Human Capital Crisis during and after Covid-19 (Thinking abouta lost learning generation)

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Abstract:

One of the most important ongoing effects of Covid-19-hit is on the education and learning process in the world. On the one hand, there is an approach talking about the "lost generation" in education and learning, while on the other hand there is also an approach that argues that this situation will create a positive transformation in education. Despite these two approaches that seem to be incompatible with each other, by the end of 2020 and the beginning of 2021, the first approach represents today, and the second only represents a possible future. In fact, all governments are trying to protect their young generations from learning losses and reduce increasing school dropout rates while tackling the Covid-19 threat. Even before the pandemic crisis, the low- and middle-income countries were experiencing an education and learning crisis; it is estimated that this crisis will deepen further. The goal of this study is to conduct a macro-level analysis of human capital development and its strategies in low- and middle-income countries pre-and during the Covid-19 period. The study is based on comparisons of three pillars of human capital (knowledge, skills, health) by relevant statistics and a review of related academic literature, international organizations' reports, and government publications.

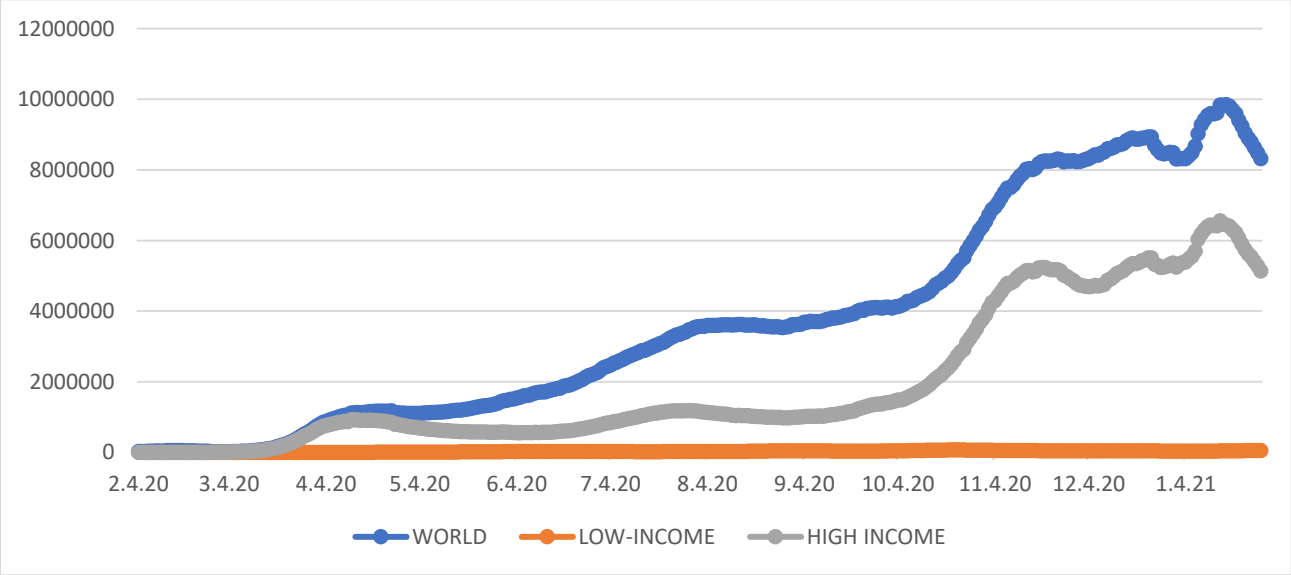
Keywords: Covid-19 pandemic, Low- and Middle-income countries, human capital development

