Stanford | PESD Program on Energy and Sustainable Development

IMPACT OF LIGHTING ON EDUCATION:
BASELINE SUMMARY

ZAMBIA

OCTOBER 2016

ACUMEN STANDING WITH THE POOR LISTENING TO VOICES UNHEARD

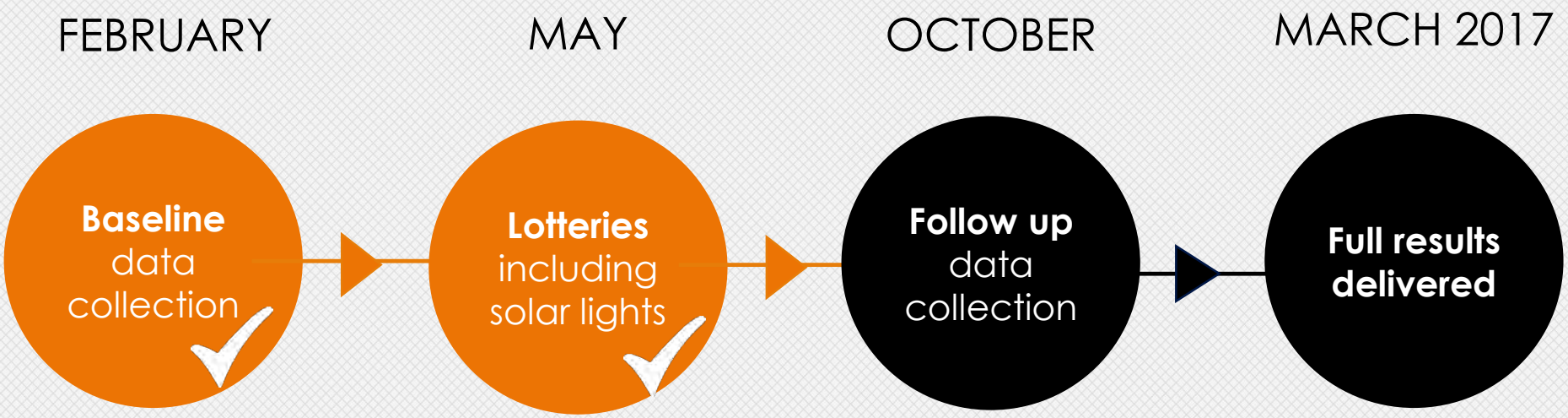
SolarAid

UKaid from the British people

PROJECT OVERVIEW

In 2014, SolarAid and Stanford University's Program on Energy and Sustainable Development (PESD) partnered to conduct research on the impact of solar lighting on education outcomes. The UK Department for International Development (DFID) are funding the research alongside a Stanford University contribution. d.light kindly donated S2 solar lights for the research. The study is managed by Kat Harrison, now at Acumen due to a move of the SolarAid Research & Impact department, more here, who is also Chair of the Global Off Grid Lighting Association (GOGLA) Impact Working Group.

The research will focus on tracking the academic performance, school attendance and secondary school advancement of primary school students, and will also devote significant efforts to uncovering changes in study patterns, use of "free" time, and the potentially complicated interplay between energy access, poverty, gender, and education.



KEY TAKEAWAYS: BASELINE

LEARNING

1. **TORCHES ARE THE PRIMARY LIGHTING SOURCE:** this is critical to the study as a change from torch-light (flashlight) to solar light may be less significant than a change from kerosene lamp light to solar light.

2. **MISSED SCHOOL:** 29% of students said they missed school because their school fees were not paid.

3. **HOMEWORK TIME:** Male students were most likely to do their homework immediately after school, whereas female students were most likely to do it very late at night.

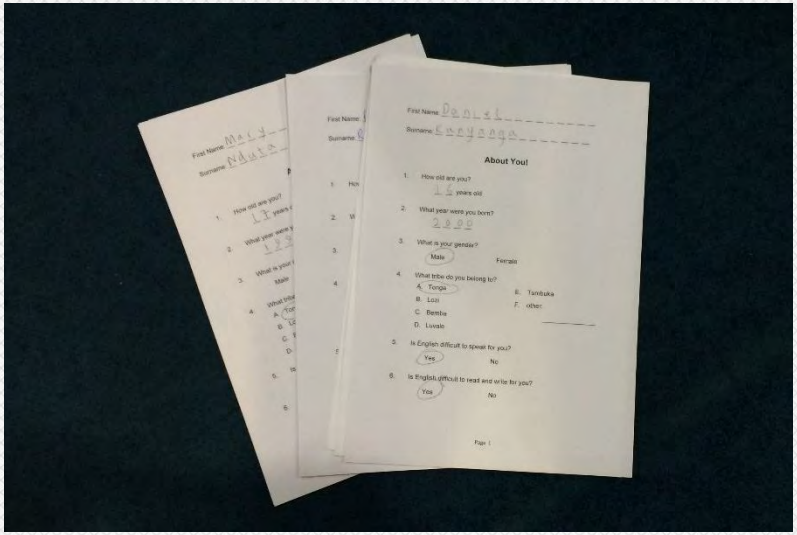
4. **WORKING TO EARN MONEY:** 67% of students reported that they work on most days to earn money. 34% of these do so to earn money to pay for school.

