

Uganda: Factors Affecting Student Learning in Primary School

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April 2023

Estimates from the World Bank (2021) suggest that 83 percent of 10-year-old children in Uganda may not be proficient in reading (the estimate includes out-of-school children). This means that they are considered as “learning poor”. National student assessments also suggest low levels of proficiency for students in primary and secondary schools. This situation is likely to have been exacerbated by the COVID-19 pandemic that led to school closures for two years. What can be done to improve student learning? This brief provides tentative answers based on an analysis of a Service Delivery Indicators (SDI) survey. The analysis looks at student performance on tests for English, numeracy, nonverbal reasoning, and the student’s overall score for the three dimensions combined. Explanatory factors include a wide range of school, teacher, child, and community characteristics. The analysis also permits a comparison of student performance by type of school.

Student performance in primary school is low

This brief relies on data from the Service Delivery Indicators (SDI) survey implemented in 2013 to look at some of the factors affecting student learning. While the survey is dated, it is still useful, including as baseline for future analysis. The survey was implemented in the same year as the SACMEQ IV assessment (data from SACMEQ V were not yet available at the time of writing). The SDI



Background: This brief was prepared for a KIX Africa 19 Hub national policy dialogue in Uganda with a focus on inclusive education. KIX (Knowledge and Innovation Exchange) Africa 19 contributes to education systems strengthening in African anglophone countries by bridging the gap between research and policy making. With support from the Global Partnership for Education and Canada’s International Development Research Center, KIX Africa 19 is managed by UNESCO IICBA.

Key findings: Using data from a SDI survey, this brief analyzes the correlates of student performance in primary school for language, mathematics, and non-verbal reasoning.

- At the school level, higher pupil-teacher ratios are associated with lower student performance, but surprisingly in most cases this is not observed for teacher absenteeism. A parent teacher association or school management committee also does not make much of a difference in most cases. By contrast, a better school environment is associated with higher student performance and students in private schools do better than those in public school, although this may not reflect differences in school performance given the possibility of sample selection.
- At the level of teachers, older teachers are associated with lower student performance, but a higher proportion of female teachers is associated with higher scores, a finding also observed in francophone Africa. Teacher behavior does not have a clear impact, but teacher knowledge of the material being taught does.
- At the level of children, older children tend to do worse, which is not surprising given that this may reflect past repetitions or a late entry in primary school. Girls tend to do less well than boys, which may contribute to gender inequality. Children who had breakfast at home, a sign of socio-economic well-being, tend to do better.
- Where a child lives also makes a difference. Students from richer areas tend to do better, and children in the Central region and in Kampala tend to do better than those in the Northern and Western regions. Controlling for those variables, living in an urban area does not make a statistically significant difference versus a rural area.

survey was part of a multi-country initiative to benchmark the performance of schools and health facilities in Africa. It provides information on both public and private schools and health facilities. For primary schools, the survey was implemented in 400 facilities. The assessment of teacher knowledge and pedagogy was conducted for 2,197 teachers. Absenteeism was measured for 3,806 teachers. Student assessments were conducted for 3,966 students for English, mathematics, and non-verbal reasoning.

This brief is adapted from Tsimpo and Wodon (2021). It focuses on the performance of primary school students on tests for English, numeracy, nonverbal reasoning, and the student's overall score for the three dimensions combined. As shown in Table 1, on a scale of 100, the average performance of students in fourth grade (P4) was at 46.2 for English, 43.4 for numeracy, 56.9 for non-verbal reasoning, and 46.6 overall. These estimates are low, with most students not meeting basic proficiency standards (this is also the case in other African countries; for a cross-country analysis of the SDI surveys, see Bold et al., 2017).

Table 1: Student Performance by Topic, SDI Survey

	Score out of 100
Language – mean value	46.2
Mathematics – mean value	43.4
Non-verbal reasoning – mean value	56.9
Overall score – mean value	46.6

Source: Authors' estimation, based on 2013 SDI survey.

A wide range of factors affect student performance

Multiple factors may affect the ability of children to learn in school, including child, family, teacher, and school level characteristics. The variables used for analyzing the correlates of test scores are listed in Table 2 with their mean value. One interesting feature of the data is that it is feasible to compare public and private schools, as well as Catholic and other schools (a large share of primary schools in the country are Catholic public schools).

To assess the association between the environment in which students learn and their performance, an index for the classroom environment was created based on a factorial analysis using a wide range of variables. The index was scaled to take a value between zero and one. A value of zero indicates that conditions in the classroom are at the bottom of the values in the sample. A value of one indicates that conditions are the best in the sample. Information is also available on the location of schools (urban versus rural location, as well as actual location with the analysis considering Uganda's regions). In addition, the level of poverty of the geographic area where a school is

located is accounted for according to a ranking of districts from the poorest (bottom quintile) to the richest (top quintile).

In terms of teacher characteristics, five variables are considered. The first two are the teacher's age (and its squared value) and gender. The next two are measures of teacher knowledge in English and mathematics. These measures are based on a test administered to teachers for the survey. In addition, an index of teaching quality or pedagogy is constructed using answers to a wide range of questions. Again, this index has been normalized to take a value between zero and one as done for the classroom environment index. In terms of child characteristics, the independent variables include the age (and its squared value) and the sex of the child, as well as whether the child has breakfast at home. Unfortunately, data are not available on household wealth or poverty, but this is partially compensated by data on the level of socio-economic development of the district as mentioned above.

Key findings from the regression analysis (hierarchical model) are provided in Table 2. Coefficients not statistically significant at the 10 percent level are denoted by NS. The interpretation of coefficients is for most variables in percentage terms (see Tsimpo and Wodon, 2021, for details). The focus here is on a qualitative analysis of the main findings.