JEL Codes: I25, I28, I15

Introduction

The world is going through tough days. On December 2019 WHO (World Health Organization) announced that a new class of corona virus has been emerged in Wuhan (China) and on March 12th the WHO has declared the COVID-19 is pandemic and they warned that it has rapidly spread around the world. According to WHO, there have been more than 114 million confirmed cases of COVID-19 and more than 2.5 million deaths throughout the world at the end of February 2021. 67.6% of the confirmed cases belong to the United States and Europe, which seems strange at a first glance. Similarly, the highest confirmed COVID-19 deaths per million are observed in North America and Europe, but Burkina Faso, Yemen, Uganda, Haiti, Ethiopia or Guinea have relatively the lowest death ratios. But this picture is occurred by the statistics not being collected properly and lack of the capacity to test and identify infected people (Fig. 1), however, demographic advantage of low- and middle-income countries may also be a reason. According to World Bank, more than 60% of Africa's population is under 25 years old, the percentage of 0-14 age in total population is 42% in low-income countries but, by contrast, it is only 16% in high-income countries (WDI, 2020). If we accept the information that under the age of 18 years has relatively few deaths, it means less people at risk in low-income countries than the elsewhere. But this demographic feature does not mean that the low-income countries have a real advantage, there are indirect effects that constitute the main disadvantage, because countries with young populations are at risk of facing the loss of human capital in the coming years.

Fig. 1 Confirmed COVID-19 Cases (04.02.2020-28-01-2021)



Not: Graph shows cases by data of case reporting through Jan 28, 2021
Source: OurWorldinData, https://ourworldindata.org/grapher/biweekly-confirmed-covid-19-cases?time=2020-03-17 (Jan. 30, 2021)

Although the prevalence of viruses is low in low-income countries, it is predicted that the impact of the epidemic will deepen, and poverty will increase in these countries. Several international organizations have estimated different statistics on global extreme poverty figures; for example,

according to the UN baseline projections in May 2020, global extreme poverty will increase by 34.3 million in 2020, and Africa accounting for about 56% of this increase. According to the International Food Policy Research Institute's baseline projections, this figure would be 140 million people, with Africa accounting for 57% of it, and according to the World Bank baseline scenario, it would be 71 million people. (UN, 2020a).

Over the past one year, the pandemic has not just put millions of people in extreme poverty, but also threatening the future human capital of the countries and thus their development opportunities. During the pandemic, there will be a "pile-on effect" of the coronavirus, that shows itself with long-term losses on human capital. Actually, before the pandemic crisis, building an appropriate human capital was a big problem in most low- and middle-income countries; this means that the aggregation of people's knowledge, skills, abilities and competencies is not sufficiently developed and productive enough to produce beneficial outcomes at both the individual and societal level. For example, according to WDI, the total government expenditure as a percentage of GDP in the low-income countries was 3.4%, and in the middle-income countries it was 4.1% which both were less than world average (4.5%) and OECD average (5.0%) in 2017. In this circumstance where government expenditures are falling, the share of human capital will also decrease. So, it is not difficult to predict that government expenditure on human capital sectors will decrease further in 2020 and 2021 due to the economic contractions observed in all economies. However, in terms of human capital agenda, the most important thing is the disruption of education due to the school closures. According to UNESCO, average two-thirds of an academic year lost on worldwide due to school closures (UNESCO, 2021). But some people argue that the loss will be more than a classroom.

This study tries to explain the overall picture of the effects of COVID-19 on human capital in terms of education and health issues. After this introduction part, the first part provides figures for education and health, two key components of human capital in low- and middle-income countries before COVID-19. The second part presents the effects of COVID-19 on low- and particularly lower-middle-income countries. The last part will cover what has been done and recommendations on this issue.

1. Overview of Human Capital Formation in Poor Countries

For a long time, it was believed that in order to develop, countries first they have to make an investment on infrastructure and sectors, then collect tax revenues for getting rich then they should invest in their people for human capital formation. That was a very explicit strategy followed by not only countries, but also by international organizations such as the World Bank or UNDP. However, despite the aid and financial sources for infrastructure provided to low- and lower-middle-income countries for years, the inequality in human capital among countries has not closed, and this result has pushed organizations towards a different project. In 2017 The World Bank has announced a new project called as the Human Capital Project and in 2018 they published the Human Capital Index (HCI), as their first outcome (Table 1).