NOTES

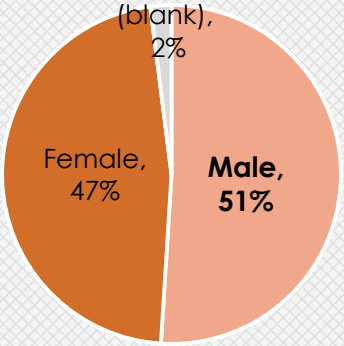
1. **MORE DATA AND ANALYSIS:** this report does not share findings on the full extent of every question asked or draw conclusions, but rather an insight into the particularly interesting data points.

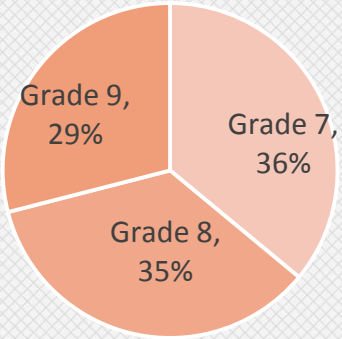
DATA COLLECTION DETAILS
(ZAMBIA, FEBRUARY 2016)

BASELINE



BREAKDOWN OF RESPONDENTS





1. SURVEY GOALS
To gather a baseline set of data to contrast against follow up data, after a lottery of solar lights (and other prizes) are given to students.

The study is a double-blind study where neither researchers on the ground or respondents know the purpose of the study.

2. SCHOOL SELECTION
12 schools randomly selected from a list of over 30 primary schools in Zimba district. Focus on students in Grades 7-9 as this is when homework volumes start to increase and lighting for this would become useful. Grades 7 and 9 also take national examinations which enables research to include secondary data.

3a. SURVEY APPROACH: STUDENTS
+ Method: in-person questionnaires with Grade 7-9 students with trained research team

+ Sample size: 1,800 completed questionnaires

+ Respondent selection: all students at class the day of the research activity (students had the option to not participate)

3b. SURVEY APPROACH: TEACHERS
+ Method: in-person interviews with headteachers at selected schools

+ Sample size: 12 completed interviews

STUDENT CHARACTERISTICS

We asked questions to get to know a bit about the students.

16
average age of student respondents

60%
students self-reporting repeating a Grade

48%
of students had been sent home from school a few times because fees were not paid

76%
of the students live at home

4.1
average number of adults living in students' homes

50%
of students said that their parents/guardians asked them to do fewer tasks on days when they have homework

HOUSEHOLD CHARACTERISTICS

We asked questions about the households' lighting sources and education level of guardians, including some that align with the Grameen Foundation's Progress out of Poverty Index questions. Here are some of the interesting data points.

73%
of students said that torches (flashlights) were the most used source of light in their home

52%
of students reported both parents heading the household, 26% said father, 7% of households were headed by the mother

75%
of students' male guardians can read and write, with 48% having completed primary school and 20% having completed secondary school

Planting and harvesting
was the main source of income for the male guardian, livestock/ animals second, business third.

92%
of households use firewood for cooking

39%
of households get their drinking water from a river or stream

59%
of students' female guardians can read and write, with 37% having completed primary school and 14% having completed secondary school

TIME USE: BEFORE SCHOOL

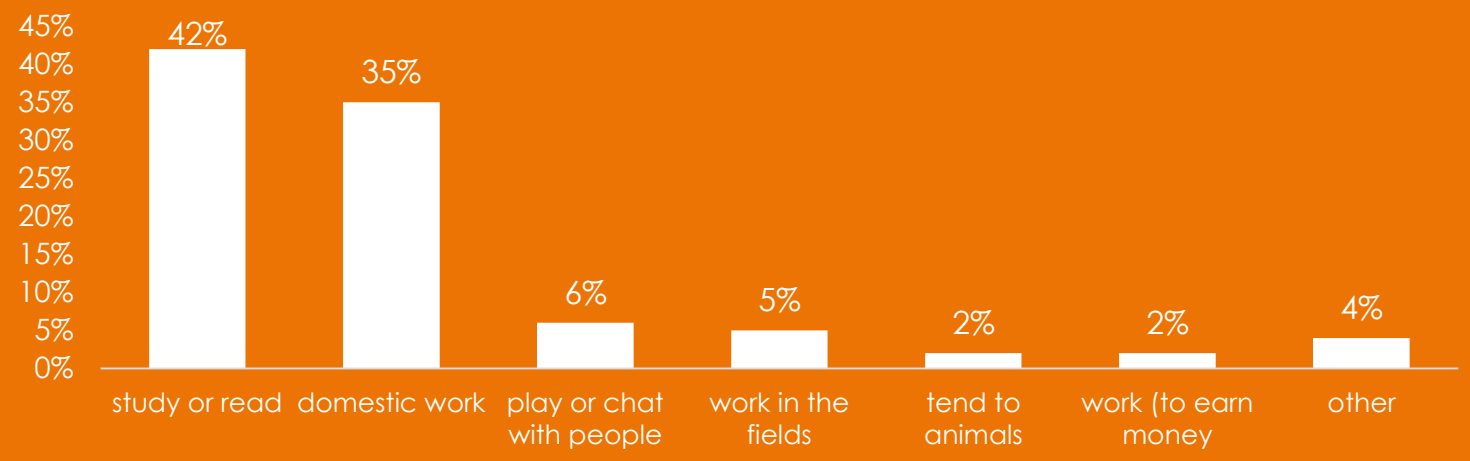
We asked questions to understand how students used their time: before school.

39%
of students start off for school before the sun is up; mostly between 5am and 6am

48%
of Grade 9 students study or read before school, 39% of Grade 7 students do domestic work before school

for 48%
travel time to school is 1-2 hours, 15 minutes to an hour for 19%, 2-3 hours for 13%

What did students do before arriving at school?



