Effect of COVID-19 on Learning Trends

Recent estimates of the impact of COVID-19 on learning imply that an additional 57 million students completing lower-secondary school will not achieve minimum learning by 2030—of which 16 million of which is the result of several countries' not pursuing remedial programmes after schools reopen. At the primary level, an additional 66 million will complete without minimum learning proficiency by 2030—of which 17 million due to lack of remedial programming. More than a 100 millions years worth of learning would be lost by 2030 for the cohort entering 2020 that could be reduced to half thanks to remedial actions.

Several recent studies have attempted to predict the impact of COVID-19 on learning achievement under a variety of processes and mitigation efforts implemented by governments. World Bank (2020) estimates the effect of both school closures and the economic shock on learning adjusted years of schooling under three different scenarios ranging from protracted school closures and few or ineffective mitigation efforts by governments, to shorter school closures and highly effective remedial efforts. Kaffenberger (2020) projections show that school closures and lost learning of primary aged students, ultimately accumulates into a larger effect when they reach 10th grade in 2027; the analysis argues that governments can mitigate this lost learning through remedial learning programmes, which could even help produce higher learning outcomes than predicted prior to COVID-19 through substantial reorientation of teaching methods. This accumulation of lost learning reflects Andrabi, Daniels and Das's (2020) study of the impact of the 2005 Pakistan earthquake on future learning outcomes; it is also reflected in Gustafsson and Deliwe's (2020a) estimates of lost learning for South Africa, where it is argued that various government interventions, particularly early grade reading interventions and school accountability reform, can mitigate the impact of COVID-19. For Ghana, Sabates, Carter and Stern (2020) estimate the magnitude of school closures, and identify factors that contribute to learning loss by exploiting data on learning loss in the transition of students between Complementary Basic Education programme schools and regular government schools.

What are the implications of these estimates for SDG 4.1.1 progress going forward? Three of these studies (Gustafson 2020; Kaffenberger 2020; World Bank 2020) provide estimates of how COVID-19 would affect the percent of students achieving minimum proficiency. They offer guidance on how COVID-19 would affect the likelihood of students not achieving minimum learning proficiency (**Table 1**), which can be adapted into the UIS projection model for SDG 4.1.1 (Gustafson 2019)[1]. For the effects estimated by Gustafson (2020) and World Bank (2020), the learning loss incurred by students exposed to school closures would have an immediate effect on the percent of students attaining minimum proficiency. This effect would ultimately disappear as

[1] This note uses the estimated effect of COVID-19 on the likelihood of not achieving minimum proficiency calculated based on estimates reported in each study (see Table 1). The estimated effects on likelihood are applied to the UIS 4.1.1 projections by multiplying the projected percent of students not achieving minimum proficiency by the increase in likelihood from each study and scenario.

the students exposed to COVID-19 school closures ultimately exit the education system[2]. Kaffenberger (2020) explicitly models the accumulation of lost learning, estimating the effect of COVID-19 on lower-secondary completers (10th graders) in 2027. All three studies offer estimates of COVID-19's effect on learning outcomes under differing scenarios of government mitigation efforts. According to a joint UNESCO, UNICEF and World Bank survey (**Figure 1**), 68 percent of countries reported that they were planning remedial activities. While the actual trajectory of the percent of students attaining minimum proficiency is of course unknown at this stage, incorporating these studies' effect sizes into the UIS's SDG 4.1.1 projection model (Gustafsson 2019) assuming a linear trajectory,[3] illustrates how COVID-19, in conjunction with government's mitigation efforts,[4] alters the projections of SDG 4.1.1 (**Figure 2 & 3**).

How many primary and lower-secondary completers will no longer achieve minimum learning due to COVID-19 by 2030, and what is the effect of governments' not pursuing remedial programmes? The change in the projected number of students completing primary or lower-secondary education, when 68 percent of countries are pursuing remedial learning programmes, offers an estimate of how many additional students will complete primary or lower-secondary education without minimum learning proficiency due to COVID-19. However, some of these additional completers not achieving minimum learning proficiency are linked to governments that are not planning to pursue remedial learning activities (**illustrated in Figure 4**). Adding up the number of additional completers not achieving minimum learning proficiency each year between 2020 and 2030 provides an estimate of how many students will lose access to minimum learning by 2030 due to COVID-19, as well as due to government inaction on remedial learning. Based on the adapted effects of the three studies included in this analysis, between 57 and 71 million additional lower-secondary completers will complete without minimum proficiency depending on which estimate of effect is used. Between 10 and 22 million of these losses are due to the 32 percent of governments not planning remedial programmes. At the primary level[5], the number of primary completers not achieving minimum learning proficiency ranges from 49 to 88 million students, with 10 to 27 million due to inaction on remedial learning (**Table 2**). At the regional level[6], the average estimate of the number of additional students completing lower secondary without minimum learning proficiency between 2020 and 2030 ranges from 2.1 million in Europe and North America to 20.9 million in Central and Southern Asia; 6.2 million of these in