Table 1. Human Capital Index by selected Low-Income and High-Income Countries, 2020

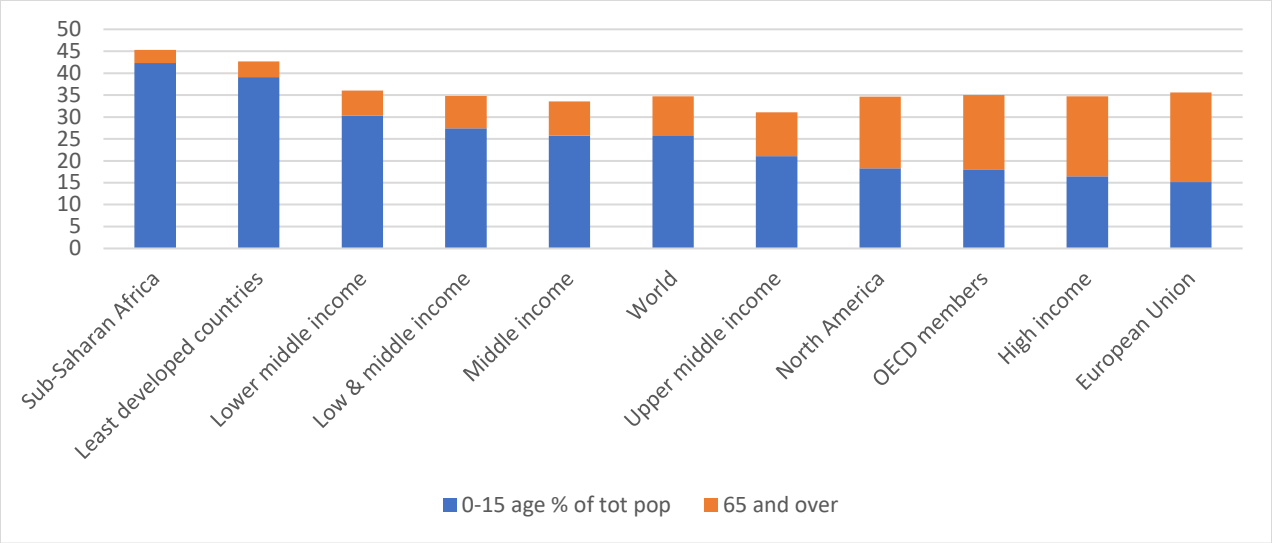
Afghanistan	Angola	Burundi	Chad	Ethiopia	Gambia	Haiti	Liberia	Malawi
0.40	0.36	0.39	0.30	0.38	0.42	0.45	0.32	0.41
Mozambique	Mali	Niger	Rwanda	S Sudan	Sudan	Togo	Uganda	Yemen
0.36	0.32	0.32	0.38	0.31	0.38	0.43	0.38	0.37
Singapore	HK	Japan	S Korea	Finland	Ireland	Sweden	Norway	Germany
0.88	0.81	0.80	0.80	0.79	0.79	0.79	0.76	0.74

Source: World Bank, Human Capital Index, 2020 Update https://openknowledge.worldbank.org/handle/10986/34432?cid=GGH_e_hcpexternal_en_ext (Feb. 19, 2021)

Their purpose is "*rapid progress towards a world in which all children arrive in school well-nourished and ready to learn, can expect to attain real learning in the classroom, and are able to enter the job market as healthy, skilled, and productive adults*" (World Bank, 2018). Apart from the Human Development Index, HCI "*measures the human capital that a child born today can expect to attain by age 18, given the risks to poor health and poor education that prevail in the country where he/she lives*" (World Bank, 2018). In other words, the index calculates how much her/his generation may fall short of achieving their full potential by the given circumstances of their country. HCI has five selected components: child survival, school enrollment, quality of learning, healthy growth and adult survival. These components have strong and direct connections to productivity and economic growth. The index is between 0 and 1, and it is based on how much each indicator contributes to productivity as an adult. For example, if the country's HCI is 0.7, it means as person in this country grows up the productivity of his or her workforce will be 70% of what he/she could be if she/he had benefited from complete education and good health. Table 1 shows the huge gap between low- and high-income countries and this gap has also continued during the pandemic months that we live. Almost all national and international organizations have been on consensus that if the necessary actions are not taken, this gap will grow even more in the coming years.