For school characteristics, higher pupil-teacher ratios are associated with lower student performance, as expected. Surprisingly, whether a larger share of teachers are present or not in the school (school absenteeism rate) or in the classroom (classroom absenteeism rate) does not have a statistically significant impact on student performance, although there is only one exception for mathematics. The fact that the school may have a parent teacher association or a school management committee in most cases does not seem to make much of a difference for student performance, except for non-verbal reasoning. Perhaps the existence of such mechanisms of school governance matters less than how well they work in practice, which is not measured in the survey. The same can be said of the number of school inspections, which in most cases do not seem to matter, or at least not systematically so. By contrast, a better school environment is associated with higher student performance in English, mathematics, and the overall score (although not for non-verbal reasoning).

There is evidence that students in private schools, whether Catholic or not, perform better than those in public schools, Catholic or not. By contrast, there are no statistically significant differences in scores between public Catholic and non-Catholic schools, and between

private Catholic and non-Catholic schools. It is important to note that these results do not imply that private schools perform better than public schools. There may be selection bias affecting school choice. In the absence of experimental data, causality cannot be inferred in terms of the impact of school placement on performance. Still, on average students in private schools perform better than those in public schools after controlling for many characteristics of the schools, their teachers, and the students.

Older teachers are associated with lower student performance, although the effect is not linear. A higher proportion of female teachers is associated with higher test scores for language and a higher overall score, a

finding that has also been observed with PASEC data for francophone African countries. The index of teacher behavior which measures aspects related to pedagogy in the classroom does not have statistically significant impacts, although teacher knowledge does. A higher score for teacher knowledge related to English is associated with higher test scores for students in English, but not in mathematics. Higher teacher knowledge in mathematics is associated with better student performance in mathematics, but not in English. There is also a positive effect from a higher mathematics score for teacher on student's performance in non-verbal reasoning, while the score of the teacher for knowledge in English is associated with a higher overall score for students.

Table 2: Correlates of Student Performance, SDI Survey

	Language	Mathematics	Non-verbal reasoning	Overall score
School characteristics				
Pupil-teacher ratio	-0.001	NS	-0.001	-0.001
School absence rate	NS	-0.061	NS	NS
Classroom absence rate	NS	NS	NS	NS
There is a PTA	NS	NS	0.029	NS
There is a SMC	NS	NS	NS	NS
Number of inspections	NS	0.002	0.002	NS
Index classroom env.	0.193	0.064	NS	0.166
Type of school				
Public, not Catholic	ref.	ref.	ref.	ref.
Public, Catholic	NS	NS	NS	NS
Private, not Catholic	0.094	0.064	NS	0.087
Private, Catholic	0.168	0.089	NS	0.151
Teacher characteristics				
Teacher's age (average)	-0.029	-0.015	NS	-0.026
Teacher's age squared	0.000	0.000	NS	0.000
Proportion female	0.058	NS	NS	0.048
Index teacher behavior	NS	NS	NS	0.058
Teacher's score English	0.150	NS	NS	0.131
Teacher's score math	NS	0.089	0.069	NS
Child characteristics				
Age	-0.031	NS	-0.006	-0.026
Age squared	0.000	NS	NS	0.000
Girl (vs. boy)	-0.016	-0.031	-0.017	-0.019
Has breakfast	0.029	NS	NS	0.023
Location and Region				
Urban area (vs. rural)	NS	NS	-0.033	NS
Central	ref.	ref.	ref.	ref.
Eastern	-0.179	-0.077	-0.079	-0.160
Kampala	NS	NS	NS	NS
Northern	NS	-0.060	-0.100	-0.082
Western	NS	NS	-0.035	NS
Area Wealth				
Poorest	ref.	ref.	ref.	ref.
Quintile 2	NS	-0.039	NS	NS
Quintile 3	NS	NS	NS	NS
Quintile 4	0.128	NS	-0.078	0.100
Richest	0.107	NS	-0.061	0.083

Source: Authors' estimation, based on 2013 SDI survey.

Older children tend to do worse, which is not surprising given that a higher age may reflect repetitions or a late entry in primary school, but the squared term reduces the negative effect for the oldest children. Girls tend to do less well than boys across the board. Whatever the reasons for those differences, they may contribute to a smaller share of girls completing primary school, and especially completing primary school with marks in the final examination that would enable them to continue at the secondary level. Children who have a breakfast at home, a sign of socio-economic well-being, tend to do better when effects are statistically significant, which is the case for English and the overall score.

Where a child lives also makes a difference. Controlling for other characteristics, students from richer areas tend to do better, at least for English and the overall score (the only exception is a curious negative effect for non-verbal reasoning in the top quintiles of areas). Children in the Central region and in Kampala tend to do better than those in the Northern and Western regions. Controlling for those variables as well as the school, teacher, and child characteristics included as independent variables, living in an urban area does not make a statistically significant difference versus a rural area.

Takeaways

The objective of this brief was to share findings from an analysis of the correlates of student learning in primary school in Uganda based on data from a Service Delivery Indicators survey. Results are pretty much in line with expectations. Improvements in the classroom environment and the knowledge base of teachers could bring gains in student performance. Having more female teachers could also help, as could a reduction in pupil-teacher ratio, although this may be costly to achieve in terms of budgetary resources. Strengthening the inspection regime could bring gains, but the evidence to that effect is slim. Similarly, the existence of PTAs and SMCs may not make a large difference despite efforts at reforming school governance. The findings should be considered as tentative, especially as the analysis is based on data from a decade ago, but they seem broadly in line with the broader literature on what may affect student learning in Uganda and many other countries in Africa.

Disclaimer & Acknowledgment

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