



What does data tell us about the education situations around the world?

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Report for
Monash University

1 June 2021

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Introduction

The purpose of this report is to analyse the different education situations across various regions and income groups using data collected from 2000 and 2019, there are four key aspects discussed in this report:

- Literacy rate of adults and youth
- Discuss the Government Expenditure on Education in percentage of GDP
- Percentage of primary-school-aged children out of school
- Pupil-teacher ratio

Data sets used in this report are provided by the World Bank, which are [Education](#) and [World Bank Country and Lending Groups](#). Both data sets falls under [Creative Commons Attribution 4.0 International license](#) and are allowed to use for analysis purpose of this report.

Literacy Rate

This section is to compare the literacy rate for adult and youth globally, regionally and in different age groups.

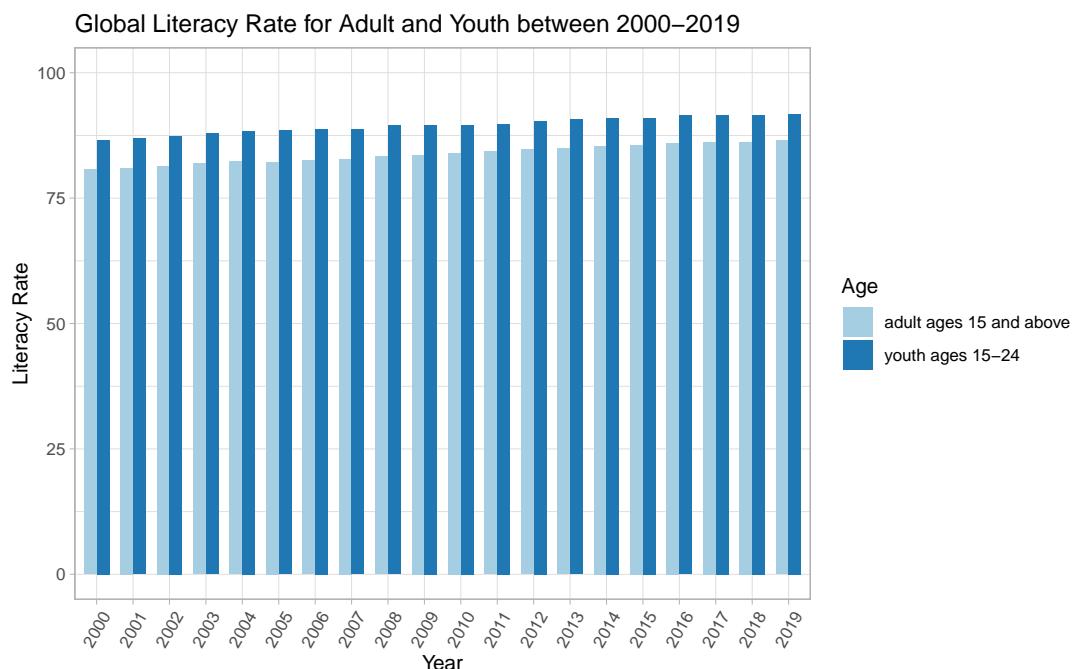


Figure 1: Global Literacy Rate for Adult and Youth between 2000-2019

Figure 1 shows that although the literacy rate for adult aged 15 and above is lower than the literacy rate for youth aged 15-24 in each year, both rates are showing a slow and steady increase over the years. The improvements in the expansion of basic education and the reduction of education inequalities have contributed to an increase in the global literacy rate, over the last 65 years it increased by 4% every 5 years (Roser and Ortiz-Ospina (2016)).

As the figure 2 shown below, there was a significant increase in the literacy rate for adult aged 15 and above in Middle East & North Africa, South Asia and Sub-Saharan Africa. South Asia and Sub-Saharan Africa also had improved the literacy rate tremendously in the youth age group over the years. Both East Asia & Pacific and Latin America & Caribbean had an 5% increase in literacy rate in the adult group where as the literacy rate increase approximately 4% in the youth group in Latin America & Caribbean and a small increase in the youth group in East Asia & Pacific. Regions like Central Europe and the Baltics and Europe & Central Asia had maintained a high literacy rate in both age groups over the years. Developed countries have better education facilities and system than developing countries, they tend to have higher literacy rate over the years.