Human capital has three pillars: knowledge, skills and health. The first two are mostly evaluated in formal and informal education and training activities. Even if you have an innate skill, it is difficult for a person to become productive unless you feed this ability. Therefore, the education of the young generation is recognized as being crucial in increasing the productive capacity of people and becomes very important for the human capital formation to be created for economic development. Although this is important for all economies, it is even more important for low- and lower-middle-income countries where the young population has a large share. More than 40% of the population in the least developed countries is less than 15; as of 2019, there are 41 countries that have this figure. Additionally, in almost the same number of countries (44 countries), the population under the age of 15 is around 30%. So easily say that around half of the world population is at school-aged children (Fig. 2).

Fig.2 Population Ages 0-14 and over 65 (% of total population), 2019



Source: https://data.worldbank.org/indicator/ (Jan. 31, 2021)

Although education is closely linked to the future human capital accumulation of low and lower-middle-income countries, the young generation of these countries have still far away from the quality and access to education. Only 22% of aid to basic education are going to low-income countries, while this figure was less than the 2002 figure of 36%. On the other hand, despite the assistance provided at the international level, what these countries do with their own attitudes makes the biggest barrier in front of the human capital formation (such as cultural norms and policies). For example, teenage pregnancy is still rising, and the poverty emerges as the main reason for early marriage and drop out of school in low and lower-middle-income countries. As parents' finances will be in difficulty due to coronavirus, out-of-school children have a higher possibility to be exposed to risks like child labor, forced marriage or family violence. According to WHO, an average of 16 million girls between 15- and 19-years old give birth every year (Mohr et al., 2019), and this deters the children from achieving education, and from participating in human capital.

On the other hand, government expenditure on education in those countries is still low which is 3.45% for low-income group, 3.90% for least developed group and 3.91% of GDP for Sub-Saharan African countries. All of these figures are under world average (4.53%) and that of high-income group (4.93%). Since pre-school and primary education ensure the development of social, cognitive, linguistic, cultural, emotional, and physical skills of children, it is crucial to make an investment to these levels. The intervention to the growth rate of this early period can be more effective than those in the later of life. This finding is particularly true for low- and middle-income countries. Various studies demonstrate that the importance of investing in primary education shows returns of schooling is higher in low- and middle-income countries than in high-income countries (Psacharopoulos, 1972; Psacharopoulos, 1973; Psacharopoulos, 1985; Psacharopoulos and Patrinos, 2004; Psacharopoulos and Layard 2012). Particularly, according to Psacharopoulos and Patrinos (2004) the social returns to investment in primary school education is higher than secondary and higher education in low-income and least developed countries. Similarly, in another study by Montenegro and Patrinos (2014), the schooling increases respond to price signals and there are high returns to primary schooling in sub-Saharan or low-income countries but there are

low returns in high-income countries. World Bank has titled these results as "*more schooling is associated with higher wages*", but these indicators do not mean quality education

According to World Bank brief report (2019), 53% of children in low- and middle-income countries cannot read and understand by the end of primary school, but in least developed countries this figure rise to 80%. Actually, the gap between high-income and low-income countries in terms of learning achievement is more important than the gap between in school enrollments. Actually, before the pandemic, the World Bank has already announced that the world was in *learning poverty*. This problem is observed in proficient in math, for example, according to Altınok et al., (2018) more than 60% of primary school children in low- and middle-income countries fail to achieve a minimum proficiency in mathematics, while in high-income countries nearly all children reach this level in primary school. Another statistic from UNESCO shows that 77% of children of upper secondary school in sub-Saharan Africa and 68% in South Asia do not complete the schools, while this figure is only 16% in Eastern Europe and Central Asia. When we look at the Learning Deprivation Gap, which measures the average distance of a learning deprived child to the minimum reading proficiency level, the Sub-Saharan countries' children (with the children in MENA region) are far below the minimum level with approximately 20%. This figure is double the global average (10.5%) and more than tenfold larger the Europe and Central Asia average gap figure (1.3%) (Azevedo, Dec. 2020).

