

SOCIETY FOR RESEARCH ON EDUCATIONAL EFFECTIVENESS | JULY 2020

IMPACT OF E-LEARNING TECHNOLOGY AND ACTIVITY-
BASED LEARNING ON LEARNING OUTCOMES:
EXPERIMENTAL EVIDENCE FROM COMMUNITY SCHOOLS
IN RURAL ZAMBIA

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Context – Challenging Education Landscape in Rural Zambia







- Zambia: **Ages 15–24 literacy rates – 58.5% for females and 70.3% for males**, despite an average of 7.7 years and 7.9 years of education (Central Statistical Office, Ministry of Health, & ICF International, 2014; UNICEF, 2015).
- **Large, autonomous community schooling system** – number of community schools increased from 100 schools in 1996 to ~2,325 schools with 473,458 children in 2017 (Ministry of General Education, Republic of Zambia, 2017)
- Community schools often staffed by untrained, underpaid teachers who teach a substandard curriculum and who may lack management skills and school supplies
- Experimental evidence – **technology integration into education** may improve quality of education and learning outcomes but **very limited evidence in rural sub-Saharan Africa**

Impact Network eSchool 360 Model – A Technology in Education Program with Wraparound Services

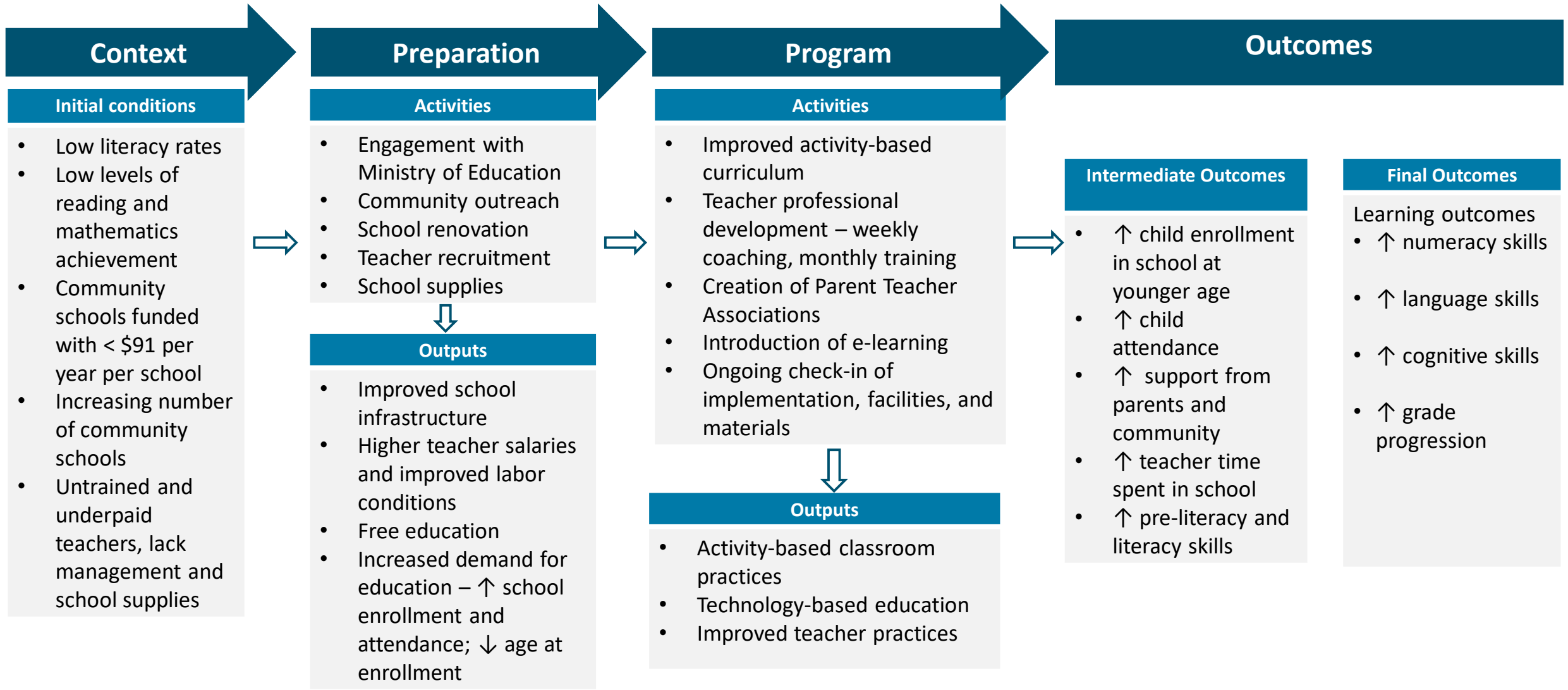


Joel Impact Network School

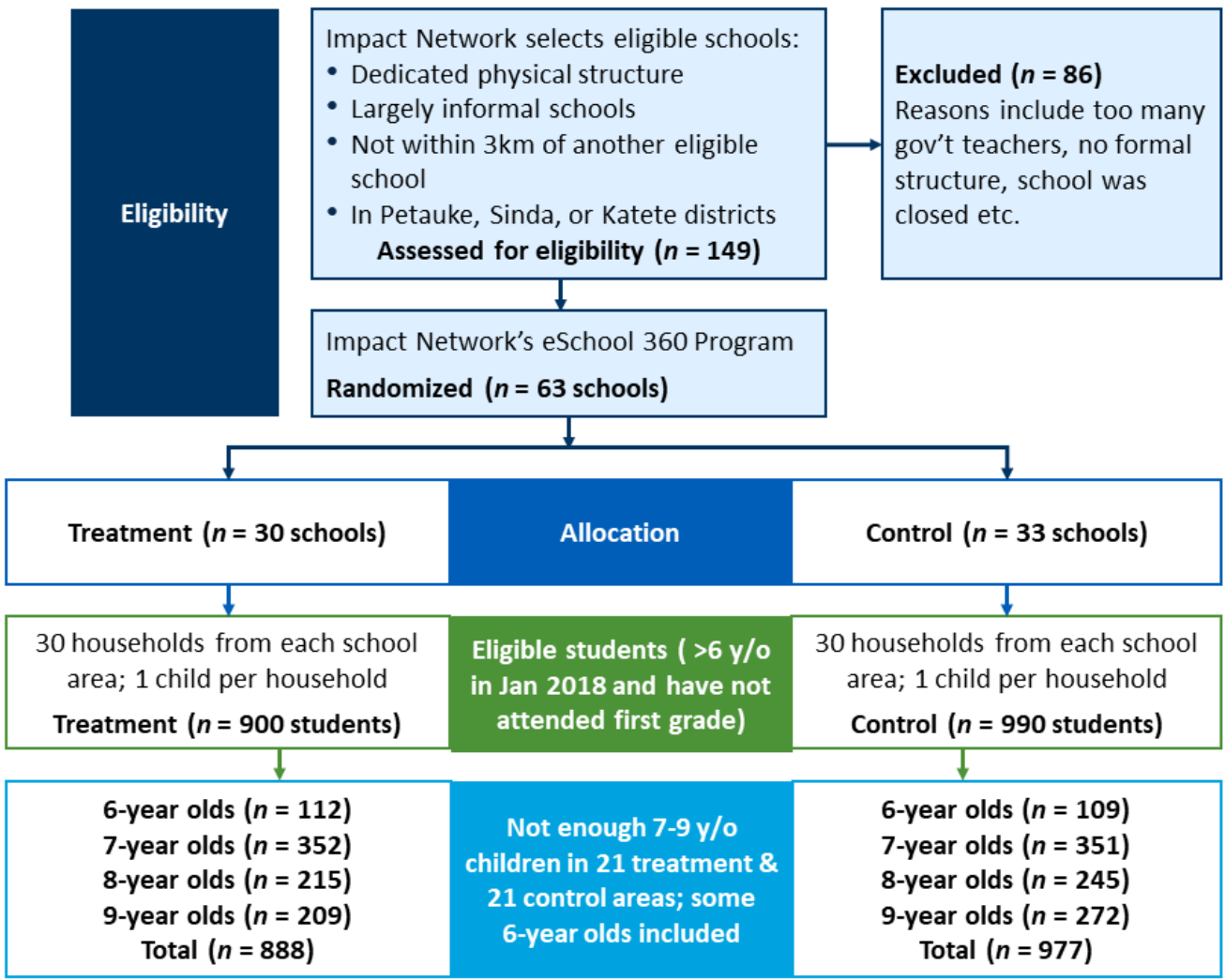


-  eLearning Hardware
-  Active Curriculum
-  Teacher Training
-  Weekly Management
-  Community Ownership
-  School Supplies
-  Teacher Stipends
-  Solar Electric
-  Building Care
-  Rural Security