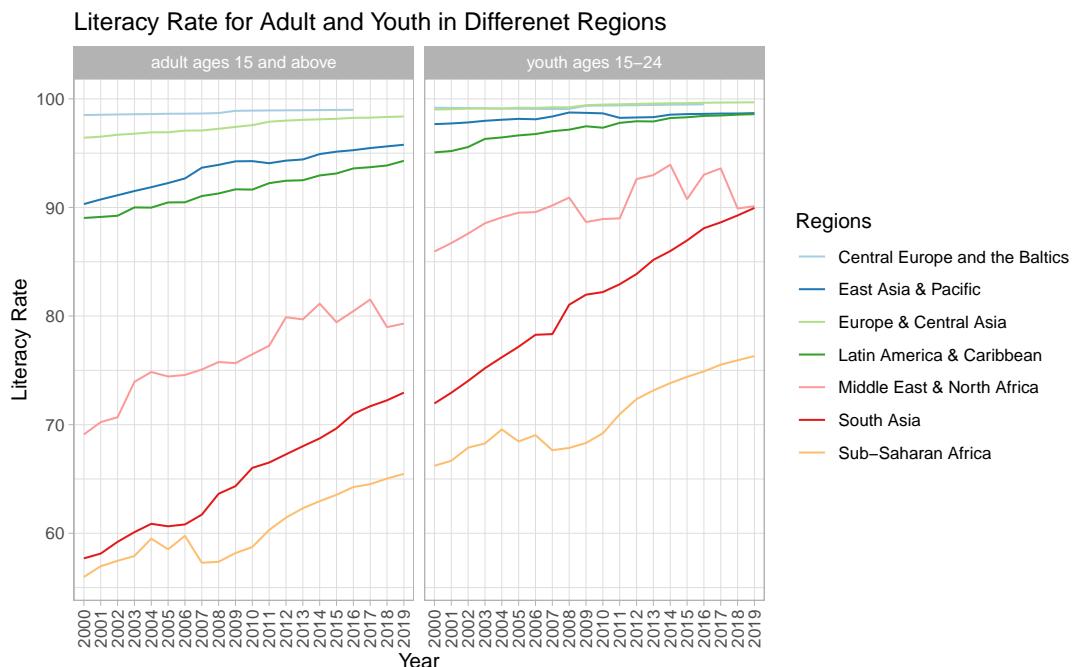


Figure 2: Global Literacy Rate for Adult and Youth between 2000-2019

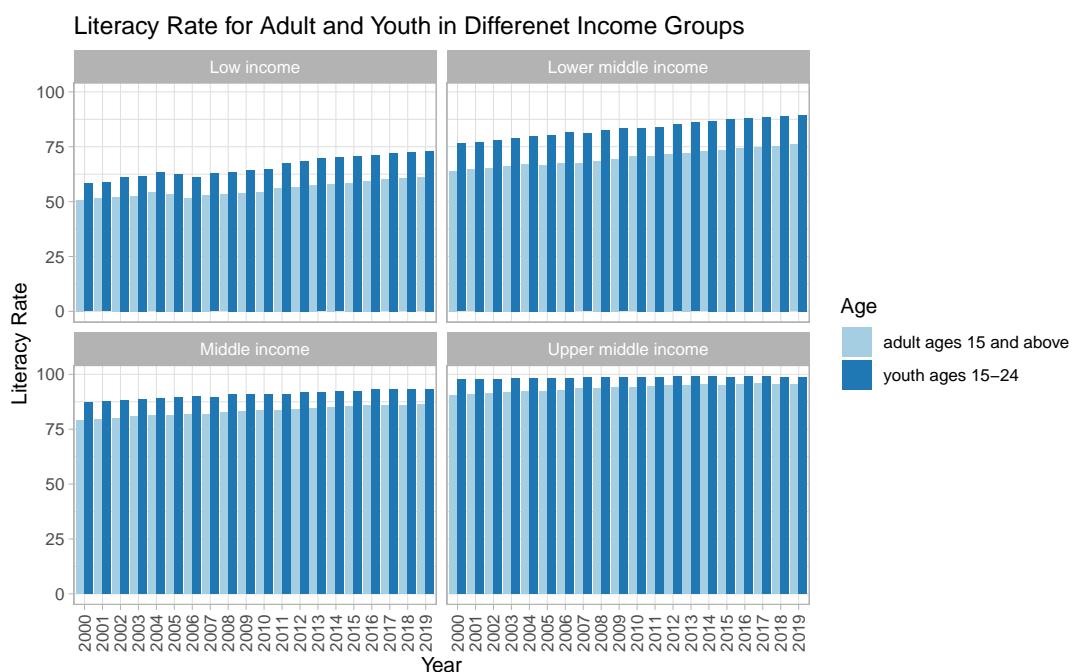


Figure 3: Literacy Rate for Adult and Youth in Different Income Groups

Figure 3 demonstrates that both adult and youth groups that have higher income tend to have higher literacy rate and all the income groups are showing an increasing trend in the literacy rate except for the upper middle income group had maintained a very high literacy rate over the years. It's pretty obvious that people have higher income are able to afford better education compare to those people with lower income.

Education expenditure trend over the world

In this section we will discuss education expenditure across different countries in time period of 2000 to 2019. The indicator we have chosen to analyze in this section is:

- Government expenditure on education, total (% of GDP).

General government expenditure on education (current, capital, and transfers) is expressed as a percentage of Gross Domestic Product (GDP). It includes expenditure funded by transfers from international sources to government.

