

The State of Schooling in Africa: A *LAYS* Perspective

Abraham Raju

Abstract—Filmer et al. [1] introduced the Learning-Adjusted Years of Schooling (LAYS) to augment the previously oft-used metric of Expected Years of Schooling (EYS) as a major education outcome. I use the LAYS framework to draw conclusions on the current state of schooling in Africa and broadly compare it to other regions, showing the region lags behind (income) comparable regions in learning. Low-income African countries experience poor learning outcomes driven by the poor quality of education, unalleviated through increased quantity. I briefly discuss the challenges and opportunities that improving learning outcomes entails in the region. I also review evidence on effective solutions to improving learning and teaching quality. A deeper understanding of the challenges in the African subcontinent requires a disaggregated study of countries, tribes and communities within and socio-economic circumstances.

Index Terms—Education; LAYS; Learning; Development.

1 INTRODUCTION

Expected Years of Schooling (EYS), i.e., the average number of years of schooling a child is expected to receive, is customarily used as a measure of education, especially in low-middle-income countries (LMICs); however, this metric is often reductionist as it fails to consider the reality on the ground. In light of this, Filmer et al. [1] developed the *Learning-Adjusted* Years of Schooling (LAYS). The measure provides a universally comparable macro-measure, using cross-country variation in standardized test scores to account for differences in quality of learning. To illustrate its differences, Crawford et al. [2] find that while the average years of schooling in Eswatini and Ghana are 8 years and 12 years respectively, both translate to only 5.5 LAYS.

While education in Africa has undergone significant improvements, it still performs poorly compared to countries that lie at the bottom of the income distribution [3]. A 2017 study [9] shows that less than two out of three African students could read a letter, and of them, only half could read a word; therefore, an important policy concern is the quality of education in Africa. Even after several years of schooling, many students are illiterate or lack basic numeracy skills [9]. This is why using EYS to study the state of education can lead to misleading (policy) inferences, especially in cases where poor quality learning is masked through more years of schooling; thus, on top of LAYS offering better inter-regional comparison, it is a better measure of the pedagogic state of Africa.

In this brief, I use LAYS, EYS, lower-secondary completion rates and economic outcomes to robustly summarize the trends in quality and quantity of schooling in Africa, contrasting it to other similar regions.

2 THE STATE OF SCHOOLING IN AFRICA

Across countries, between 1999 and 2019, the median of children completing primary school has risen from 35% to 53.9% (Figure 1); the median of children completing lower-secondary school has also risen dramatically, from a mere 5% in 1971 to 40% in 2015[3]. Within-regional differences are present, with North Africa faring better across LAYS and EYS (Figure 2) than most of Africa. North African countries such as Algeria, Morocco and Egypt, on average, fare better with 2.5 years more of EYS. The learning adjustment, i.e., the average difference between EYS and LAYS of the same countries, was -4.5 years in 2020. This difference persists in even significantly poorer countries such as the Congo (-4.6 years) and South Africa (-4.6 years). This points to a stark finding. That although higher-income countries in Africa such as Algeria, Morocco and even Kenya offer more schooling, their quality of education is still relatively low. This indicates the quality of education is independent of the income distribution, which is deceptively mitigated by the efforts of some countries to increase years of schooling, albeit of poorer quality.

The within-region difference is also evident in Figure 4, which points to a direct correlation between received learning and GDP. The plot shows that GDP is a strong correlative of LAYS, with Sub-saharan countries faring worse along LAYS than the Middle East & North African region. Important channels to explore also include (1) colonial origins [3], e.g., the data shows that former British colonies such as Kenya, South Africa and Egypt fare better in schooling, at least in terms of quantity [6] and (2) variations in intensity of colonial slave trade e.g., in Nigeria and Ghana, there are persistent systemic differences in development, literacy and education [10] as a result of this.

• Msc. Economics, Department of Economics, University of Bonn, E-mail: abrahamrajuoyola@gmail.com

3 AFRICA AND THE WORLD: HOW DOES THE REGION COMPARE?

Differences are economically stark. On average, students can expect to receive 6 fewer years of adjusted learning in Sub-Saharan Africa than they would in North America (Figure 3). To provide perhaps a better comparison, I compare Africa to other countries that lie in the same area of the income distribution, as shown by Figure 5. Expected Years and Learning-Adjusted Years of schooling are lower in African countries compared to non-African low-income countries such as Ukraine, Vietnam and Sri Lanka. Sub-Saharan low-income countries, on average, receive 4.1 years of Adjusted Learning compared to the 6.7 years in European low-income countries. Similar studies side with these findings e.g., [11]. Middle eastern and North African EYS and LAYS are statistically similar.