eSchool 360 Model: Mechanisms to Improve Learning Outcomes



Randomized Controlled Trial Stratified by Region and Age



Mixed-Methods Design to Determine Impacts on Literacy and Mathematics Outcomes

Quantitative Data

- Cluster-RCT: Child assessments at baseline (2018) and midline (2019) – EGRA, EGMA, ZAT, and Oral Vocabulary administered in Nyanja
- Baseline N=1,865. Midline N=1,700. **No differential attrition**

Compares outcomes of eligible children in treatment and control areas at midline

ITT

IV analysis of – 1) Enrollment in treatment school in last year; 2) Attendance in treatment school >3 days in week

TOT

Midline Qualitative Data

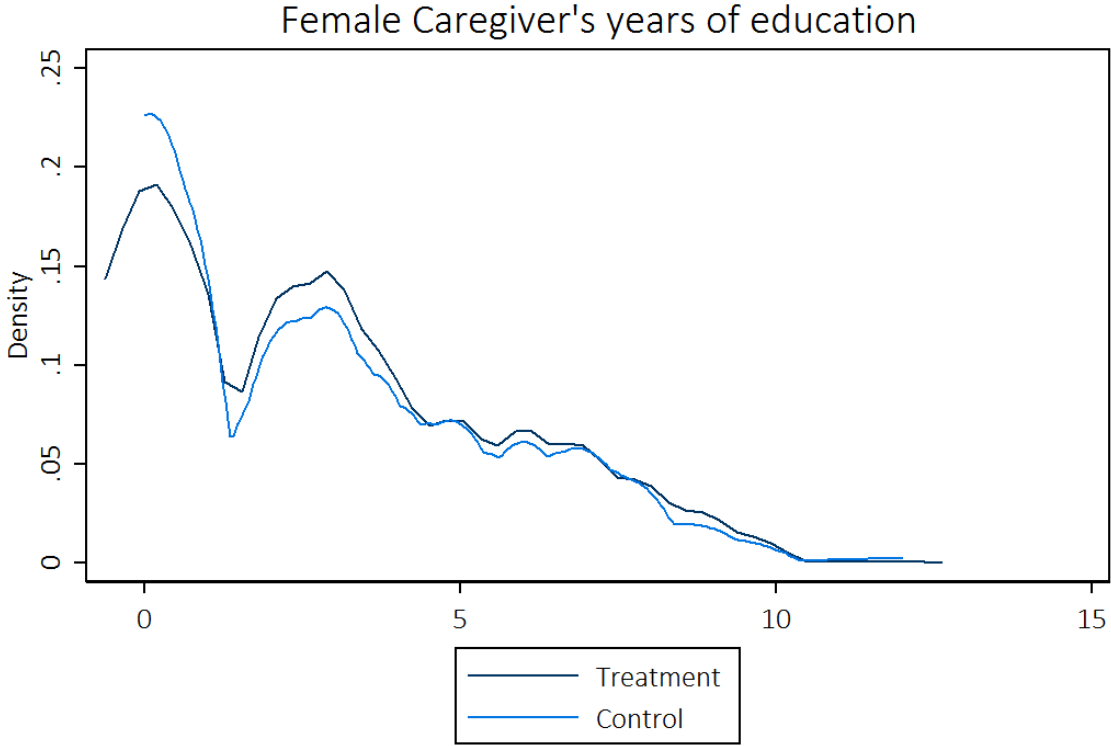
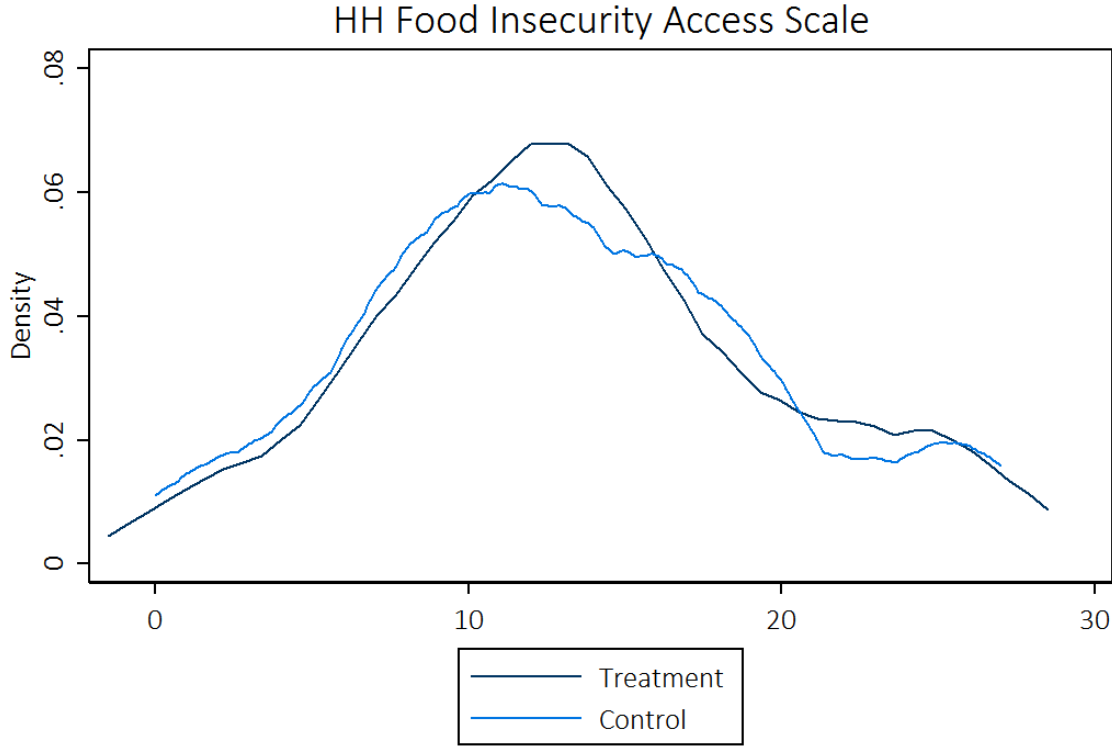
- Schools for qualitative data were selected based on school size, distance from district center, and distribution of high/low performing schools based on student learning outcomes from prior years