Such figures show an early warning sign for the future status of human capital formation in low- and lower-middle-income countries. Similarly, there is a severe gap in pupil-teacher ratios between high-income and least developed countries. Since a child acquires the necessary skills needed to function as a productive member of society in primary school, the pupil-teacher ratio in primary school is even more critical. This primary school ratio is worse than a secondary school in low and lower-middle-income countries; for example, the primary school ratio is 37.15 while the secondary is 26.8 in least-developed countries in 2018. For the low-income and lower-middle-income countries, the gap is not different; the primary school ratios are 39.8 and 28.8 for low and lower-middle-income countries, but these figures drop 25.3 and 20.9 respectively, for secondary school ratio. However, the same figures are 14 for primary and 12 for secondary in high-income countries. We all know education or training is more than someone just standing in front of a group of students, children learn more if the teachers can be actively involved into classroom.

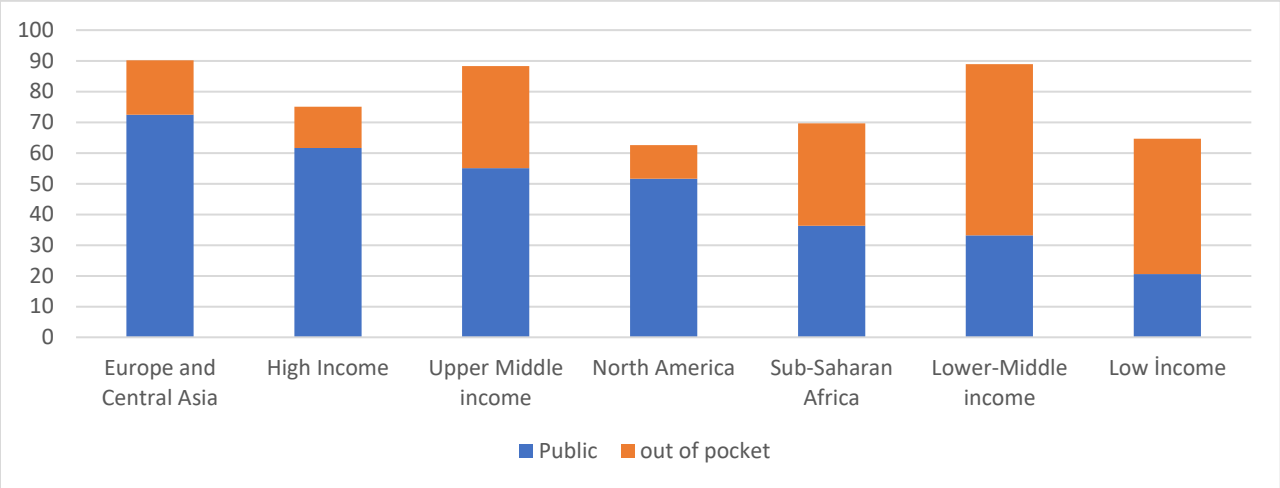
Another important indicator that belongs to the quality of education is attendance, which is also recognized as a measure of investment in human capital (Strauss & Thomas, 1995; Thomas et al., 2003). Unfortunately, a significant trend in low- and middle-income countries is that attendance is low and gender-characterized, such as girls lag behind boys. School attendance is accepted as a baseline factor in achieving school success, and the relationship between attendance and achievement has a significant consequence for later human capital formation. For example, Romero et al. (2007) make a connection between absenteeism (particularly in kindergarten and first year of primary school) and the negative first-grade outcomes and the lower achievement in reading, math, general knowledge (NCES, 2009). All over the world, despite significant progress in net enrollment rates, attendance rates are lower than officially enrolled children. Many children in low and lower-middle-income countries do not attend school and are not acquiring even basic literacy and other vital skills that they need in their entire

life. The UNESCO report in 2005 verified that the low attendance rates are a fundamental problem, particularly in sub-Saharan Africa. In Niger, Chad, and Liberia, estimations suggest that less than half of the school-aged children attend primary school (UNESCO, 2005). When we look at Africa, we see that it is not only children who do not attend classes but also absent teachers. According to Bold et al. (2017), the percentage of teachers absent from school more than 20% in Tanzania, nearly 30% in Uganda, and more than 40 % in Mozambique. The figures for absence from class are relatively higher than school absenteeism; it is almost 60% in Uganda and Mozambique and more than 40% in Kenya and Tanzania. As a result, unless the above problems on education are corrected, they will face poverty and vulnerability when today's children become adults as a potential of their countries' human capital.