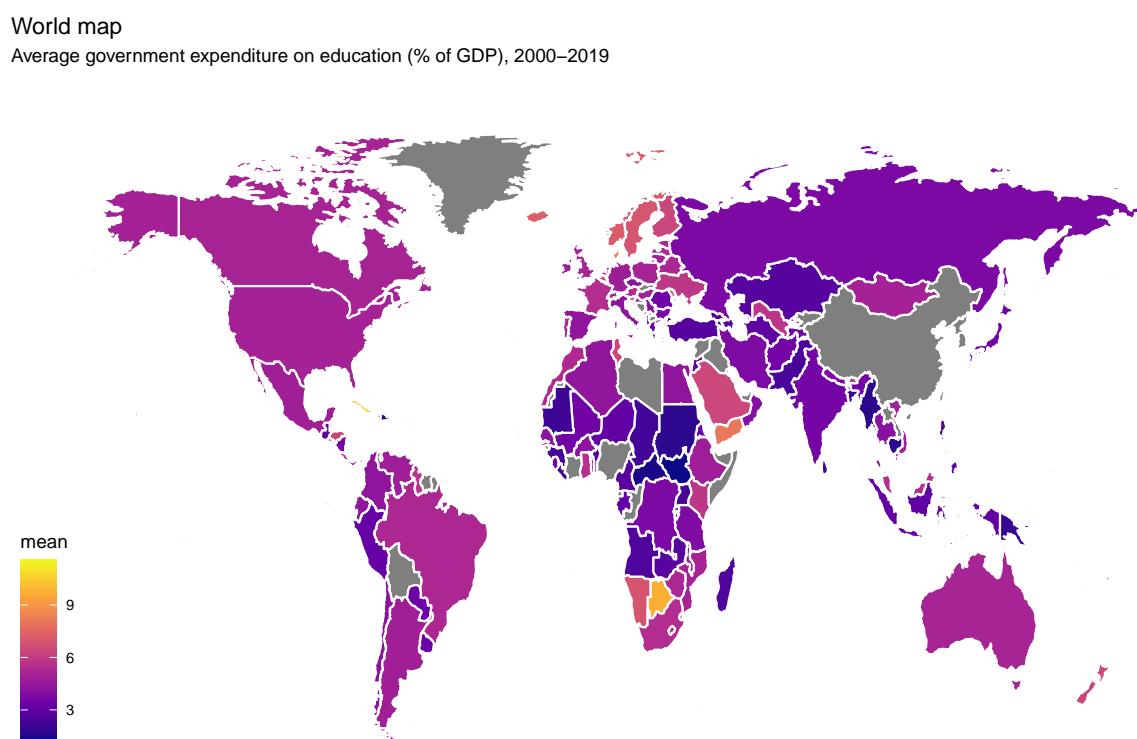


Figure 4: Average government expenditure on education (% of GDP), 2000-2019

Figure 4, provides an overview of spending on education by country. To produce the figure, we calculated average spending over the time period for each country. The average government spending on education across countries ranged between 1.2% - 11.5% of their GDP.

Then we looked at the government expenditure on education by income group over time in Figure 5. What evident on the graph is that the low income countries have devoted much lesser proportion of their GDP but also we can see that spending has increased on average for those countries. On the other hand, high income countries spending more share of their GDP roughly between 4.5% to 5%. However the data had many missing values, a broad upward trend can be observed from the Figure 5.