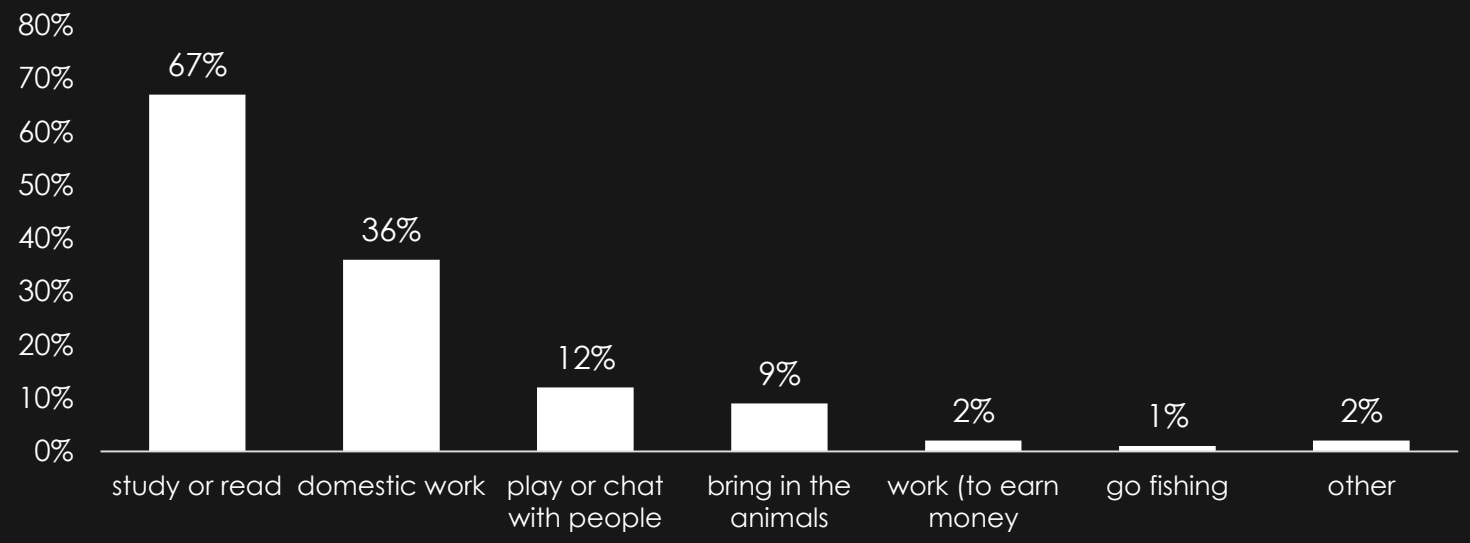
TIME USE: AFTER SCHOOL

We asked questions to understand how students used their time: after school.

69%
of students went directly home after school finished, 17% studied with study group, 10% remained at school to read

78%
of female students reported going directly home after school, only 61% of male students; male students more often stayed back and went to a study group (20% males vs. 13% females) or remained at school to read (14% males vs. 6% females)

What did students do between sunset and bedtime?