Angrist et al. [7] uses a fixed effects regression to arrive at regional time-trends in Harmonized Learning Outcomes (HLO) or universally comparative test scores. HLO is key to calculating LAYS and the Human Capital Index and can be visually explored [here](#). For Africa, there is a clear indication of improvement in predicted HLO by 16 points over the last 15 years, which approaches the 20-point advance that Europe and Central Asia have achieved; however, this rate of increase is still marginal, and there is no indication of an endogenous improvement that would close the large gap between Africa and more developed regions. A key observation unaddressed to explain this is the relatively lower primary enrollment rate in Africa. The primary enrollment rates for the Sub-Saharan region has large dispersion, with rates between 30% and 90%, while other regions have primary enrollment rates concentrated above 80%¹.

4 CHALLENGES TO IMPROVING SCHOOLING IN AFRICA: WHAT DOES RESEARCH SAY?

The challenges in Africa surveyed in academia are (1) getting teachers to teach better (2) socio-economic circumstances and (3) mismatched incentives. Pressure to improve enrollment has led to a generation of poor quality teachers who are underpaid and underqualified. The increased push to drive up enrollment has led to improvement in EYS, but masks intrinsic learning deficiencies [8].

Beside poor quality teachers, socioeconomic circumstances are the most significant predictor of schooling performance. Poorer students are caught in a 'nexus of disadvantage' [12] as they enter the educational system already disadvantaged due to poor nutrition and low cognitive stimulation. This disadvantage snowballs into a widening chasm of learning disparity into later years as they pass through a poor, ill-equipped education system. Gender, ethnicity and location explain most of the remaining variation in educational outcomes.

Lastly, mismatched incentives or unaligned interests within a system allow for inefficiencies in the delivery of quality education. Specifically, teachers, bureaucrats, and private suppliers have mismatched incentives. Teachers seek to protect their employment; bureaucrats want to keep politicians happy and private suppliers their profit margins.

These incentives often lead to deterioration in learning outcomes in Africa [21] by promoting some of the policies above (e.g., pushing quantity over quality).

5 IMPROVING LEARNING IN AFRICA : WHAT WORKS?

Improving the quality of education has been proven to lead to varied benefits. Not only does it improve income and consumption, but also create general equilibrium benefits, growing the economy as whole. Equitable improvement in education can also decrease the risk of internal strife. Better educated women in Africa are also shown to be better able to negotiate for life saving healthcare [?].

Suggestions to improve the median quality of learning include switching to a native language-based curriculum [17], constructing more schools [18] and utilizing technology in the classroom such as phone-based apps [19]. All show promise of improving learning, but only marginally. In recent years, low-cost private schools have emerged as competitors for under-performing public schools in many African countries. There is however, debate about whether these schools actually deliver better-quality education and the implications for inequality [13].

No other factor is, however, as important as teacher quality once the students arrive in school. Research shows that a 'good' teacher can improve understanding of the curriculum by as much as 50% while 'great' teachers can lead to an average improvement of 1.5 grade levels [23]. Preparation and incentive contracts for teachers is key to improving educational outcomes in Africa. Programs which aspire to do so have to consider unifying incentives. Contemporary research recommends providing financial rewards or incentives to teachers, offering professional rewards to improve intrinsic satisfaction and recognition, better working conditions and enhancing accountability as an effective solution to improving learning outcomes [20].

6 CONCLUSION

The EYS measure often leads to mismatched policy incentives to 'pump the numbers' by simply increasing the number of students and the length of their stay in poor quality schools. LAYS is an effective metric in distinguishing between quality and quantity of education in Africa, and contributes to more informed micro- and macro-policy decisions.

However, LAYS cannot be used in isolation to measure individual welfare even as it dramatically improves on other metrics such as EYS, enrollment or school completion. Irrespective of learning, schooling can improve income and consumption through improved networks and access to better employment. A robust study on educational outcomes in Africa should consider variations within country and community level and tackle the socio-economic circumstances of students, which is the best predictor of academic performance. The educational heterogeneity within Africa is a result of not only the present, but also the past and hence requires sensitivity to the socio-anthropological context and colonial origins. Policy reforms in the region should consider the variations in cultural, social and economic conditions across countries and best aim at matching incentives between different stakeholders to improve education in Africa.