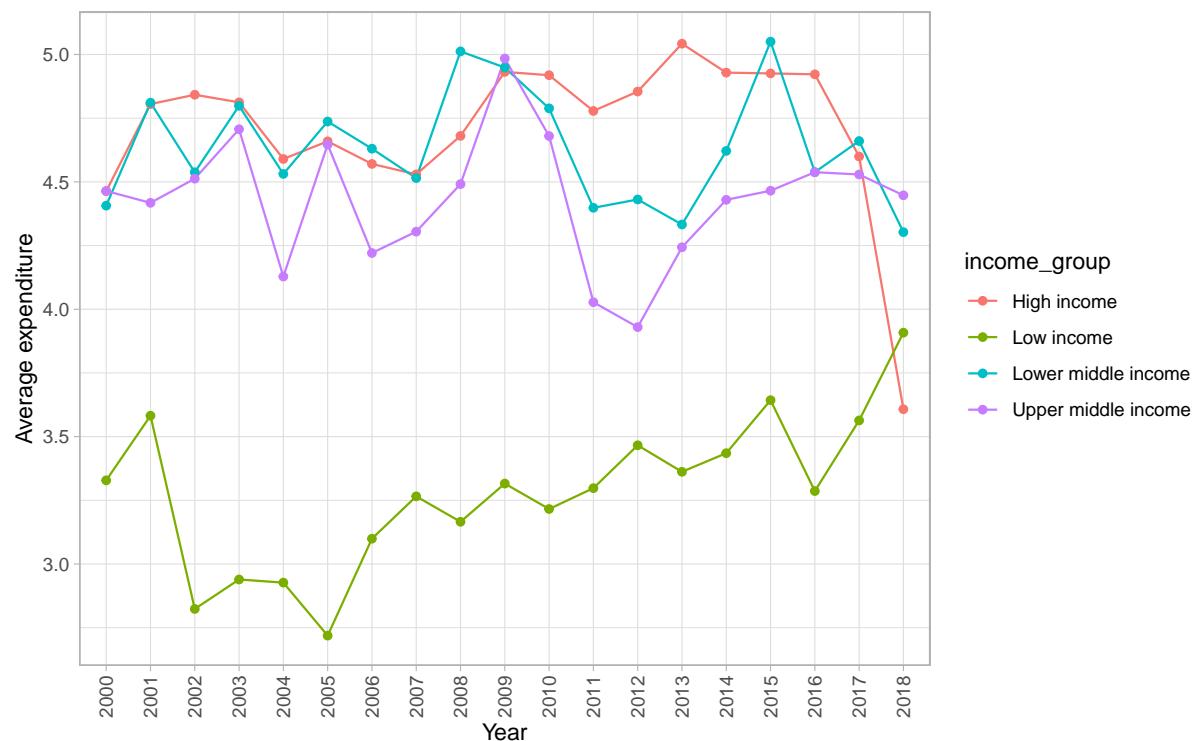


Figure 5: Government expenditure on education (% of GDP), by income group

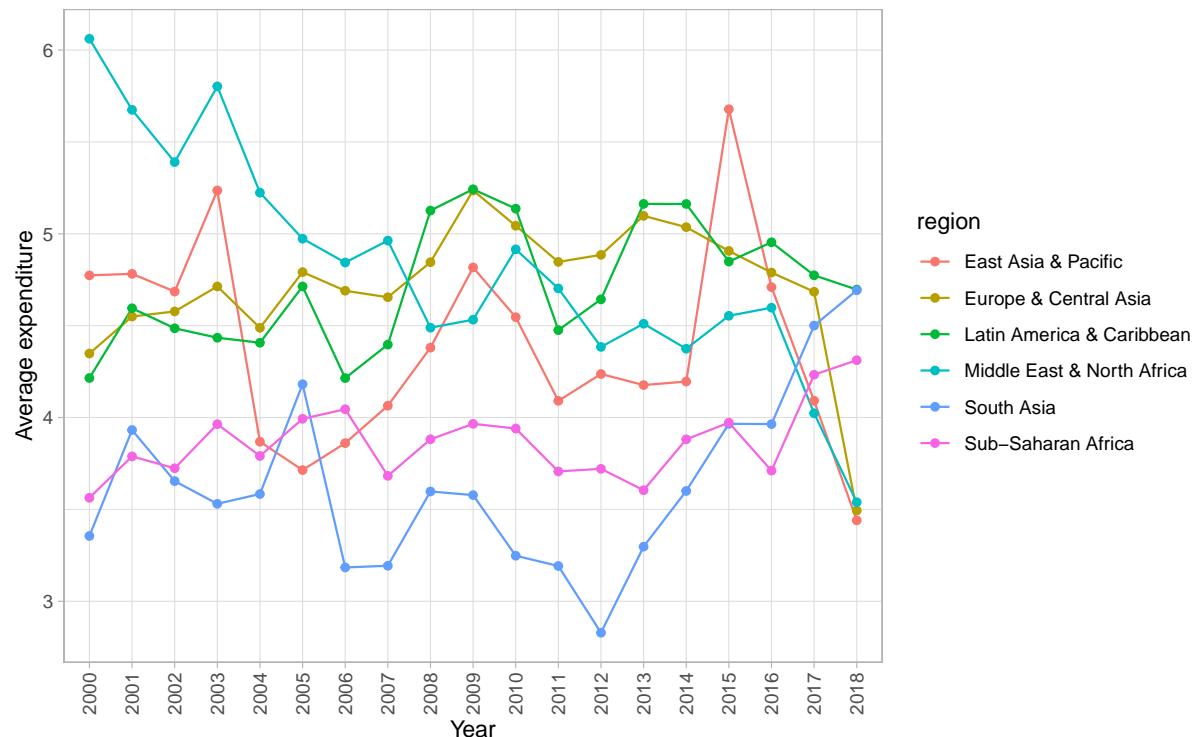


Figure 6: Government expenditure on education (% of GDP), by region

In Figure 6, we visualized the education spending by geographical regions. During the time period, South Asia and Sub-Saharan Africa had the lowest spending ranging between 3-4% but again, the plot shows upward trend for those regions. For the other regions, it seems that it has been relatively stable over time.

Table 1: Total government expenditure on education by income group in 2000 and 2015

Income groups	2000	2015	Percentage change
High income	4.46	4.93	10.35
Low income	3.33	3.64	9.46
Lower middle income	4.41	5.05	14.61
Upper middle income	4.46	4.47	0.02

As shown in Table 1, the increase in education spending is evident for the majority of countries. But it remained at the same level for the upper middle income countries.

Overall, it can be concluded that the total amount of global resources spent on education is increasing over the world. But according to Trabelsi (2018), it is suggested that if the governance is weak more public spending on education leads to lower growth. However, the improvement of the quality of institutions enhances the economic performance.

Percentage of children out of primary school

This section discusses the percentage of primary-school-age children who are not enrolled in primary or secondary school across regions between 2000 to 2019, including the changes of overall percentage and the difference in percentage between gender over these two decades.