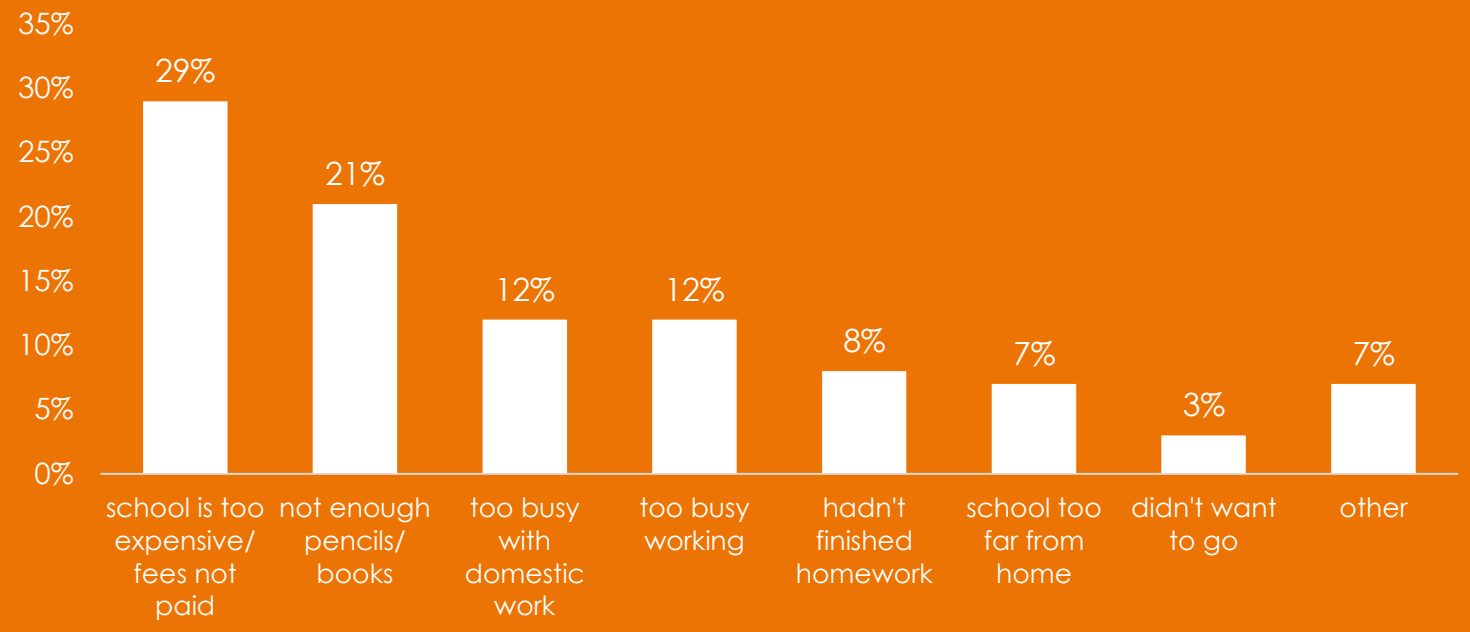
MISSED SCHOOL

We asked questions to understand what the main reasons for missing days of school (beyond sickness) were.

29%
of students missed school because school was too expensive or school fees were not paid

21%
of students said they didn't have enough pencils or books

Most important reason for not attending school (when not sick)?



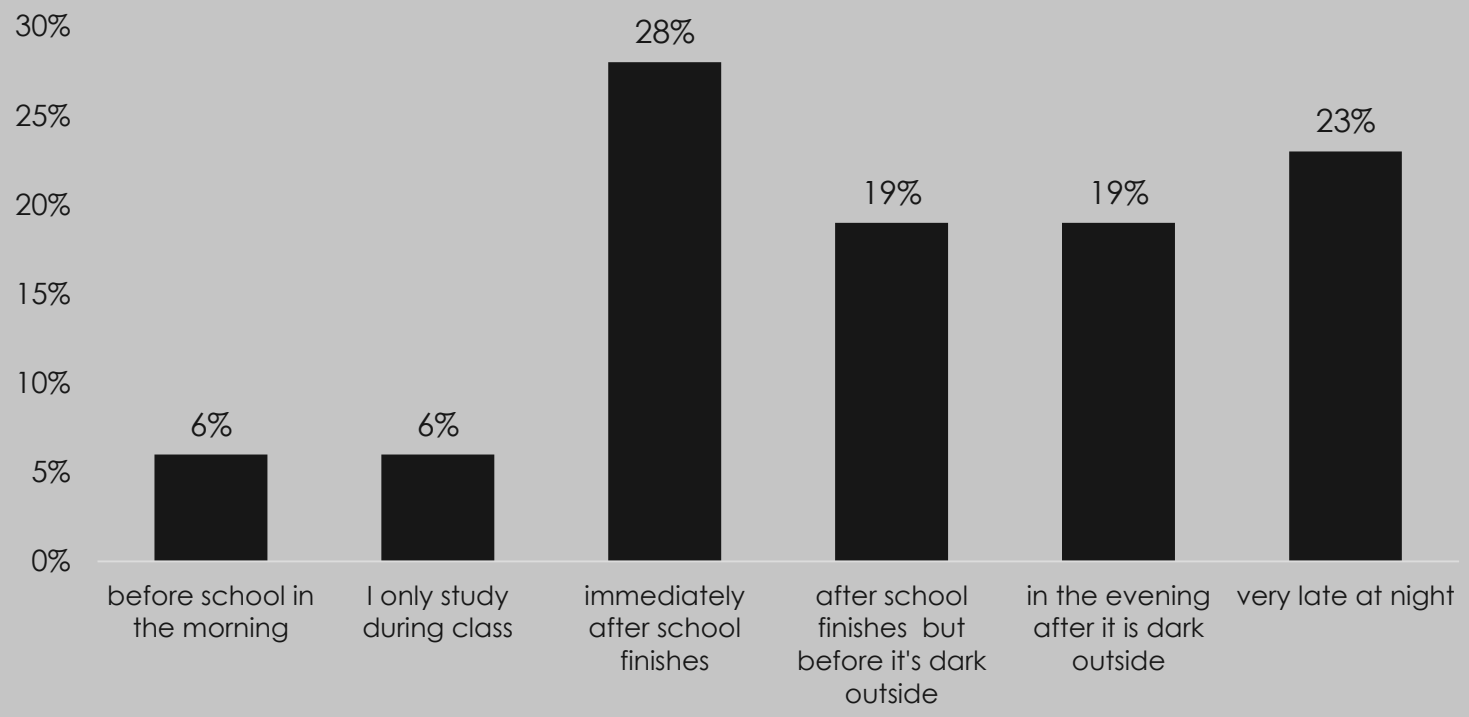
HOMEWORK TIME

We asked questions to understand when students most commonly did their homework.

31%
of male students studied or did their homework immediately after school finished

27%
of female students studied or did their homework very late at night

When did students study or do homework?