The activities that can improve the quality of education and learning outcomes in low- and lower-middle-income countries also include better child nutrition and a healthcare system for the young generation. But in terms of health, low- and lower-middle-income countries are in an even more difficult situation. And they met the COVID-19 when they have already not been in good health. In other words, all these challenges are getting bigger and bigger by the burden of the COVID-19. Access to adequate healthcare services is one of the significant problems in those countries. For example, before the pandemic, low- and lower-middle-income countries accounted for more than 70% of global disease burden but less than 15% of global health spending. The majority of health finances in those countries are usually out-of-pocket expenditure (Fig. 3). As we see in fig. 3, the out-of-pocket expenditure on health in lower-middle-income countries is 55.7%, and it is 44,1% in low-income countries, while it is only 13.5% in the high-income group of countries.

Similarly, the low- and lower-middle-income countries have a lesser density of health workers and availability of hospital beds per population. For example, physicians per 1000 people in low- and lower-middle-income countries is 0.3 and 0.8 respectively, while this figure is 3.1 in high-income countries. The same huge gap is seen in figures of nurses&midwives per 1000 people (the figures are 0.9, 1.8 and 10.9 respectively). On the other hand, the availability of hospital beds per 1000 people in low- and middle-income countries is 2.28 while it is 5.28 in the high-income group, 3.48 in upper-middle-income countries, 2.89 in the world.

Fig. 3 Health Expenditure by Public and Out-of-Pocket (% of current), 2018



Source: http://wdi.worldbank.org/table/2.12 (Jan. 31, 2021)

One of the major problems in low- and lower-middle-income countries is malnutrition in terms of human capital. Malnutrition affects human capital negatively because deficiencies, stunting, wasting, and being underweight are affecting not only the survival of children but also their physical and mental (particularly cognitive) capacities. According to UNICEF, malnutrition causes 45% of children's deaths globally, and approximately 151 million children under 5 are stunted, affecting brain development and learning activities. Like the other indicators, there is a vast difference in malnutrition rates for children under the age of 5 in between low-income and high-income countries. For example, in high-income countries, the percentage of malnutrition for children under 5 is 0.8%, while it is 20.6% for lower-middle-income countries in 2019 (Table 2).

Table 2. Malnutrition rate, % of children under 5 (2019)

	2017	2018	2019
High-income group	0.9	0.9	0.8
Upper-middle income	2.2	2.1	1.9
Middle-income group	14.4	14.0	13.7
Low&middle-income	15.2	14.9	14.5
Low-income group	19.0	18.5	18.1
Lower-middle-income	21.7	21.1	20.6
World	13.6	13.3	13.0

Source: WDI, https://data.worldbank.org/indicator/SH.STA.MALN.ZS (Feb. 1, 2021)

Besides malnutrition, it is expected that particularly lack of sanitation, no access to clean water, and overcrowding settlements may facilitate and accelerate the transmission of COVID-19 in those countries. All these indicators have raised concerns for low- and lower-middle-income countries during the pandemic.

2. COVID-19 and its Impacts on Human Capital in Poor Countries

As of the end of January 2021, some high-income countries, such as the United States, UK, and France, have announced a more significant number of cumulative cases and the number of cumulative deaths than the low-income countries' figures. Probably both results may be due to the lack of testing capacity and data availability, because the test capacities of the low-income countries are insufficient, while the high-income countries can perform more tests. To show this difference, Table 3 provides a summary of COVID-19 cases and deaths by selected countries. However, even with limited data in low-income countries, the number of cases and death have increased rapidly. For example, at the end of January 2021, the cumulative COVID-19 cases of Uganda are 86 times more than the June 2020 number of cases. A similar picture is observed in Malawi; at the end of January 2021, the cumulative COVID-19 cases of Malawi are 82 times more than June 2020. The cumulative death numbers of Malawi at the end of January 2021 are 171 times more than seven months before. On the other hand, in the US and UK, we can see the difference is only 14 times and it is nearly 11 times more in Italy.