Figure 7 shows that among all of the seven regions, Sub-Saharan Africa has the highest percentage of primary-school-age children out of school, followed by South Asia and Middle East & North Africa. However, all of these three countries witnessed a decrease in the percentage, especially in Sub-Saharan Africa, the figure dropped from nearly 40% in 2000 to lower than 20% in 2019. As suggested by Bennell (2002), high levels of sustained enrollment growth could be observed in Sub-Saharan Africa between 2000 and 2015. The percentage in South Asia and Middle East & North Africa also decreased to below 10% in 2019 while the figure for rest regions remained relatively steady between 0-5%.

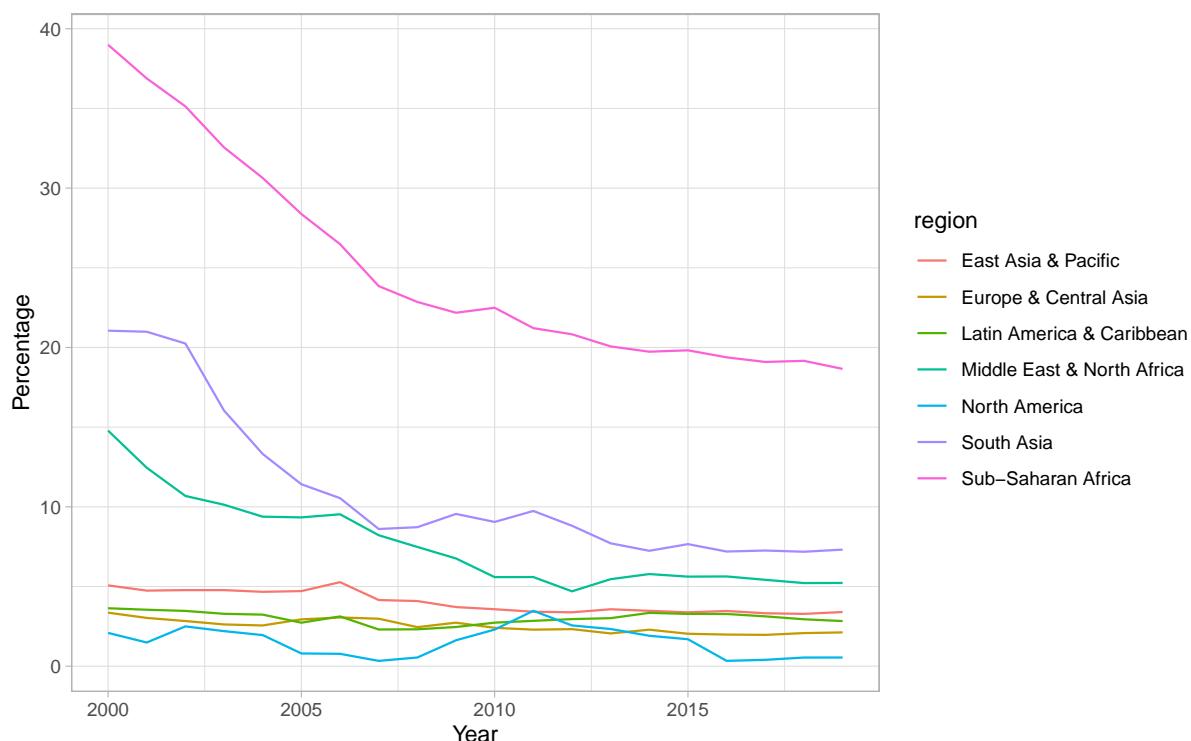


Figure 7: Percentage of children out of school in primary school age

To have a deeper understanding, Figure 8 explores the difference of percentage of primary-school-age out of school in gender across regions. Again, in Middle East & North Africa, South Asia and Sub-Saharan Africa, where the total percentage is significantly higher, it is obvious that more females in primary school age are out of school compare with males.