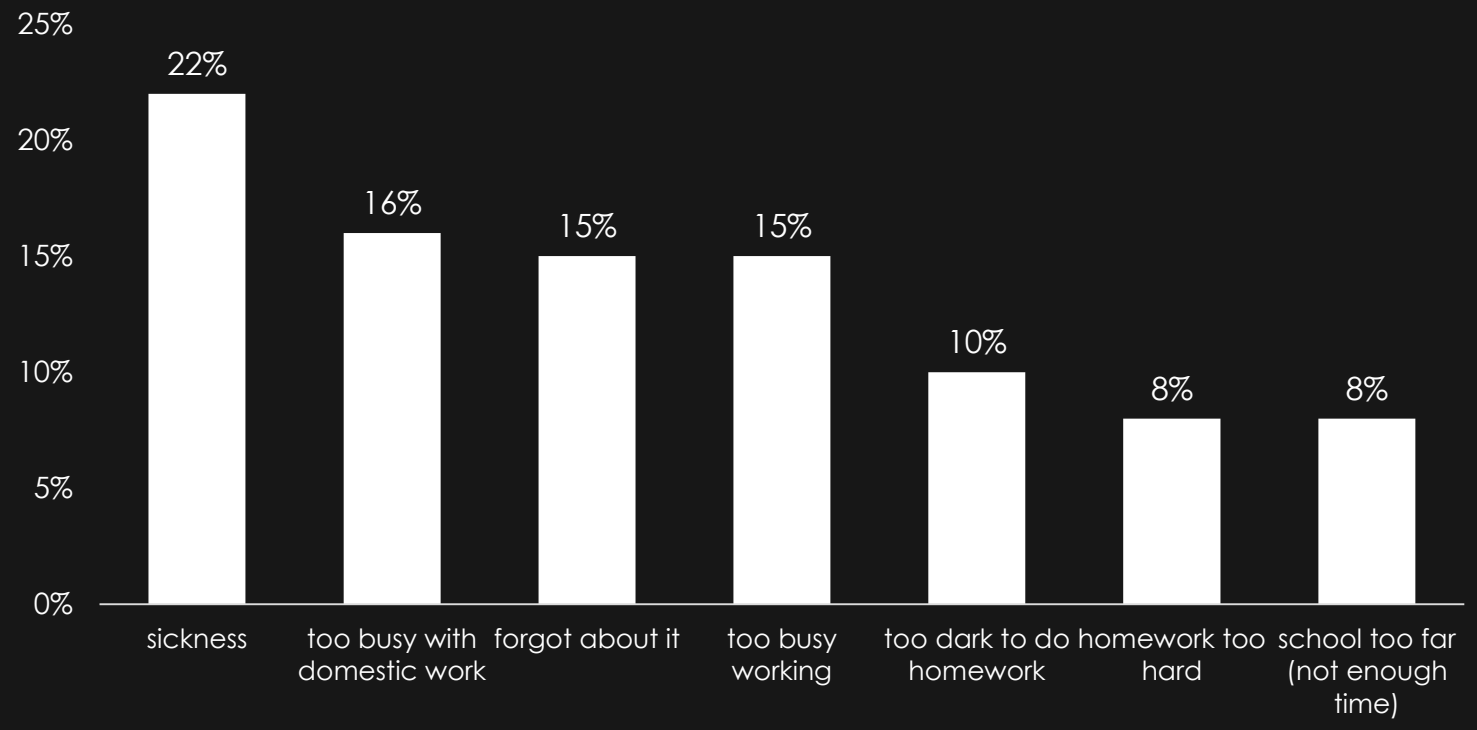
HOMEWORK: REASONS FOR NOT COMPLETING

We asked questions about homework, and reasons it wasn't completed.

91%
of students report having homework on most days

53%
of students say their parents/ guardians help them with homework

What is the main reason homework is not completed?



