Can an Integrated Technology-Aided Instruction Program Lead to Improved Learning Outcomes in Low-Income, Rural Zambia?

Midline Findings from a Mixed-Methods Experimental Study

AIR®
AMERICAN INSTITUTES FOR RESEARCH®

Introduction

Zambia faces many challenges common to low- and middle-income countries as it seeks to improve its education system, including low literacy rates for young Zambians and low public expenditure on education.

In the past 20 years, Zambia's school system has expanded to reach more children in rural areas, primarily through community schools, which are autonomous from the government. But many community schools in Zambia are staffed by untrained and underpaid teachers who lack access to quality lesson plans, management skills, and basic supplies. These schools need a cost-effective solution for delivering quality education to improve learning outcomes.

One potentially promising intervention for Zambia's community schools is Impact Network's eSchool 360 model, a multifaceted technology-aided instruction program designed to deliver low-cost education to children in rural areas. The model incorporates three potentially high-impact components:

Standardized e-learning curriculum and pedagogy, through which schools receive technology—tablets and projectors powered through solar power—loaded with lesson plans for teachers and interactive lessons for students in the local language;

Frequent teacher coaching and professional development on how to use the technology and enhance pedagogical skills; and

Community ownership, meaning that teachers are recruited from the community and schools engage frequently with parents of students.

RESEARCH OVERVIEW

WHAT: AIR's evaluation of a multifaceted technology-in-education program

WHERE: Three districts in Zambia's Eastern Province

WHEN: Evaluation began in 2017

HOW: Mixed-methods experimental study, with a cluster-randomized controlled trial across 63 schools and additional qualitative evidence-gathering methods, such as interviews and focus groups

WHY: To contribute to the evidence base on use of technology in education, particularly its use in low-income rural areas, and to examine the feasibility of improving the quality of education by scaling the eSchool 360 model

The American Institutes for Research (AIR) is conducting an evaluation of this model's effectiveness in support of its mission to use the best evidence available to improve people's lives. This research will contribute to the body of existing evidence on the impact of technology on education in two important ways.

1. Previous research shows that merely providing technology to schools is not enough to move the dial on student outcomes, and this evaluation examines the effect of technology as one component of a multifaceted intervention.

2. The most rigorous evidence examining the use of technology in education in low- and middle-income countries comes from urban areas. This evaluation will provide evidence on the effect of technology-aided instruction programs on learning outcomes in rural areas of sub-Saharan Africa.

Methodology

To evaluate Impact Network's eSchool 360 model, AIR designed and implemented a cluster-randomized controlled trial; 63 schools in three districts in poor, rural Zambia were assigned to either implement the model (30 schools) or serve as control (33 schools).

Fourteen months after the start of the program, researchers examined math, reading, oral vocabulary, and Zambian Achievement Test scores of children who lived in the areas of the 63 schools and were eligible to enroll in first grade when the program started. Researchers estimated the effects of:

■ The opportunity to enroll in a school that had implemented the model; and

■ Enrolling and actively attending a school that had implemented the model.

The introduction of the model may have prompted some eligible children to enroll in schools with the model and thus changed enrollment and attendance, as well as the composition of the classroom. Because of these changes, children in schools with the eSchool 360 model are not comparable to children in other community schools. This comparison would produce invalid impact estimates. Estimating the effect of the opportunity to enroll in a school implementing the eSchool 360 model allowed researchers to account for these changes in classroom composition when estimating how the model affected learning outcomes.