[2] This would occur no sooner than 2031 for lower-secondary completers (based on lower-secondary completers being in 10th grade, and no sooner than 2028 for primary completers (based on primary completers being in 8th grade); the effects are expected to linger longer with repeaters.
[3] For World Bank (2020), the size of the effects were assumed to be incurred in 2020 and the path returning to the pre-COVID-19 projection for 2031 assumed as linear. For Gustafsson (2020), the same trajectory is used. For Kaffenberger (2020), the effect is applied in 2027 for lower-secondary with linear projections before and after.
[4] Projections between the remedial and non-remedial scenarios were calculated as a weighted average (68 percent for the remedial scenario and 32 percent for the non-remedial scenario). For World Bank (2020), this was the pessimistic and optimistic scenarios while for Kaffenberger (2020) this was the non-remedial scenario with 1/3 lost learning and remedial only scenario.
[5] For adapting the World Bank (2020) effect to primary level, the increase in likelihood was calculated as 1.08 times that of lower-secondary following the ratio of effects on likelihood implied by Gustafsson (2020). For the Kaffenberger (2020) adaptation, the effect on the likelihood of zero learning at the 8th grade level was used.
[6] Effects on the likelihood for each region was assumed to be the same as the global effect sizes.

Central and Southern Asia are due to governments' not pursuing remedial learning programmes (**Table 3**). At the primary level, Sub-Saharan Africa will have the largest number of primary completers not attaining minimum learning proficiency with 25.5 million by 2030; this is followed by Central and Southern Asia at 21.0 million.

How much is the percentage of children not learning increasing, and what is the regional distribution? The Covid-19 pandemic would increase the number of children not learning in Primary education by 2.8% (Figure 5), which correspond to 100 millions (cumulative) students more not reaching the minimum proficiency level (MPL) between 2020 and 2030, based on current distribution of proficiency with reference to a minimum level at 400 on a harmonized score (Figure 6). Most of them are in Sub-Saharan Africa (39%) and Central and Southern Africa (32%). In lower secondary education the situation is not that different, with 3.5% (or 86 millions) more students not learning between 2020 and 2030. However, the regions contribute differently to the global total. The contribution from Central and South Asia is 36%, Sub-Saharan Africa 20%, and Eastern and South-eastern Asia 13%. As many of the children are below the MPL they are the more likely to be affected by drop outs.

How many years of schooling will be lost for first graders in 2018 by 2030? According to Kaffenberger (2020) the absence of mitigation programmes (such as remedial classes, extra-time accelerated learning among others) would provoke losses equivalent to a year worth of learning for third grader students by grade 10, that is 10% of the years spent in schooling. Nonetheless, if remedial actions are taken after the immediate shock, the impact gets reduced to half a year's worth of learning, allowing the student to recover, at least partially, the initial loss. For the cohort of 145 million of students that started school in 2018 (as per UIS database) of whom 70% would complete secondary education this would mean collectively 1 billion years worth of learning for the 10 years to 2030, one for each year of schooling for each student that completes the cycle (145*.70*10). The COVID-19 would make this cohort lose collectively 100 million of years worth of learning in the absence of remedial actions and 50 million (or 5% of time) if educational systems succeed in implementing remedial programmes.
While the various studies do not show exactly why some of the losses accumulate for groups of students at risk, so that they fall further and further behind over time, they do allow tentative suggestions that are pertinent to the remediation issue. It would seem that, as knowledge is cumulative and built on foundations, if those foundations are not laid, then the students fall further and further behind, as teachers focus on the majority of students who did not fall behind. While the pandemic may have kept all students out of school at the same time, in every school there are, even under normal circumstances, students who fall and stay behind—the pandemic will make this normal tendency worse. Thus, some of these authors put an emphasis on remediating especially in early (or foundational) grades and target populations most at risk for

catch-up instruction. Remedial catch up actions identified as a response to COVID also address those children who were already at risk of falling behind.