1. Author calculation from data made available by Angrist et al. [7]

REFERENCES

- [1] Deon Filmer, Halsey Rogers, Noam Angrist, Shwetlena Sabarwal, Learning-adjusted years of schooling (LAYS): Defining a new macro measure of education, *Economics of Education Review*, Volume 77, 2020, 101971, ISSN 0272-7757.
- [2] Lee Crawford, Susannah Hares, Alexis Le Nestour and Jack Rossiter, Does Education Need a QALY and Is LAYS It?, Center for Global Development Blog, 2019, accessible at <https://www.cgdev.org/blog/does-education-need-qaly-and-lays-it>
- [3] David K Evans, Amina Mendez Acosta, Education in Africa: What Are We Learning?, *Journal of African Economies*, Volume 30, Issue 1, January 2021, Pages 13–54, <https://doi.org/10.1093/jae/ejaa009>
- [4] Bold, T., Filmer, D., Martin, G., Molina, E., Stacy, B., Rockmore, C., Svensson, J., and Wane, W. (2017). Enrollment without Learning: Teacher Effort, Knowledge, and Skill in Primary Schools in Africa. *Journal of Economic Perspectives*, 31(4), 185–204. <https://doi.org/10.1257/jep.31.4.185>
- [5] Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review*, 91 (5): 1369-1401.
- [6] Dupraz, Yannick (2013), "British and French Colonial Education in Africa: A Spatial Discontinuity Analysis at the Border between French-Speaking and English-Speaking Cameroon", Mimeo, Paris School of Economics.
- [7] Angrist, N., Djankov, S., Goldberg, P.K. et al. Measuring human capital using global learning data. *Nature* 592, 403–408 (2021). <https://doi.org/10.1038/s41586-021-03323-7>
- [8] Kremer, Michael, Brannen, C., Glennerster, R. 2013. "The Challenge of Education and Learning in the Developing World." *Science* 340(6130):297–300.
- [9] Bold, Tessa, Filmer, Deon, Martin, Gayle, Molina, Ezequiel, Stacy, Brian, Rockmore, Christophe, Svensson, Jakob, Wane, Waly. 2017. "Enrollment without Learning: Teacher Effort, Knowledge, and Skill in Primary Schools in Africa." *Journal of Economic Perspectives* 31(4):185–204.
- [10] Nonso Obikili, The Impact of the Slave Trade on Literacy in West Africa: Evidence from the Colonial Era, *Journal of African Economies*, Volume 25, Issue 1, January 2016, Pages 1–27, <https://doi.org/10.1093/jae/ejv018>
- [11] Pritchett, Lant. 2013. *The Rebirth of Education: Schooling Ain't Learning*. Washington, DC: Center for Global Development.
- [12] Spaull, Nicholas, Kotze, Janeli. (2015). Starting behind and staying behind in South Africa. *International Journal of Educational Development*. 41. 10.1016/j.ijedudev.2015.01.002.
- [13] Grant, Monica J. 2017. "De Facto Privatization and Inequalities in Educational Opportunity in the Transition to Secondary School in Rural Malawi." *Social Forces* 96(1):65–90.
- [14] Hanushek, Eric A., Luque, Javier A. 2003. "Efficiency and Equity in Schools around the World." *Economics of Education Review* 22(5):481–502.
- [15] Duflo E., Dupas P., Kremer M. (2015a) 'School Governance, Teacher Incentives, and Pupil-Teacher Ratios: Experimental Evidence from Kenyan Primary Schools', *Journal of Public Economics*
- [16] Mbiti I., Schipper Y. 'Teacher and Parental Perceptions of Performance Pay in Education: Evidence from Tanzania', *Journal of African Economies*. 2021
- [17] Piper, B., Zuilkowski, S. S., and Ong'ele, S. (2016c). Implementing Mother Tongue Instruction in the Real World: Results from a Medium-scale Randomized Controlled Trial in Kenya. *Comparative Education Review*, 60(4), 776–807. <https://doi.org/10.1086/688493>.
- [18] Kazianga H., Linden L. L., Protik A., Sloan M. (2019) 'The Medium-Term Impacts of Girl-Friendly Schools: Seven-Year Evidence from School Construction in Burkina Faso', National Bureau of Economic Research, (working paper no. 26006). <https://doi.org/10.3386/w26006>.
- [19] Jere-Folotiya, J., Chansa-Kabali, T., Munachaka, J. C., Sampa, F., Yalukanda, C., Westerholm, J., Richardson, U., Serpell, R., and Lyytinen, H. (2014). The Effect of Using a Mobile Literacy Game to Improve Literacy Levels of Grade One Students in Zambian Schools. *Educational Technology Research and Development*, 62(4), 417–36. <https://doi.org/10.1007/s11423-014-9342-9>
- [20] Vegas, E., and I. Umansky. 2005. "Improving Teaching and Learning through Effective Incentives." In *Incentives to Improve Teaching: Lessons from Latin America*, edited by E. Vegas, 21–62. Washington, DC: World Bank.
- [21] The World Development Report 2018 (WDR 2018)—LEARNING to Realize Education's Promise <https://www.worldbank.org/en/publication/wdr2018>
- [22] Brookings Institute 2015, 'What Works in Girls' Education: Evidence for the World's Best Investment', <https://www.brookings.edu/book/what-works-in-girls-education-evidence-for-the-worlds-best-investment/>
- [23] Bruns, Barbara; Luque, Javier. 2015. *Great Teachers : How to Raise Student Learning in Latin America and the Caribbean*. Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/20488> License: CC BY 3.0 IGO.