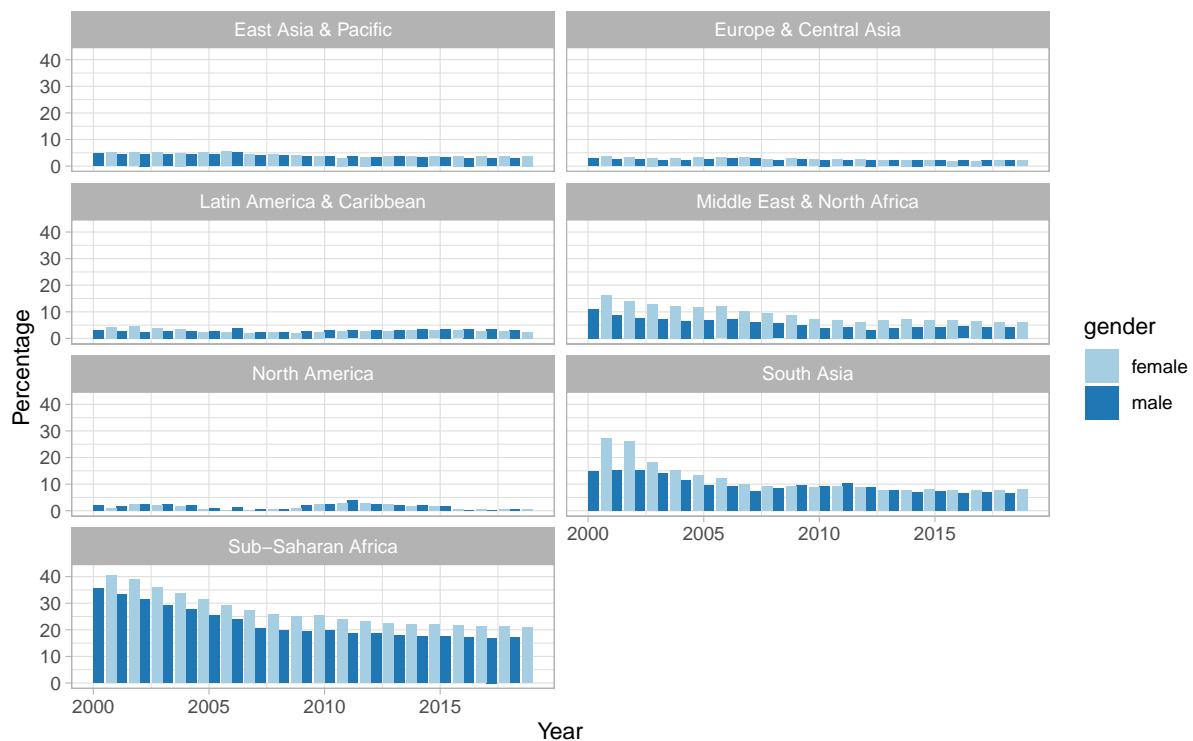


Figure 8: Percentage of children out of school in primary school age by gender

According to Table 2, in South Asia, the difference in percentage between male and female was the highest in 2000, the percentage of female children out of primary school is 13.05% higher than male. However, the difference decreased along with the total percentage, by the year of 2019, the difference in percentage has dropped to 1.26%.

Same changes can be observed in Middle East & North Africa, the difference in percentage also decreased from 7.33% to 1.94% between 2000 and 2019. Whereas in Sub-Saharan Africa, even though the total percentage drooped over the years, the difference in percentage between male and female school aged children did not decrease as much as in South Asia and Middle East & North Africa. In 2019, the percentage of female children out of primary school is still 4.29% higher compare with male.

Table 2: Difference in percentage of primary-school-age children out of school between males and females

Region	Difference in percentage - 2000	Difference in percentage - 2019
South Asia	13.05	1.26
Middle East & North Africa	7.33	1.94
Sub-Saharan Africa	7.16	4.29
Europe & Central Asia	1.09	-0.14
Latin America & Caribbean	0.91	-0.56
East Asia & Pacific	0.72	0.84
North America	0.23	0.11

Another interesting finding is that in Europe & Central Asia and Latin America & Caribbean, the difference in percentage is -0.14% and -0.56% respectively in 2019, which indicates that in 2019, the percentage of primary-school-age male who are not enrolled in primary or secondary school is actually slightly higher than female, although the difference is very close to zero (Table 2).

Pupil-teacher Ratio

This section discusses the pupil-teacher ratio from 2000-2019.