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Tables and figures

Table 1. Summary of studies predicting effects on percent of students attaining (or not attaining) minimum proficiency at the end of lower-secondary (SDG 4.1.1)

Scenarios	How many times more likely is a student to be below minimum proficiency compared to pre-COVID-19?
World Bank 2020 (effect on current cohort as measured by PISA)	
Optimistic – schools are closed only for 3 months of a 10-month school year, and the effectiveness of mitigation measures put in place by governments (such as remote learning) is high.	1.18
Intermediate – schools are closed for 5 months, and the mitigation measures have a middle level of effectiveness.	1.25
Pessimistic – schools are closed for 7 months, and the mitigation measures have low levels of effectiveness.	1.33
Kaffenberger 2020 (cumulative effect for 10th grade students' achieving basic proficiency in 2027)	
No mitigation - Shock reduces grade 3 learning by 1/3	1.27
Remediation only- Shock reduces grade 3 learning by 1/3 + remediation	1.14
Remediation and instruction reorientation- Shock reduces grade 3 learning by 1/3 + remediation + instruction reorientation	0.71
Gustafsson 2020 (projections as % of lower secondary students exposed to COVID-19 declines)	
No mitigation:	1.23x initially, 1.24x by 2024, 1.11x by 2030
With mitigation:	1.23x initially; back to pre-COVID-19 trend by 2025

Table 2. Projected number of additional students completing without minimum reading proficiency between 2020 to 2030 (millions)

	If no country pursues mitigation (business-as-usual)	If all countries pursue mitigation	If 68 percent of countries pursue mitigation	Loss due to 32 percent of countries not pursuing mitigation
End-of-lower-secondary students				
based on adaptation from World Bank 2020	103.3	55.8	71.2	15.4
based on adaptation from Kaffenberger 2020	63.4	31.7	42.0	10.3
based on adaptation from Gustafsson 2020	92.8	36.0	57.4	21.5
Average of projections	**86.5**	**41.2**	**56.9**	**15.7**
End-of-primary students				
based on adaptation from World Bank 2020	81.3	51.0	60.8	9.8
based on adaptation from Kaffenberger 2020	144.6	60.3	87.7	27.4
based on adaptation from Gustafsson 2020	79.8	34.0	48.9	14.9
Average of projections	**101.9**	**48.5**	**65.8**	**17.4**

Total number of students completing lower secondary and primary between 2020 and 2030 is modeled as 1.07 and 1.25 billion, respectively, assuming current completion rates of 73 and 85 percent, respectively.

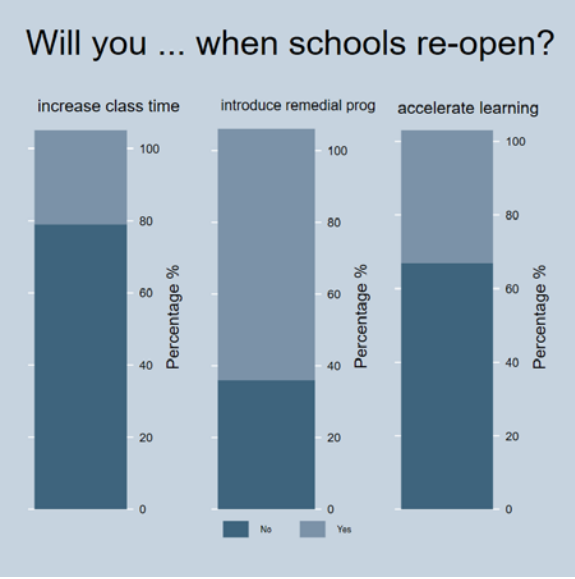
Table 3. Projected number of additional students completing without minimum reading proficiency between 2020 to 2030 (millions), average of projections