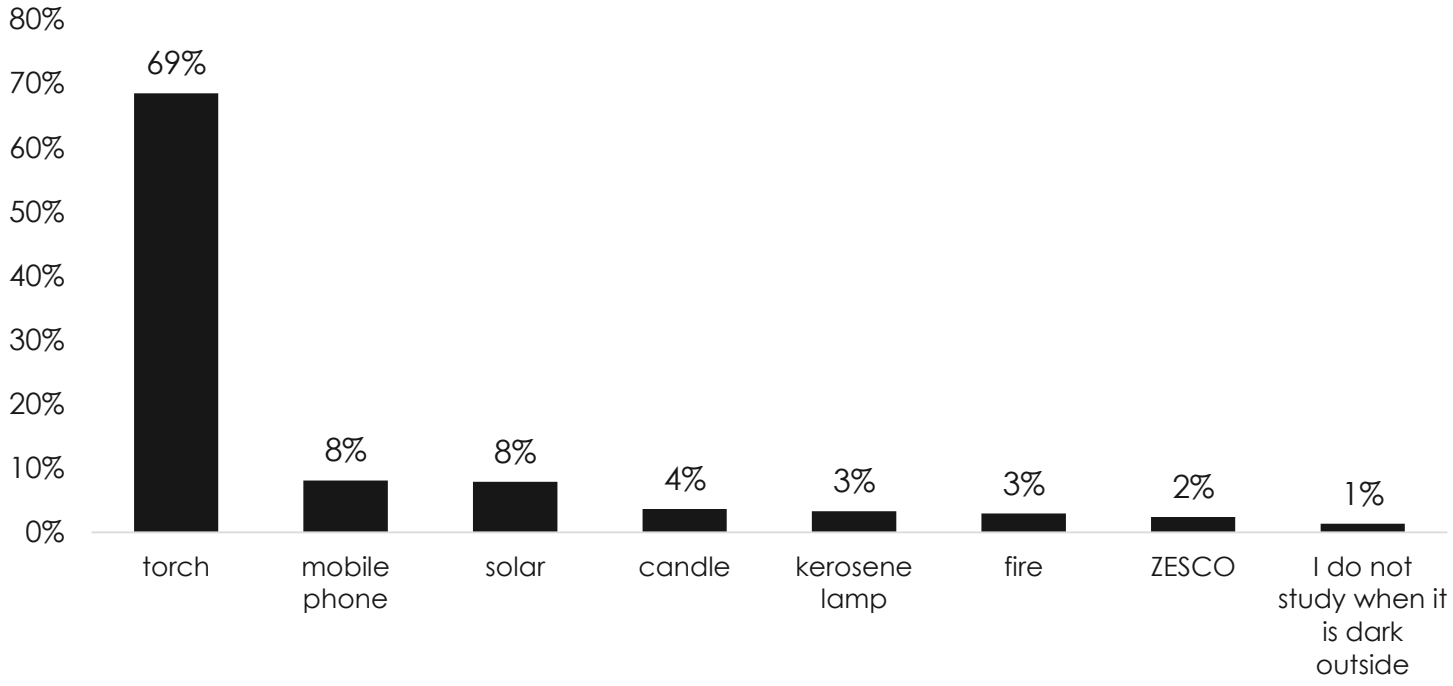
HOMEWORK: LOCATION & LIGHTING

We asked questions to understand where students do their homework and who with.

55%
of students do their homework at their home, 24% at school after school finishes

38%
of students study with one friend, 23% study alone, 20% with a study group

What lighting is used to study after dark?

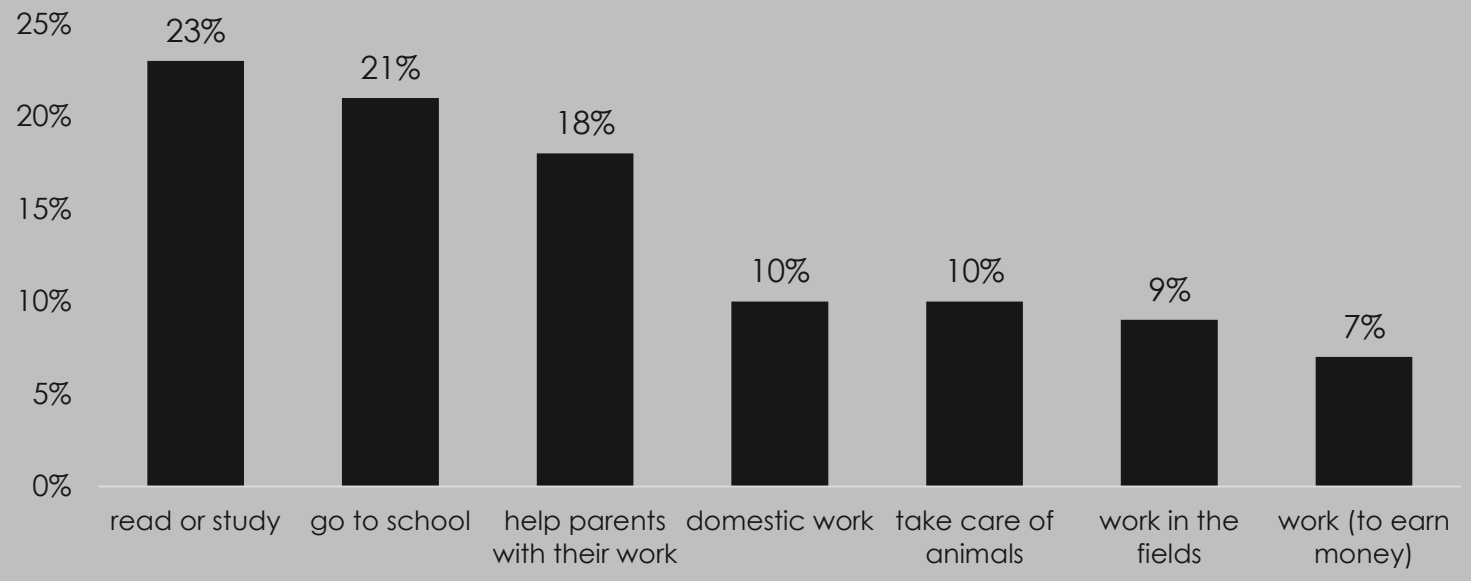


DAILY ACTIVITES

We asked questions to understand what activities or tasks students did on most days, what tasks took students the most time on most days, and which tasks were most important.

Reading or studying took the longest for female and male students, with going to school a close second.
Female students were more likely than male students to cook or help prepare and serve food, to fetch water and wood.
Male students were more likely than female students to play with friends, buy things for the household, and look after animals.

What thing takes the most time on most days?