APPENDIX

LOWER SECONDARY COMPLETION RATE ACROSS REGIONS (2020)

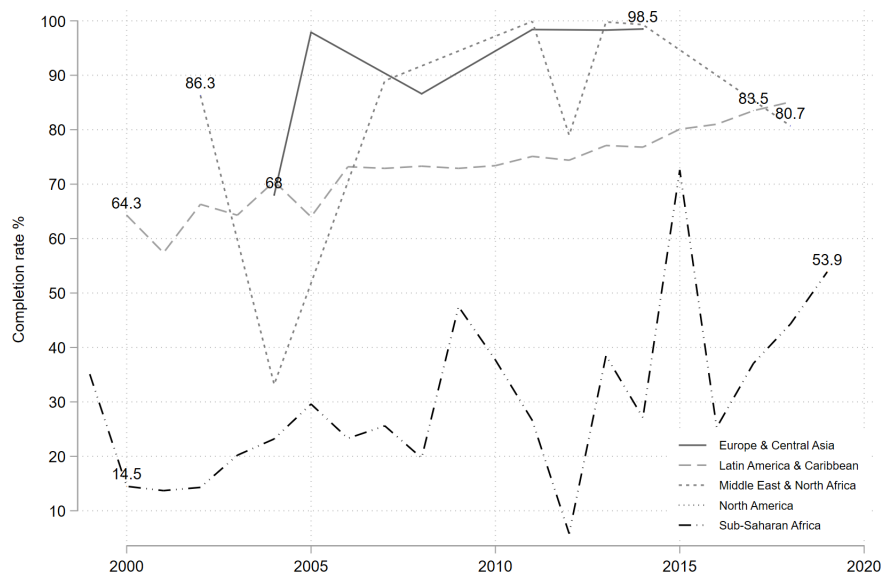


Figure 1: Author tabulation using using data from the World Bank (2020). Lower secondary completion rate, total (% of relevant age group), is calculated as the number of new entrants in the last grade of lower secondary education, regardless of age, divided by the population at the entrance age for the last grade of lower secondary education. The underlying data is missing in several years and countries, therefore, the lines join across median completion rates within each region.

LEARNING-ADJUSTED YEARS OF SCHOOLING IN AFRICA (2020)

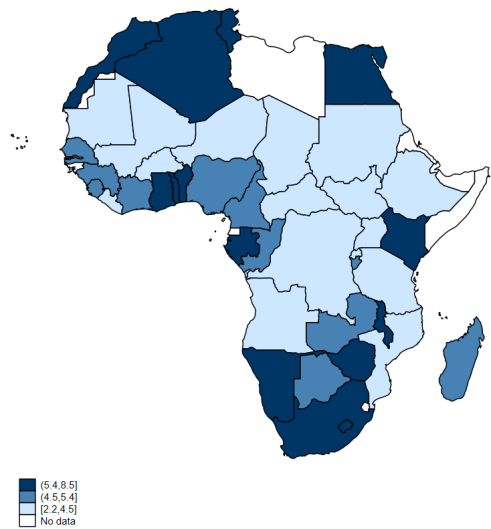


Figure 2: Author tabulation using data from the World Bank (2020).The data uses Learning-Adjusted Years of Schooling (LAYS) as constructed according to the methodology of Filmer et. al [1]. LAYS data is unavailable for Somalia, Djibouti, Eritrea and Libya in 2020. Darkest blue areas represent the highest tertile of LAYS which includes South Africa, Algeria, Morocco and Kenya. The lowest tertile includes Niger, Congo and Ethiopia.