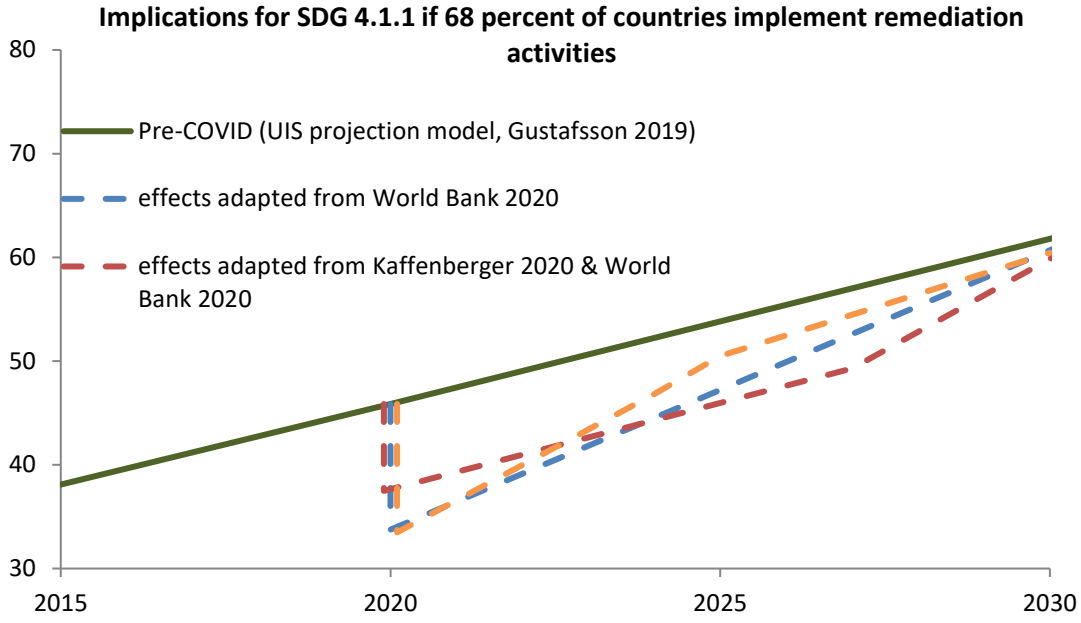
Region	If no country pursues mitigation (business-as-usual)	If all countries pursue mitigation	If surveyed percent of countries pursues mitigation	Loss due to countries not pursuing mitigation	surveyed percent of countries pursuing mitigation	assumed completion rate
End of lower secondary						
World	86.5	41.2	56.9	15.7	68	73
Sub-Saharan Africa	16.9	7.6	10.8	3.2	68	37
Northern Africa and Western Asia	7.1	3.5	3.5	0.0	100	74
Central and Southern Asia	30.8	14.7	20.9	6.2	64	77
Eastern and South-eastern Asia	11.6	6.1	8.5	2.5	58	79
Oceania	m.	m.	m.	m.	67	m.
Latin America and the Caribbean	5.1	2.7	3.3	0.7	75	81
Europe and Northern America	2.8	1.5	2.1	0.6	55	98
End of primary						
World	101.9	48.5	65.8	17.4	68	85
Sub-Saharan Africa	39.3	19.0	25.5	6.5	68	64
Northern Africa and Western Asia	9.3	4.2	4.2	0.0	100	84
Central and Southern Asia	32.5	14.4	21.0	6.6	64	89
Eastern and South-eastern Asia	9.4	4.1	6.3	2.2	58	95
Oceania	m.	m.	m.	m.	67	m.
Latin America and the Caribbean	4.2	1.8	2.4	0.6	75	91
Europe and Northern America	1.0	0.4	0.7	0.3	55	99

Table 5. Adjusted Indicator 4.1.1 by region and globally (weighted by school age population)

	World	Sub-Saharan Africa	Central and Southern Asia	Eastern and South-Eastern Asia	Latin America and the Caribbean	Europe and Northern America	Oceania	Northern Africa and Western Asia
School aged population (millions)								
Primary	722.2	171.0	188.9	177.0	59.0	67.4	4.2	54.8
Lower secondary	395.3	77.0	114.7	93.2	35.2	44.5	2.0	28.8
Adjusted Indicator 4.1.1 (average of countries in region)								
Primary - Mathematics	43.9	11.6	42.9	67.5	37.3	76.6	53.6	41.7
Primary - Reading	49.0	25.8	41.3	69.9	39.7	82.9	72.1	49.1
Lower secondary - Mathematics	31.8	9.7	18.8	51.9	27.4	71.4	62.3	23.5
Lower secondary - Reading	37.4	15.0	20.9	56.5	39.9	77.4	69.2	37.8
Number of children **NOT** learning - mathematics (millions)								
Primary	405.2	151.1	107.8	57.5	37.0	15.8	1.9	31.9
Lower secondary	269.4	69.5	93.1	44.9	25.5	12.7	0.8	22.0
Number of children **NOT** learning - reading (millions)								
Primary	368.4	126.9	110.9	53.2	35.6	11.5	1.2	27.9
Lower secondary	247.2	65.4	90.7	40.6	21.1	10.1	0.6	17.9