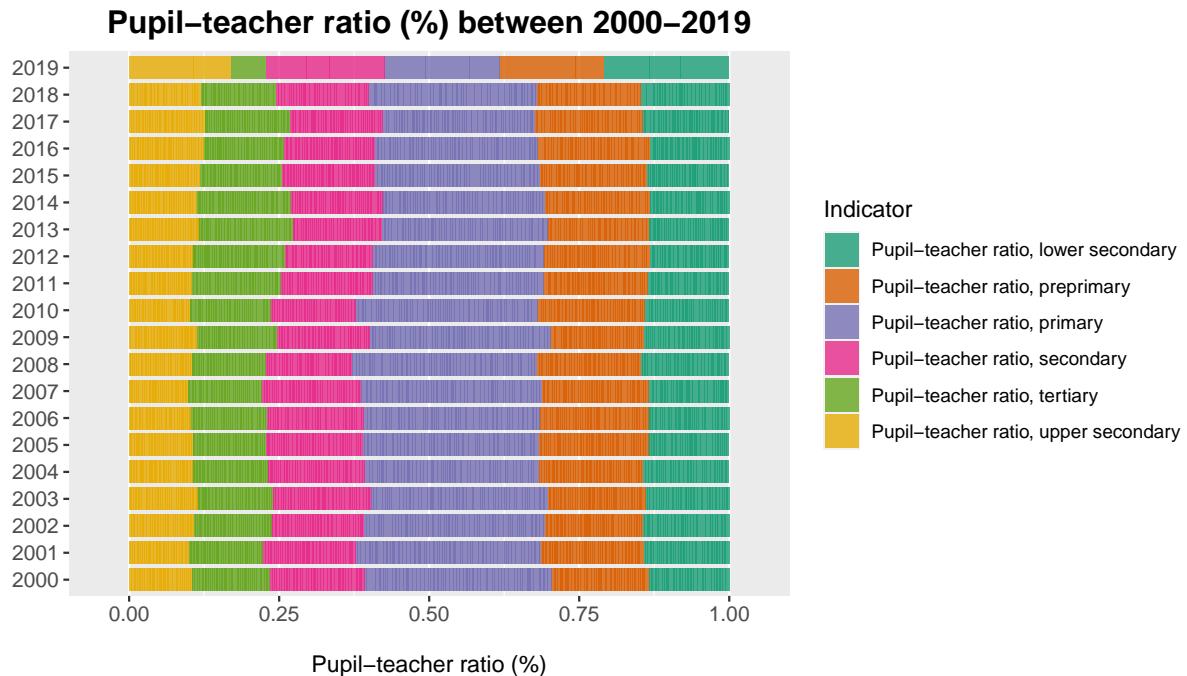


Figure 9: Pupil-teacher ratio (%) between 2000-2019

Figure 9 Pupil-teacher ratio seems similar across 2000-2018. However, in 2019, there's a significant decrease in pupil-teacher ratio especially in tertiary level and primary level. Next, there's an increase pupil-teacher ratio in upper secondary level, secondary level and lower secondary level.

Table 3: Regional Average Pupil-teacher ratio between 2000-2019

Indicator	Region	Average_ratio
Pupil-teacher ratio, lower secondary	North America	7.883399
Pupil-teacher ratio, secondary	North America	7.979289
Pupil-teacher ratio, preprimary	North America	9.078012
Pupil-teacher ratio, upper secondary	North America	9.125136
Pupil-teacher ratio, primary	North America	10.210233
Pupil-teacher ratio, lower secondary	Europe & Central Asia	10.472160
Pupil-teacher ratio, secondary	Europe & Central Asia	11.001635
Pupil-teacher ratio, upper secondary	Europe & Central Asia	12.030519
Pupil-teacher ratio, tertiary	North America	12.085918
Pupil-teacher ratio, preprimary	Europe & Central Asia	12.700575
Pupil-teacher ratio, upper secondary	Middle East & North Africa	12.831898
Pupil-teacher ratio, tertiary	Latin America & Caribbean	13.020706
Pupil-teacher ratio, tertiary	Europe & Central Asia	14.475969
Pupil-teacher ratio, secondary	Middle East & North Africa	14.811131
Pupil-teacher ratio, primary	Europe & Central Asia	14.839421
Pupil-teacher ratio, upper secondary	Latin America & Caribbean	15.641246
Pupil-teacher ratio, lower secondary	Middle East & North Africa	15.967261
Pupil-teacher ratio, secondary	Latin America & Caribbean	16.471384
Pupil-teacher ratio, lower secondary	Latin America & Caribbean	17.696099
Pupil-teacher ratio, preprimary	South Asia	17.959625
Pupil-teacher ratio, preprimary	Middle East & North Africa	17.971469
Pupil-teacher ratio, tertiary	East Asia & Pacific	18.230038
Pupil-teacher ratio, secondary	East Asia & Pacific	18.814013
Pupil-teacher ratio, upper secondary	East Asia & Pacific	19.035888
Pupil-teacher ratio, preprimary	Latin America & Caribbean	19.303227
Pupil-teacher ratio, primary	Middle East & North Africa	19.411776
Pupil-teacher ratio, tertiary	Middle East & North Africa	20.082141
Pupil-teacher ratio, lower secondary	East Asia & Pacific	20.270048
Pupil-teacher ratio, primary	Latin America & Caribbean	20.330124
Pupil-teacher ratio, tertiary	Sub-Saharan Africa	20.578647
Pupil-teacher ratio, preprimary	East Asia & Pacific	20.920228
YANG, BATSARSHAN, WANG, YUNPENG, 2021	Sub-Saharan Africa	21.345747
Pupil-teacher ratio, tertiary	South Asia	22.264410
Pupil-teacher ratio, upper secondary	South Asia	23.370092

Table 4: Regional Average Pupil-teacher ratio between 2000-2019

Indicator	Region	Average_ratio
Pupil-teacher ratio, primary	Sub-Saharan Africa	41.887322
Pupil-teacher ratio, primary	South Asia	31.633370
Pupil-teacher ratio, lower secondary	Sub-Saharan Africa	31.375117
Pupil-teacher ratio, preprimary	Sub-Saharan Africa	27.359228
Pupil-teacher ratio, secondary	South Asia	26.190960
Pupil-teacher ratio, lower secondary	South Asia	26.102560
Pupil-teacher ratio, secondary	Sub-Saharan Africa	25.207200
Pupil-teacher ratio, primary	East Asia & Pacific	23.503276
Pupil-teacher ratio, upper secondary	South Asia	23.370092
Pupil-teacher ratio, tertiary	South Asia	22.264410
Pupil-teacher ratio, upper secondary	Sub-Saharan Africa	21.345747
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Pupil-teacher ratio, tertiary	Latin America & Caribbean	13.020706
YANG, BATSALIKHAN, WANG, UPPER SECOND 2021	Middle East & North Africa	12.831898
Pupil-teacher ratio, preprimary	Europe & Central Asia	12.700575
Pupil-teacher ratio, tertiary	North America	12.085918