Key informant interviews with teachers, teacher supervisors, and Impact Network staff

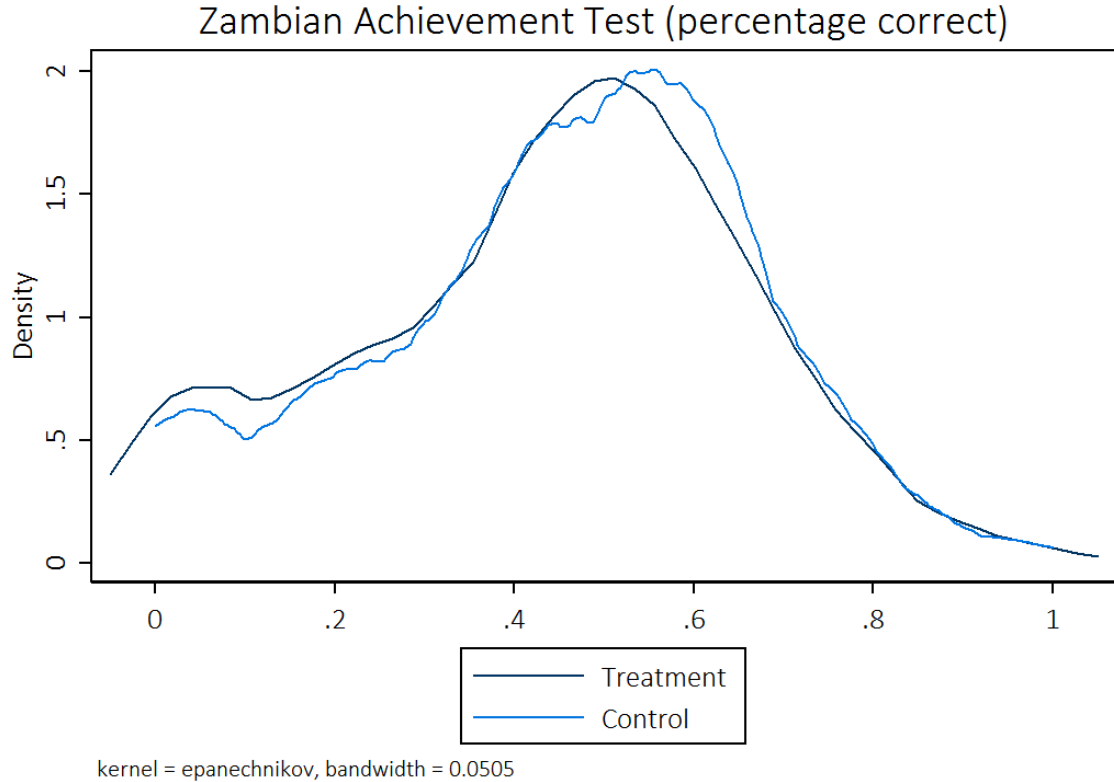
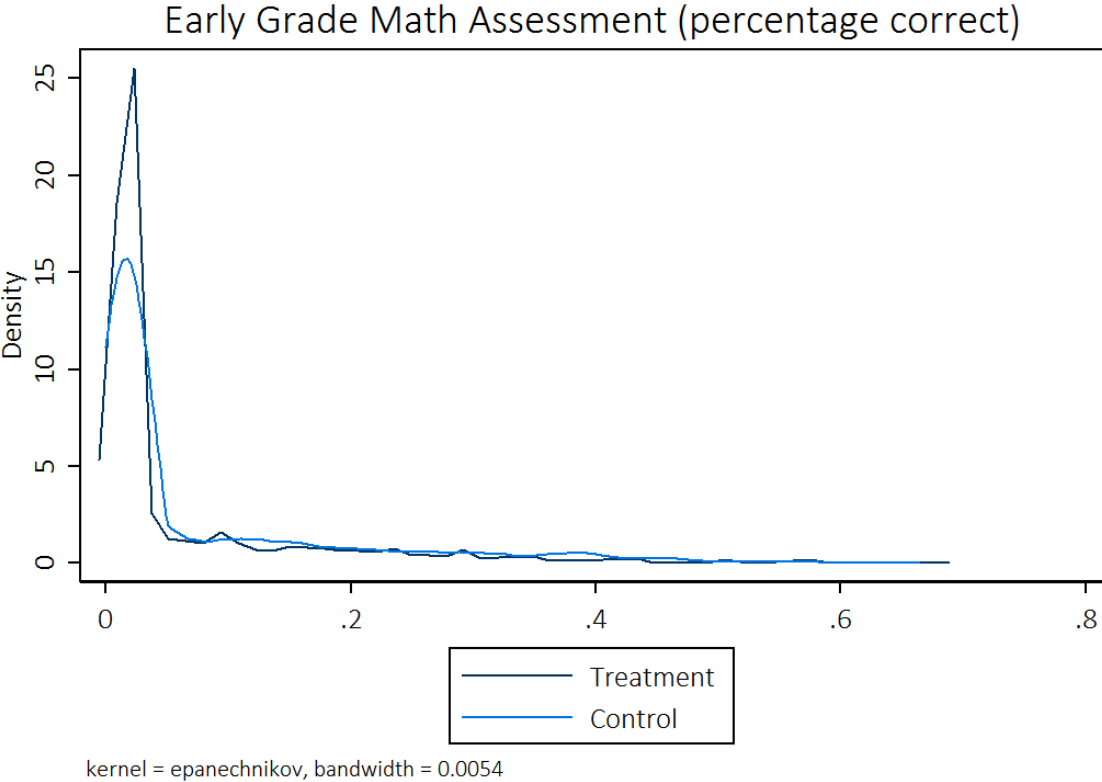
Focus group discussions with parents, PTA members, and students