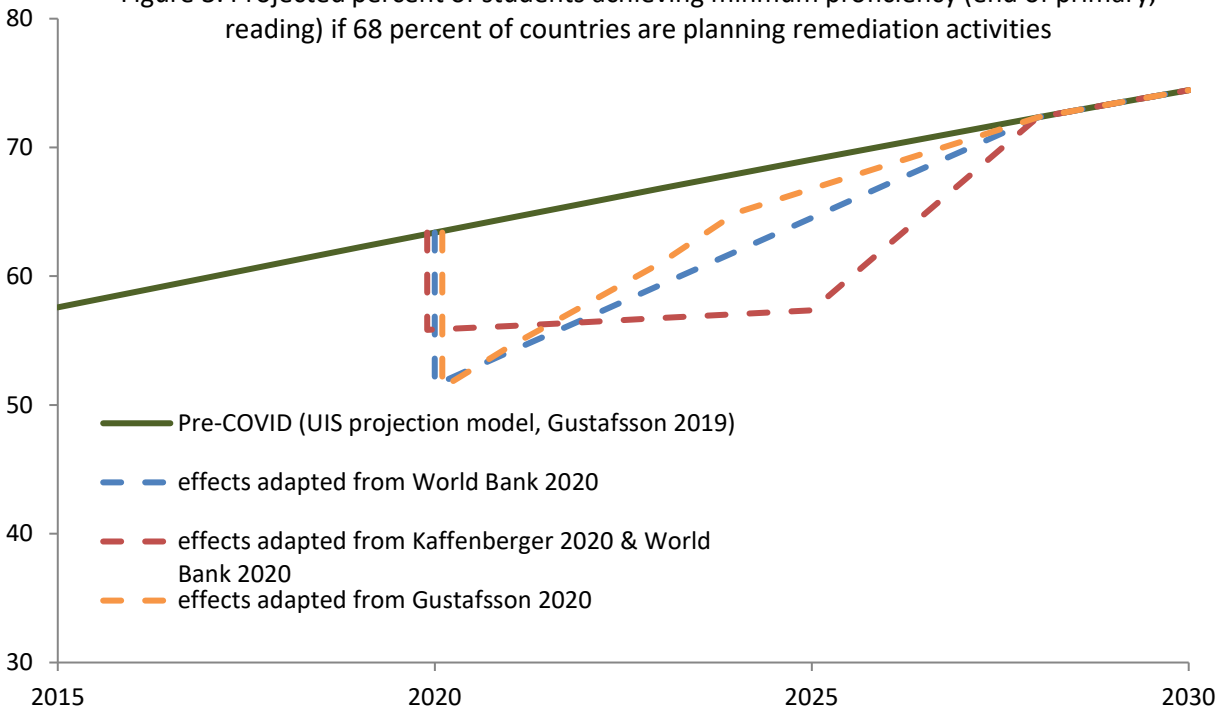
Figure 1. Percentage of countries planning selected actions in response to the pandemic