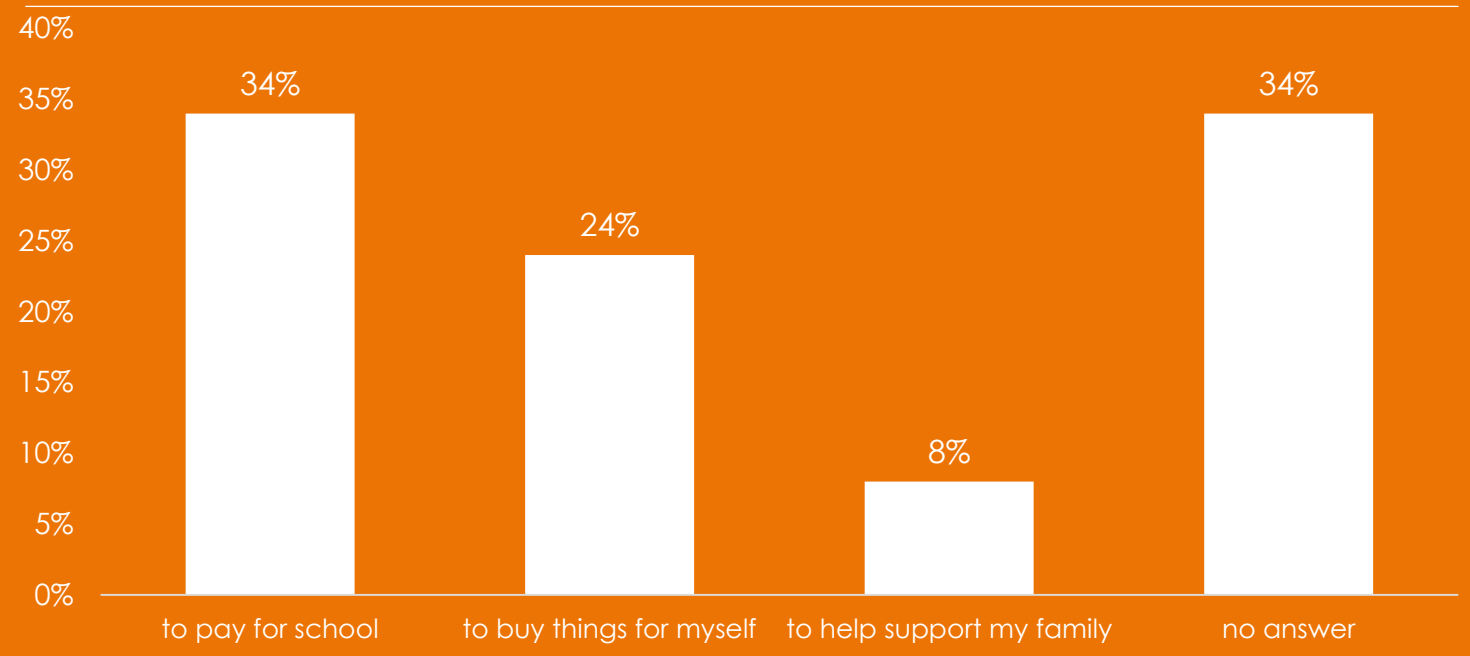
EARNING MONEY

We asked questions to see whether students worked to earn money and the purpose behind that. This data, of course, like the rest, is self-reported.

67%
of students reported that they work on most days to earn money (73% male vs. 61% female)

34%
of students who work earn money to pay for school

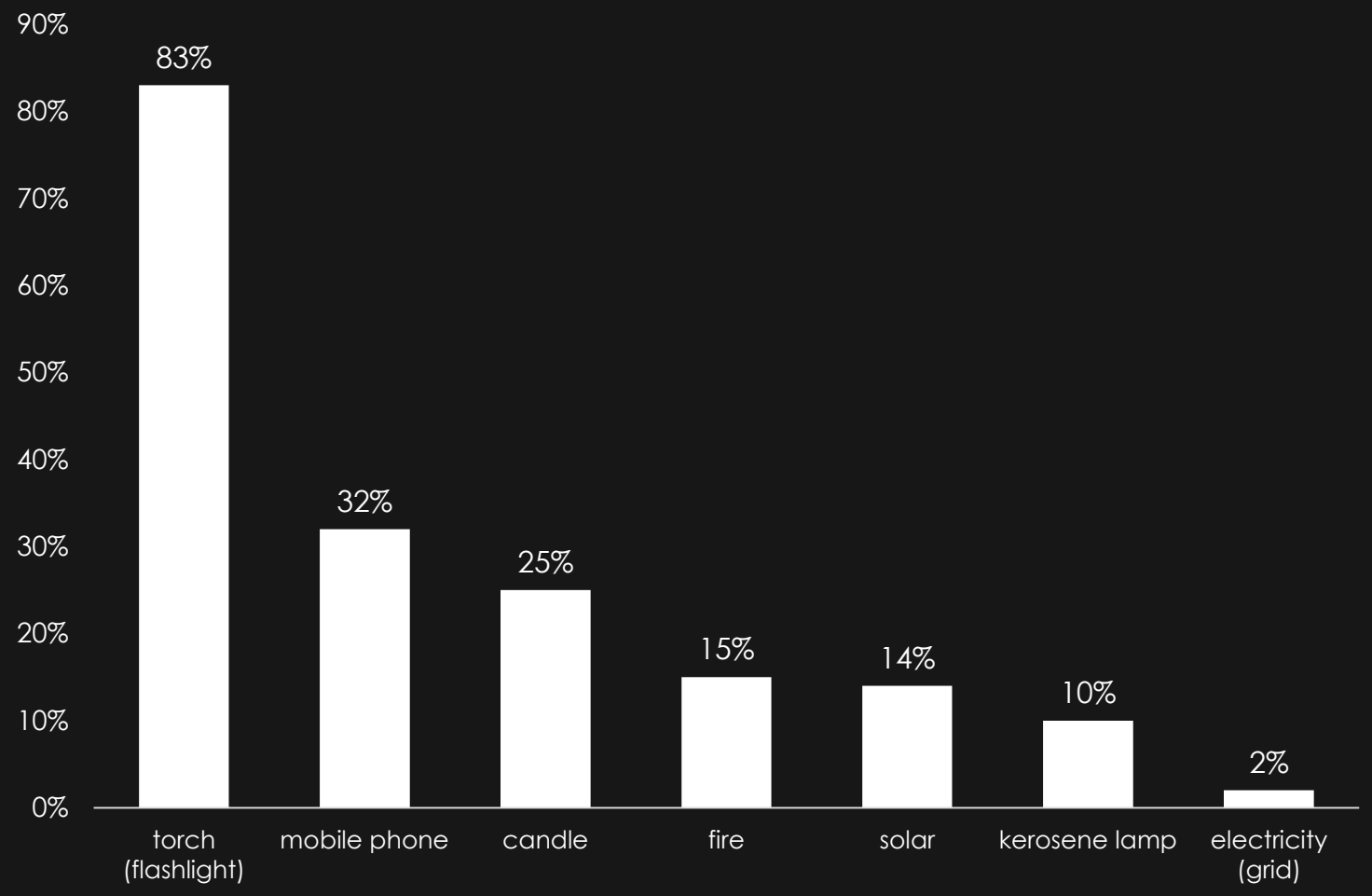
What was the main reason for students working to earn money?