Table 3 and Table 4 indicates that the highest average ratio is 41.887322 in Sub-saharan Africa's primary level between 2000-2019 holding other variable constant. Holding other variable constant, the lowest average ratio is 7.883399 in North America's lower-secondary level between 2000-2019

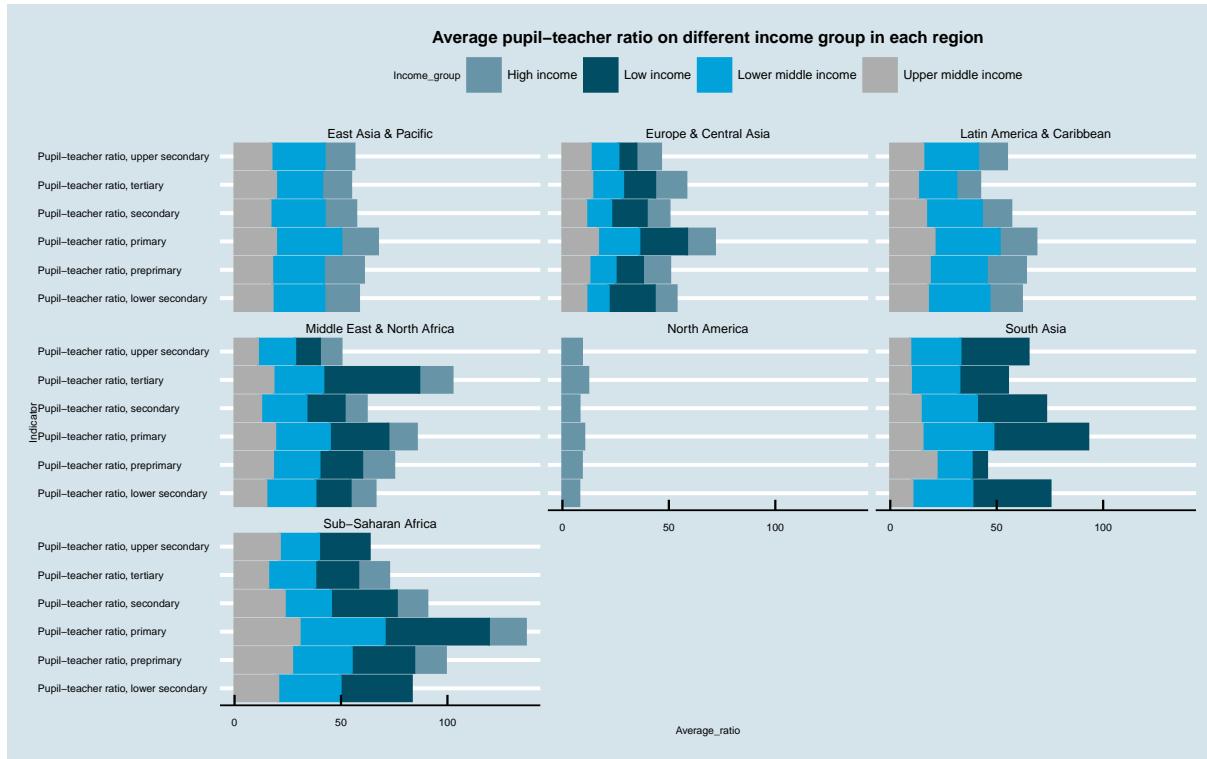


Figure 10: Average pupil-teacher ratio on different income group in each region

Figure 10 Interestingly, it seems that Sub-Saharan Africa, South Asia and Middle East & North Africa has greater proportion in low income group comparing to other countries. Middle East & North Africa and Sub-Saharan Africa has greater average pupil-teacher ratio in primary level. Europe& Central Asia has similar average pupil-teacher ratio across region. East Asia & Pacific and Latin America & Caribbean has similar average pupil-teacher ratio. Significantly, pupil-teacher ratios are very essential to quality of education. They perhaps rank alongside professional knowledge, skill, as well as strategies, in genuinely determining educational success and performance ([ikediashi2012pupil](#)).

Conclusion

Based on the findings discussed in this report, literacy rate overall shows an increasing trend since 2000, the improvements in the expansion of basic education and the reduction of education inequalities have contributed to the increase over the years. Total amount of global resources spent on education is increasing over the world, whereas the percentage of children out of primary school and the difference in percentage between male and female is also decreasing. In addition, middle income group has an overall steady average pupil-teacher ratio in each education level comparing to high and low income, while Europe & Central Asia and Middle East & North Africa has the most complete distribution of each income group in each education level. Overall, the global education situations are indeed getting better over the years.

The conclusions could be biased due to the limitations of time period and number of datasets, as well as missing values recorded in the data used.

References

- Bennell, P (2002). Hitting the target: doubling primary school enrollments in Sub-Saharan Africa by 2015. *World Development* **30**(7), 1179–1194.
- Roser, M and E Ortiz-Ospina (2016). Literacy. *Our World in Data*. <https://ourworldindata.org/literacy>.
- Trabelsi, S (2018). Public education spending and economic growth: The governance threshold effect. *Journal of Economic Development* **43**(1), 101–124.