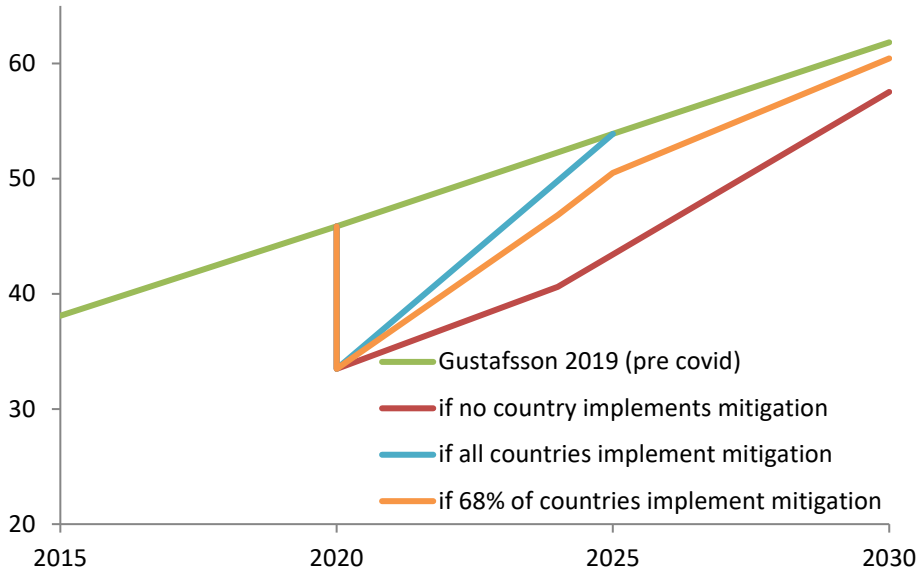
Implications for SDG 4.1.1 if 68 percent of countries implement remediation activities

Figure 3. Projected percent of students achieving minmum proficiency (end of primary, reading) if 68 percent of countries are planning remediation activities



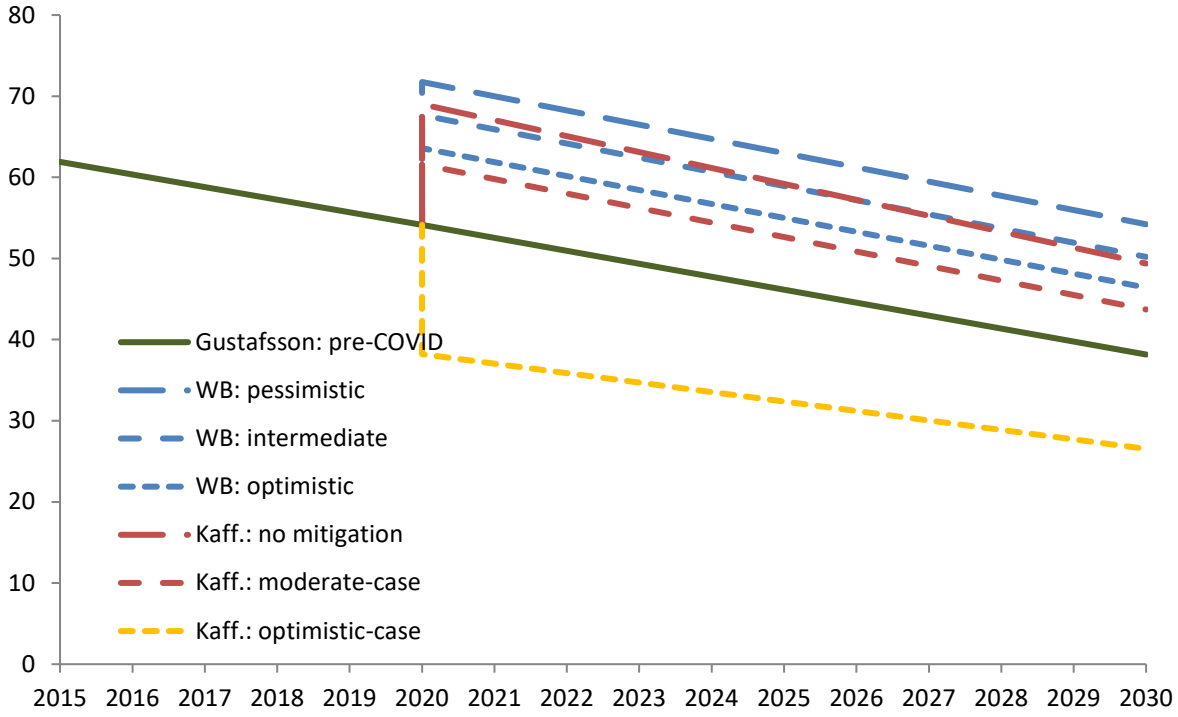
How many students will lose access to learning due to lack of remediation?

Figure 4. Projected percent of students achieving minimum proficiency (end of lower secondary, reading), effects adapted from Gustaffsson 2020



How COVID-19 affects SDG 4.1.1 projections

Figure 5 - Percent of students not achieving minimum proficiency (end of lower



How many students are above Minimum Proficiency Level at Cut-off point (400 points)

Figure 6. Distribution of students' proficiency at baseline – Gustafson (2020)