Researchers also reviewed self-reported enrollment and attendance data and conducted additional investigations, including classroom observations, interviews, and focus groups, to understand the model's implementation, how students and their parents experienced and perceived the model, and other potential effects of the model.
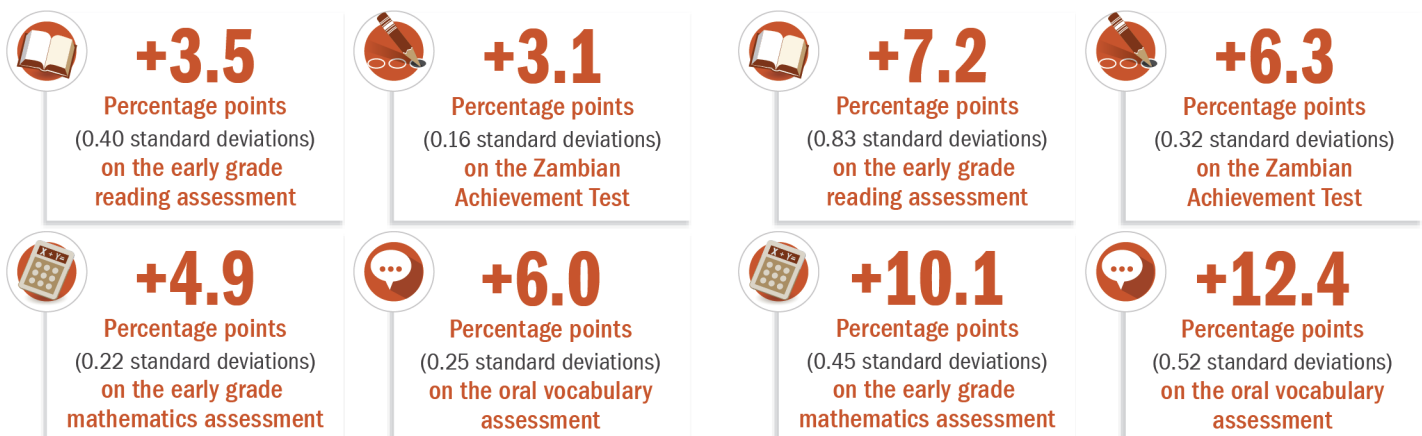
A midline study, summarized here, focused on the impact and implementation of the Impact Network eSchool 360 model.

Midline Findings Show Positive Effects of the eSchool 360 Model on Reading and Math Outcomes

Although AIR's evaluation of the Impact Network eSchool 360 model in Zambia is ongoing, midline results are promising: They show that well-designed, multifaceted, integrated technology-aided instruction programs can improve learning outcomes in the poorest areas of sub-Saharan Africa.

Compared to children in the control group, **children who had the opportunity to enroll in schools that implemented the eSchool 360 model** had higher scores by:

+3.5
Percentage points
(0.40 standard deviations)
on the early grade reading assessment

+3.1
Percentage points
(0.16 standard deviations)
on the Zambian Achievement Test

+4.9
Percentage points
(0.22 standard deviations)
on the early grade mathematics assessment

+6.0
Percentage points
(0.25 standard deviations)
on the oral vocabulary assessment

Outcomes were strongest for **students who attended a school with the eSchool 360 model** at least three times a week prior to the assessment. Specifically, these students had scores higher than comparable students in the control schools by:

+7.2
Percentage points
(0.83 standard deviations)
on the early grade reading assessment

+6.3
Percentage points
(0.32 standard deviations)
on the Zambian Achievement Test

+10.1
Percentage points
(0.45 standard deviations)
on the early grade mathematics assessment

+12.4
Percentage points
(0.52 standard deviations)
on the oral vocabulary assessment

Other notable findings at the midpoint of the evaluation include:

- Students, parents, teachers, and program staff reported that they perceived schools with the eSchool 360 model to provide a higher quality of education, for example, because teacher attendance was higher.

- Researchers found positive and statistically significant effects on parents' perceptions of child engagement in school, and their satisfaction with school and teacher quality.

- Compared to control areas, enrollment in schools in areas where the model was implemented was higher by 7.9 percentage points.

- The model did not have a statistically significant effect on parents' aspirations for their children's education (measured by expectation that child will study beyond 12th grade).

- In the rainy season, school attendance was lower, with some children working on their family farms, herding cattle (boys only), or caring for younger siblings.

What's Next

Although the midline results show the Impact Network eSchool 360 model had statistically significant effects on overall learning in the short-term, more research is needed to assess whether this model can achieve greater learning gains in the future.

The next phase of AIR's evaluation will examine program effects three years after the start of the program and whether the model is cost-effective. A previous study showed the model cost $3 per student per month, 70% less than what the Zambian government spent per student at the time of that study. AIR will update these results based on primary cost data collection.

Learn more at www.air.org/eschool-360-midline

Contact

Principal Investigator:

Thomas de Hoop
tdehoop@air.org

Qualitative Research Lead:

Hannah Ring
hring@air.org

Quantitative Research Lead:

Garima Siwach
gsiwach@air.org

About the American Institutes for Research

Established in 1946, with headquarters in Washington, D.C., the American Institutes for Research (AIR) is a nonpartisan, not-for-profit organization that conducts behavioral and social science research and delivers technical assistance, both domestically and internationally, in the areas of education, health, and the workforce. For more information, visit www.air.org.

AIR®
AMERICAN INSTITUTES FOR RESEARCH®

1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000

11027_v08_03/20