EXPECTED YEARS VS. LEARNING-ADJUSTED YEARS OF SCHOOLING (2020)

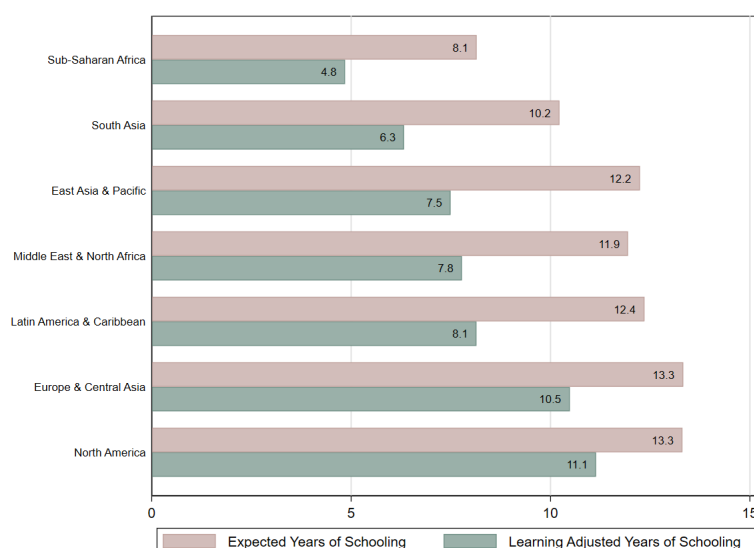


Figure 3: Author tabulation using data from the World Bank (2020): Human Capital Project. The bars represent median years of EYS and LAYS within each region.

LEARNING-ADJUSTED YEARS OF SCHOOLING VS LOG GDP PER CAPITA (2020)



Figure 4: Author tabulation using data from the World Bank (2020). GDP is represented as log of GDP per capita in US dollars. Only selected countries are labelled for legibility. Grey points represent countries excluding regions of Middle East and Africa.

HETEROGENITY IN LEARNING BETWEEN SEXES ACROSS REGIONS (2020)

	LAYS (Male)	LAYS (Female)	Difference	LAYS Adj. Difference
East Asia & Pacific	7.1	8.0	-.82	-.16
Europe & Central Asia	10.4	10.6	-.23	-.16
Latin America & Caribbean	7.7	8.3	-.61	-.04
Middle East & North Africa	7.5	8.24	-.63	-.59
North America	11.1	11.2	-.17	-.14
South Asia	5.7	6.2	-.47	.00
Sub-Saharan Africa	4.8	4.8	-.02	-.22

Table 1: Author tabulation using 2020 data from the World Bank. LAYS (Male) and LAYS (Female) represent median LAYS in 2020 for males and females respectively in each region. Difference represents the difference in medians. LAYS Adj. Difference is the difference between LAYS adjustment for males and or females. LAYS adjustment is the difference in median between LAYS and EYS. The table indicates that females on average have higher years of learning and learn more per year, but the difference is negligible.

EYS vs LAYS, AFRICAN LOW INCOME VS NON-AFRICAN LOW INCOME COUNTRIES (2020)

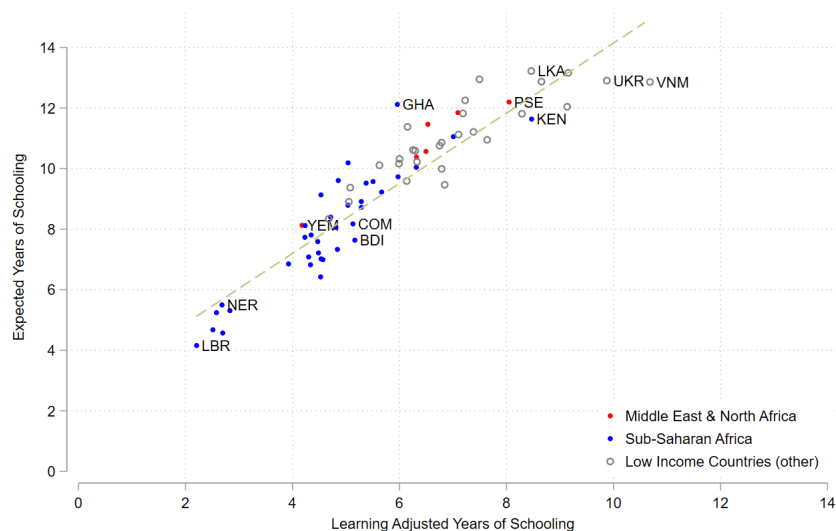


Figure 5: Author tabulation using 2020 data from the World Bank. The graph shows the relationship between Expected and Learning-Adjusted years of schooling for low and low-middle income African countries and low and low-middle income countries from outside Africa.