Classroom observations

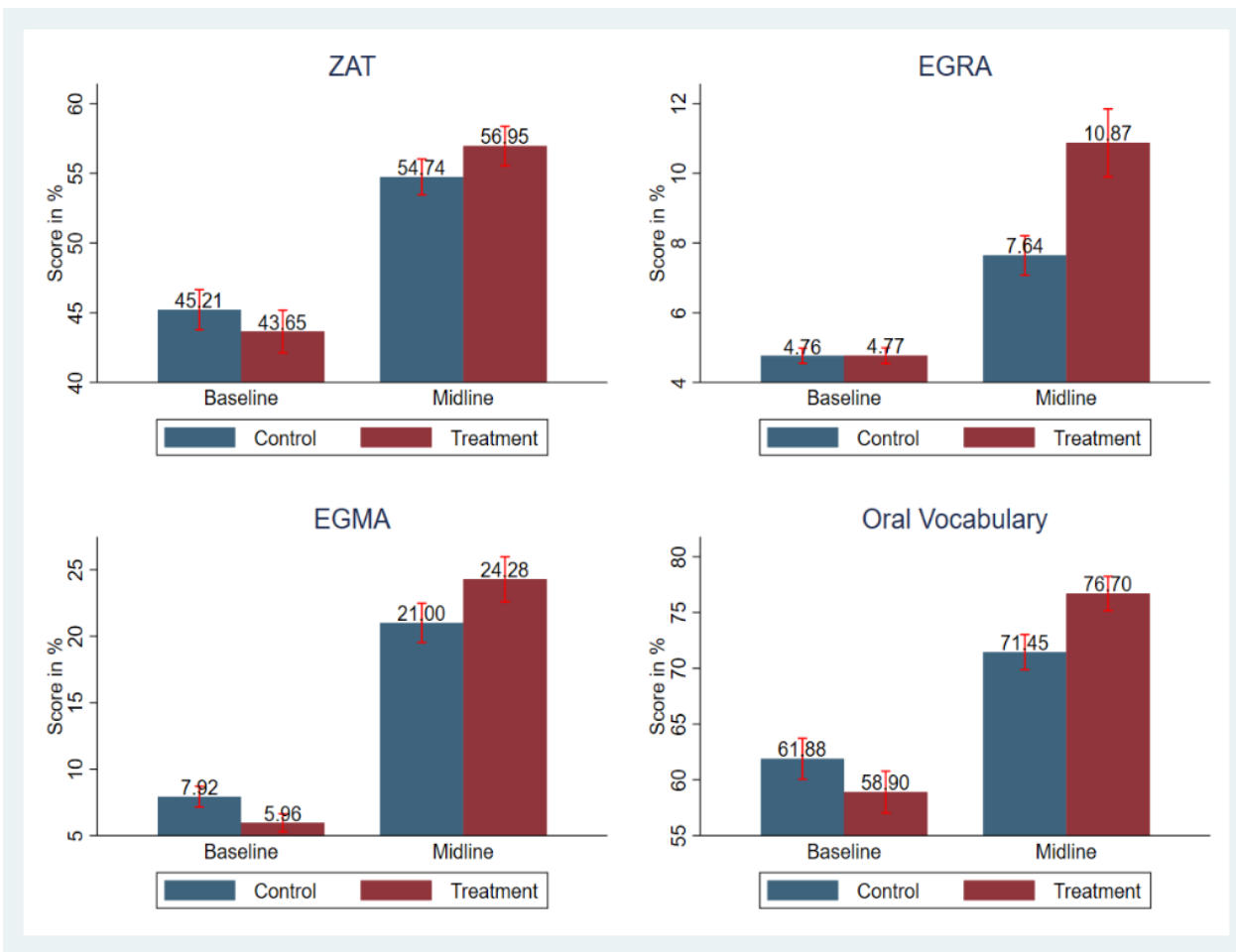
Context: High Levels of Food Insecurity and Low Levels of Parental Education