Table 3. Summary of COVID-19 Indicators for Selected Countries, 06/2020-01/2021

	Cases-Cumulative			Deaths-Cumulative			
Country	June 2020	Jan 2021	x times	June 2020	Jan 2021	x times	HCI‘20
USA	1,757,522	25,817,939	14.6	103,554	436,051	4.21	0.70
India	190,535	10,757,610	56.4	5,394	154,392	28.6	0.49
UK	255,519	3,743,738	14.6	37,445	103,126	2.7	0.78
France	148,524	3,126,351	21.0	28,746	75,466	2.6	0.76
Italy	233,019	2,541,783	10.9	33,415	88,279	2.6	0.73
Turkey	163,942	2,470,901	15.0	4,540	25,865	5.7	0.65
Germany	181,815	2,216,363	12.2	8,511	56,945	6.7	0.75
Ethiopia	1,172	137,021	116.9	11	1,529	139	0.38
Kenya	1,962	100,675	51.3	64	1,755	27.4	0.55
Norway	8,411	62,575	7.4	236	563	2.3	0.77
Finland	6,859	44,402	6.4	320	419	1.3	0.80
Uganda	458	39,533	86.31	0	324	324	0.38
Malawi	284	23,497	82.7	4	687	171.7	0.41
BurkinaFaso	881	10,580	12	53	120	2.2	0.38
Chad	778	3,347	4.3	65	118	1.8	0.30

Source: WHO Coronavirus Disease Dashboard (Feb.1, 2021)

This rapid increase in coronavirus within the health and education conditions of low- and lower-middle-income countries poses significant risks for those countries' human capital formation. While the coronavirus impact on human capital starts in pre-school, economic difficulties cause an urgent consumption needs to come to the fore, instead of health or education expenditure. A fall in income worsens human capital accumulation by this transmission channel (Corral & Gatti, 2020). If families are likely to spend less on health and nutrition, particularly the stunting rate, which is an indicator of healthy child development, is expected to increase. In the literature, some findings show that a 10% increase in GDP leads to a decrease in stunting from 7.3% to 2.7%. From another perspective, it is estimated that a percentage point increase in child stunting prevalence results in a 0.4% decrease in GDP per capita. (Mary, 2018).

There is also another problem related to the mental health of children and adolescents. Closures have made considerable effects on students' feelings of self-worth besides the sense of belonging to schools According to a recent study in Ecuador, one in six high-school students (ages 14-18) face depression due to COVID-19-related social isolation and financial difficulties (Asanov et al., 2020). The mental health of children is not the only problem; according to the study of Hogan et al. (July 2020), in low- and middle-income countries, the effects of the COVID-19 on some specific diseases (such as HIV, tuberculosis, and malaria) will be more severe than other consequences of the pandemic. Because these diseases still pose a considerable burden on the health system in these countries. In their model, they compare with- and without-COVID-19 situations of these three diseases and they find that over the next five years, deaths due to these-three diseases may increase by 10%, 20, and 36%, respectively; and the highest death rate is expected in malaria under the COVID-19 status.

The World Food Program estimated that by the end of 2020, around 265 million people in low- and middle-income countries would face an acute food supply problem due to COVID-19. They warn the international community of the next hunger pandemic. This problem particularly threatens access to child health and nutrition services; that means the pandemic increases the risk of all forms of malnutrition. For example, according to the estimations of UNICEF, there is a 30% reduction in essential nutrition services in low-income and middle-income countries (UNICEF, June 2020) due to disruption in production, transportation, and nutritious production of fresh and affordable foods.

Undoubtedly, the problematic background is not the only problem for these countries' struggle with COVID-19. But it is a severe barrier that have to consider.

