School Electricity and Native Language Digital Media to Improve Student Learning in Tanzania

Sector(s): Education

Fieldwork: Off Grid Electric (OGE)

Location: Tanzania

Sample: 164 schools

Target group: Secondary schools Students

Outcome of interest: Student learning

Intervention type: Renewable energy Monetary incentives

AEA RCT registration number: AEARCTR-0000842

Research Papers: Do school electrification and provision of digital media deliver educational be...

Partner organization(s): Energy Policy Institute at the University of Chicago (EPIC), International Growth Center (IGC), Off Grid Electric (OGE), The United Republic of Tanzania President's Office, Youth Shaping Sharpening Movement (YSSM), GivePower Foundation

Policy issue

One in seven people worldwide lacks access to electricity, while one in three do not have access to education in their native language.[1] Prior research has found mixed impacts of providing instruction in students' native language on their academic achievement and income. Meanwhile, prior research has had little to say on the school electrification on students' academic performance. Can school electrification, delivered with or without language-varied educational videos, improve students' academic performance?

On the left, lights are installed in a classroom; on the right, students look at a screen at the front of the classroom delivering educational instruction.

Photo: Samuel Seo

Context of the evaluation

Increasing numbers of students in Tanzania have enrolled in secondary school in recent years, but relatively fewer are passing their exams. For instance, between 2000 and 2013, the percentage of the official junior-secondary age-group population enrolled (grades 8–11) rose from 10 percent to 50 percent, but the percentage of students passing their secondary school exams fell, from approximately 90 percent to 50 percent. Students in Tanzania complete their education through grade 7 in Swahili, which is many students' native language, before switching to English for grade 8 and upwards, which coincides with the beginning of junior secondary school. This language shift may leave some students behind, particularly new entrants to the educational system who are likely to come from more well-prepared backgrounds. Students also take standardized exams at the end of grade 11.

One factor that could be weakening student performance is poor access to electricity in schools, as electricity could provide teachers access to educational tools like videos, as well as improved lighting. Tanzania had an electricity access rate of 16 percent in 2014, right before this intervention was conducted. Furthermore, 20 percent of the schools in 23 northern Tanzanian districts did not have access to electricity in 2015. Though classes take place during the day, extracurricular activities, like sports and clubs, often occur after regular hours, making it likely that at least some students would benefit from school lighting.

Researchers worked with schools that had relatively low average academic performance for this intervention; for instance, their average exam pass rate was 58 percent in 2016, compared to 70 percent nationwide. The intervention measured outcomes for students in grade 11.

Details of the intervention

Researchers conducted a randomized evaluation to test the impact of school electrification and/or mixed-language digital educational materials, on student exam scores and exam pass rates. Researchers collaborated with Zola (formerly, Off Grid Electric), a major solar energy equipment supplier headquartered in Tanzania; the Youth Shaping and Sharpening Movement, a youth empowerment organization based in northern Tanzania; and the Tanzanian President's Office–Regional Administration and Local Government. Together with these groups, researchers developed a list of Tanzanian schools that did not have access to electricity. From there, the 164 schools without electricity as of September 2015 in 20 northern Tanzanian districts took part in the study.

The schools randomly received a combination of two potential interventions.

Firstly, schools randomly either did or did not receive solar facilities, which included solar panels, lights, radios, two televisions, and a solar battery. These facilities were sufficient to power two classrooms and one office, in addition to the two televisions. As the average school had approximately eleven classrooms and three offices, this intervention only provided electricity to a fraction of classrooms in each school.

Second, schools randomly either did or did not receive a set of videos on biology, geography, and self-esteem to build students' confidence in their academic potential. Schools received either English videos, bilingual (English and Swahili) videos, or neither. The Youth Shaping and Sharpening Movement created the videos, which featured lectures by highly motivated, certified local volunteers with degrees in education.

Through a combination of electricity access and educational videos, schools were thus randomly assigned to one of six groups:

1. *Electrification + bilingual video group (31 schools):* Schools gained electricity access and received bilingual videos
2. *Electricity + English video group (29 schools):* Schools gained electricity access and received videos only in English
3. *Only electrification group (26 schools):* Schools gained electricity access, but no video content
4. *Only bilingual video group (24 schools):* Schools received bilingual videos, but no electricity access (or associated televisions)
5. *Only English video group (29 schools):* Schools received English videos, but no electricity access
6. *Comparison group (25 schools):* These schools received neither electricity access nor video content

Researchers collected data from three sources: school surveys, administrative records, and solar battery meter scans. Schools reported information on tuition, numbers of teachers, classrooms, offices and years of operation. A follow-up survey collected information on pedagogy and educational time use. These questions centered around electricity access, estimated hours of light and multimedia use per week, as well as students' participation in clubs and use of electricity after classroom hours. Second, researchers collected data on students' grade 11 exam scores after receiving a year of the intervention. The government reported grades on each student's seven best subjects, which were then used to compute an average grade that signaled passage or failure. Lastly, researchers also collected data on school's usage of the solar battery.

Results and policy lessons

On the whole, researchers did not find an effect of electrification on student learning, nor did they find an effect from the presence of educational videos, either in English or both English and Swahili. Analysis of second-year results are pending.

Electrification and multimedia consumption: Researchers found that groups of schools with solar facilities reported a 19 to 25 percentage point higher classroom electrification rate than schools that did not receive solar facilities, which had 10 percent of classrooms electrified on average. The electricity + English video group reported watching an average 4.2 hours more television in school per week than the comparison group, which reported watching 24 minutes per week on average. While the electricity + bilingual video group reported watching videos for 51 minutes more than the control group, this difference was not statistically significant.

Student behavior: Across all six groups, students did not display any differences in likelihood to engage in extracurricular activities after school, though there is some evidence that students in electrified schools were more likely to stay at school late to use electricity.

Student achievement: Students across the six groups did not demonstrate any differences in their average grades or final exam test scores. Similarly, neither the electricity provision nor the presence of video content, in either English or both English and Swahili, influenced these outcomes.

Previous research on this topic indicates that technological investments have relatively small impacts on student learning; for instance, interventions that provided computers, internet connection, or instructional computer programs to students often show minimal effects on student learning outcomes. In this study, researchers suggest that passive viewing of videos may have been less effective than technologies that allow students to actively engage with material. Though technological interventions can be effective, this study suggests that, even when combined with native-language electronic materials, electrification may not necessarily improve learning.

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1. [1] Washington, DC. UNESCO (2016, February). If you don't understand, how can you learn? Policy Paper 24, United Nations Educational, Scientific and Cultural Organization, Paris, France.