Context: Potential for Floor Effects because of Low Baseline Learning Outcomes



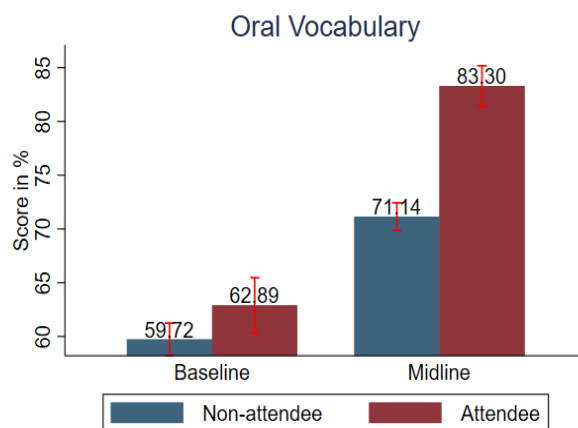
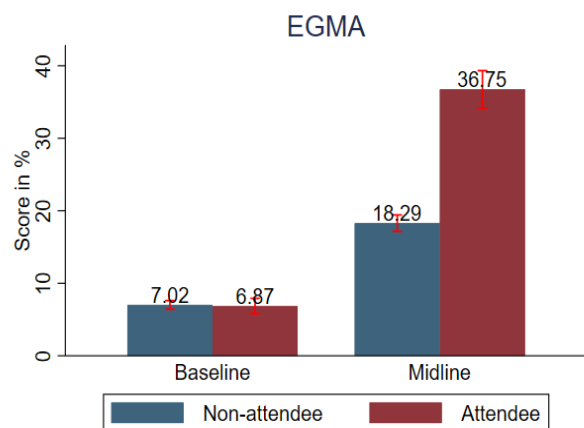
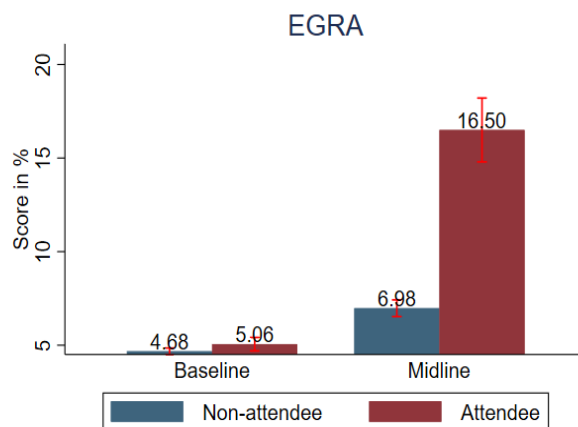
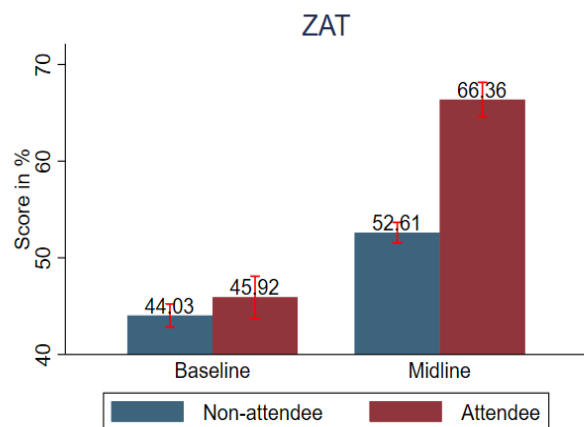
ITT Effects – Improved scores on all primary tests after 14 months. Estimates range from 0.16 SD to 0.40 SD.



	ZAT- SMD	EGRA- SMD	EGMA- SMD	OV-SMD
Treatment	0.158*** (0.056)	0.404*** (0.083)	0.219*** (0.065)	0.251*** (0.053)
Observations	1,688	1,688	1,688	1,688

Standard errors clustered at school level and reported in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

TOT Effects – Significant increase in test scores for children who were ever enrolled in IN school. Estimates range from 0.26 SD to 0.68 SD.



	1st Stage	ZAT- SMD	EGRA- SMD	EGMA- SMD	OV-SMD
Treatment	0.597***				
	(0.030)				
Enrolled in IN school		0.264***	0.677***	0.366***	0.420***
		(0.088)	(0.131)	(0.100)	(0.087)
Observations	1,688	1,688	1,688	1,688	1,688

Standard errors clustered at school level and reported in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Mechanisms to Explain Findings – Improvement in enrollment, attendance; Teacher Professional Development

	Enrolled (yes/no)	Weekly attendance (days)	Age at enrolment (for enrollees)
Treatment	0.079** (0.038)	0.358** (0.158)	-0.096** (0.038)
Observations	1,688	1,688	979
R-squared	0.021	0.024	0.800
Control mean	0.545	1.915	9.044