HOUSEHOLD LIGHTING

We asked questions to see what lighting was used in the home.

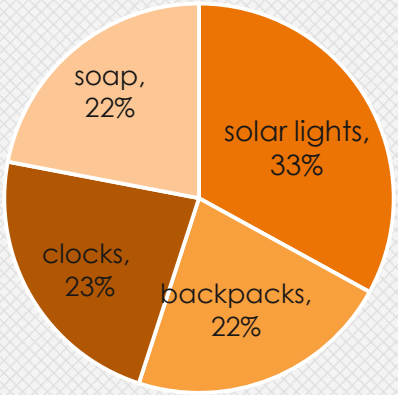
What types of lighting was used in the household?



STUDENT LOTTERIES
(MAY 2016)

LOTTERIES

BREAKDOWN OF PRIZES



1. LOTTERY DELIVERY

In every school a lottery was run with students who participated in the survey. 3 of the 4 prizes were available at each school: a solar light, a backpack, a clock, a bar of soap.

In 3 of the 12 schools, no solar lights were given out. On average, 41% of students who had completed a survey got a prize.

2. STUDENT SELECTION

Students who had completed the survey were selected randomly to receive a prize. The lottery was advertised as a thank you for the students who completed the questionnaire. All students received something (40% got the prizes in the chart above, 60% got sweets).

3. LOTTERY APPROACH

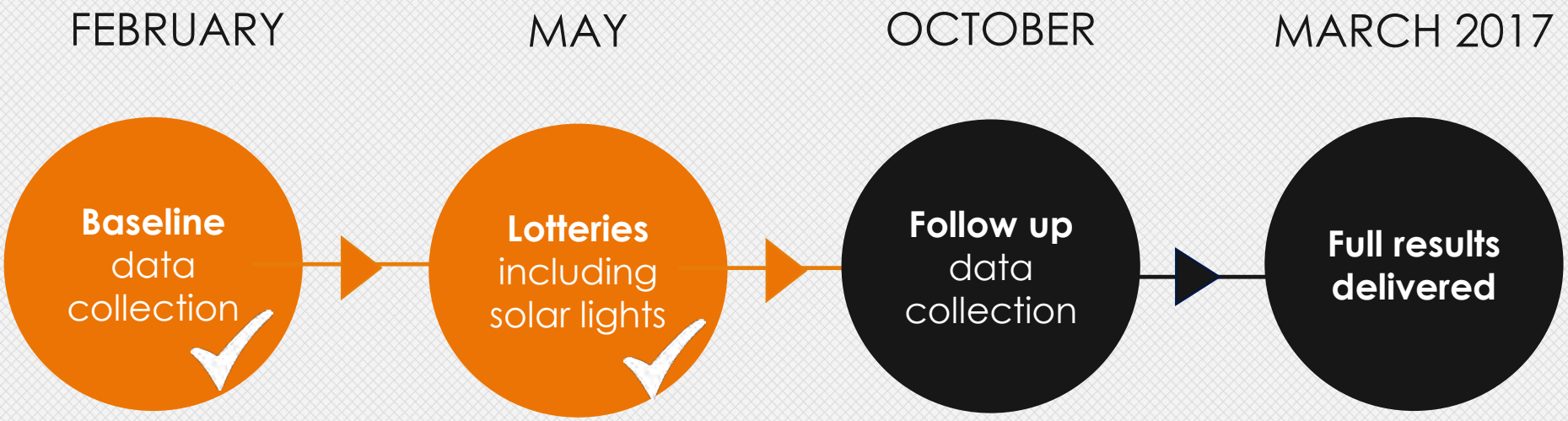
+ Method: students who completed a questionnaire were given a printed ticket which they put in a drawing bin. A district official supervised and participated.

+ Sample size: 690 students received prizes

+ Follow up: a member of the research team are following up with students who won solar lights each month to ensure they're working.

NEXT STEPS: FOLLOW UP

The next stage of the research is to revisit schools and conduct almost identical questionnaires with students who completed in the baseline to identify any changes.
The endline data collection is ongoing. The results of the two questionnaires will then also be mapped to students' individual school records (term marks and attendance), as well as their national examination scores for Grades 7 and 9. These are the primary variables that will be used in econometric models to assess whether there is preliminary evidence that the lights impacted educational outcomes. The clean-up and integration of such data is targeted for completion by February 2017. A detailed analysis and report is targeted for March 2017 which will present the results of this pilot study and evaluate the prospects and feasibility of scaling-up the effort to undertake a more comprehensive investigation of the way in which solar lights are used by students for studies and other daily activities.



REACH OUT WITH ANY QUESTIONS

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ACUMEN
THE AMBITION TO LEARN AT THE EDGE, THE WISDOM TO ADMIT FAILURE, THE COURAGE TO START AGAIN