati. However, to fully understand the potential of technology in schools further research is required and other policy options should be explored for cost-effectiveness.

⁶ Limitations:

- One of the main reasons why islands were selected was their relatively easy access. This means that the evaluation results may not be the same for more remote islands.
- The small sample size meant that some aspects of the KTT lacked the power to measure impact accurately.
- The one-year duration of the trial may have affected outcomes negatively and/or positively. For example, with more time teachers could improve how they use the tablets during lessons, but this may also lead to dips in performance as the excitement and/or novelty fades.
- Student attrition was relatively high. This has implications for the power of the study and whether the results could be replicated in other schools. Statistical weighting was used to try and address this.
- Social desirability bias or other related biases could affect some of the results. For example, respondents (students, teachers, principals, parents) could overstate the benefits of the tablets in the hope that the program should be expanded. Collecting student and teacher assessment results was important to counter this issue.
- Teachers reported using tablets for other subjects, such as science and healthy living, but students were tested only for English and math. Impacts on other subjects or computer literacy were not considered in the design and analysis.