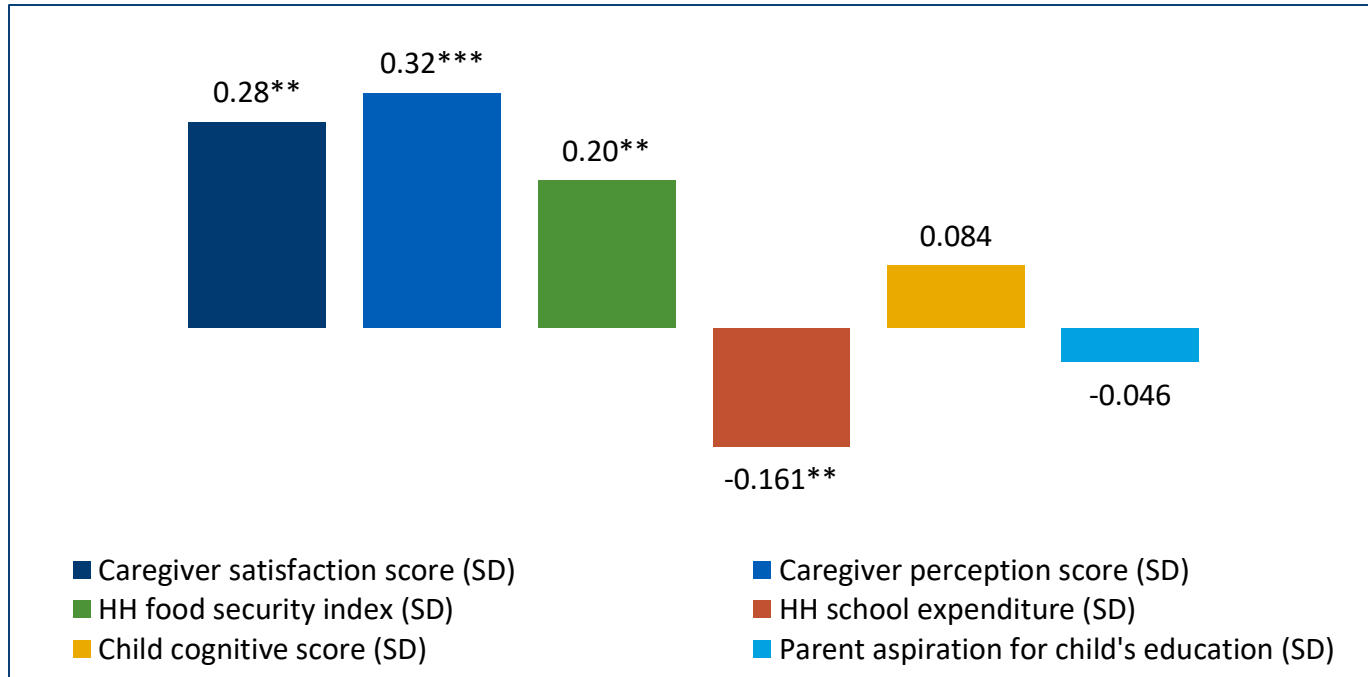
Standard errors clustered at school level and reported in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Process evaluation findings:

- Use of tablets and technology motivates students to attend class
- Well-trained and knowledgeable teachers use innovative teaching methods, attend school consistently, and follow up when students are absent → these teacher characteristics were perceived to lead to improvements in student performance

“The teacher is very good. Any time the children come to school there is no time they come back [and say] that the teacher is not there. When the child is absent from school the teacher makes a follow-up to us parents to get the reason the child is absent.” -Parent

Mechanisms to Explain Findings – Improvements in Perceived Quality of Education



* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Process evaluation findings:

- Parents, teacher supervisors, students, and program staff believe Impact Network teachers provide students with high-quality education
- Observations confirm teachers' use of active, participatory pedagogical approaches as they were trained to do, such as putting students into small groups and inviting them to actively participate in the lesson

“The children at this school learned how to read from Grade 1; but you find a child who is in Grade 4 there [in a government school] but does not know how to read.” -Parent

Conclusion – Positive one-year effects but learning levels remains low

- **Midline results are promising** –multifaceted, integrated technology-aided instruction program can improve literacy and mathematics outcomes **in poorest areas of sub-Saharan Africa**
- **Increase in school enrollment and attendance, improvements in the quality of education, and increases in teacher attendance** were likely the main drivers of the positive effects
- Despite the positive effects, **children residing in Impact Network catchment areas scored an average of only 11% correct on EGRA and 24% correct on EGMA assessments**

Future work – Testing Hypothesis about Exponential Growth in Learning Outcomes, COVID-19, and Cost-Effectiveness

- Endline study will assess the ability of the program to **exponentially increase learning outcomes after 4 years of programming.**
- Endline qualitative study will examine the ability of the program to **cope with learning loss after COVID-19.**
- Endline study will examine the cost-effectiveness of the program – **Nonexperimental study shows some evidence for low costs and high cost-effectiveness in comparison with government schools.**

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