- First, since these countries are overcrowded, it is impossible to apply the "social distance" as a serious measure.
- Secondly, water shortage makes it impossible to maintain hygienic conditions due to difficult access to clean water. Similarly, finding sanitizer is not easy to find.
- Thirdly, there is a shortage of hospital beds and particularly intensive care units (ICU). According to some fieldwork studies (Murthy et al., 2015; Dandorp et l., 2016; Schultz et al., 2017), more than 50% of low and lower-middle-income countries have no officially published data on ICU capacity of their countries. Despite the limited data, these studies indicate that there are between 0.1 and 2.5 ICU beds per 100,000 people, while between 5 and 30 ICU beds in high-income countries. Even if ICU beds were abundant, there is a significant shortage of other materials such as oxygen, ventilators, infusion pumps, and all of the other necessities for COVID-19 treatment (Bong et al., 2020).
- Fourthly, another critical deficiency is the lack of health personnel from all branches; shortage of health personnel arises from high-risk employee deaths. Hence, the deaths of healthcare personnel put the pandemic in an even worst cycle.
- Finally, the most crucial problem is the availability of COVID-19 vaccines. Most of these vaccines have been purchased by high-income countries; according to WHO, there are 130 countries in the world where not a single vaccine reaches it. Recently, COVAX has delivered first phase of COVID-19 vaccine to Africa and 320 thousand doses of the Pfizer-BionTech vaccine have been allocated to four African countries (Cabo Verde, Rwanda, South Africa and Tunisia). However, even if vaccines could be delivered to Africa, they do not have the necessary facilities

to store (vaccine made by Pfizer/BioNTech has to be stored at -70^{o}C) these vaccines and distribute them.

Within the framework of the general health problems related to COVID-19 mentioned above, when we compare children with adults, coronavirus's direct fatal effects on children are less. But still, there is a severe indirect effect on their today and future. The information that COVID-19 has less impact on young people depends on early data from China and high-income countries. But the news has started to come that the mutated virus significantly impacts young people. As we will mention below, we may say that there are direct effects of COVID-19 on children and teenagers who have health problems in low- and lower-middle-income countries, although not as many as indirect effects.

- First of all, one of the significant indirect effects is the increase in poverty level, which directly affects children in all aspects.
- Secondly, as we mentioned in those countries, children have a more significant share in the population, such as up to 60% in some of them (see Fig. 2). It makes a problem, and this problem is at the root of the healthy and educated human capital formation.
- Thirdly, since the resources spend on adult COVID-19 disease, child health care may have faced a shortage of treatment. In a sense, we can talk about the crowding-out effect of COVID-19 against other child diseases.
- Fourthly, these children have still faced with some other health problems, such as malnutrition (see Table 2), incomplete immunization, HIV, and since these children have a much higher problem with lower respiratory tract infection (LRTI) the consequences on their future life will be much more severe. According to WHO, 17% of death among children under-5 is because of the lower respiratory tract infection, particularly pneumonia (Ourworldindata, 2017; OECD, 2018). On the other hand, it is also expected that another 3.4 million children under-5 will add to the figure of stunted children due to COVID-19-related malnutrition.
- Finally, in low- and lower-middle-income countries, school feeding schemes are essential. According to World Food Program, as of 2019, schools are feeding approximately 310 million children in low- and middle-income countries. It is an excellent benefit for both themselves and their families when children come to their homes with a full stomach. But midday feeding is more than the nutrition of students, it is a part of package which includes vitamin and mineral supplementation, water and sanitation, deworming, vaccination, vision screening, malaria control, menstrual hygiene management and oral health (WFP, 2020). So the pandemic has also affected the families and their budgets.

According to many international organizations, such as UNICEF, World Bank, and the IMF, the pandemic has already created a serious disruption of the education system in almost all countries globally by covering nearly 1.6 billion learners. In other words, closures of schools have impacted 94% of the world's student population. Various studies find that the general impact of closures on children's success is negative, using some historical examples of high-income countries (von Hippel, 2020; Andresen et al., 2020; Dorn et al., 2020). But the situation is worse in low- and lower-middle-income countries because 99% of the world's affected students are in low- and lower-middle-income countries. From another perspective, Haeck and Lefebvre find that the socioeconomic skills gap could increase by more than 30% due to school closure, using

PISA data for Canada. According to the authors, if Canada is one of the strongest countries in PISA results but is producing such an outcome, the skills gap in low-income countries would be expected to be larger (Haeck and Lefebvre, June 2020). Another finding from UNDP indicates that during the second quarter of 2020, 86% of children in primary school have been out of school in countries with low human development, while this figure is only 20% in countries with very high human development (UNDP, 2020).

Meanwhile, the pandemic affects not just today's learning losses but also threatens to beyond the generation. Because some additional children may drop out or not have access to school next year due to the continuous economic impacts of the pandemic. (UNICEF, August 2020) The learning poverty in low- and lower-middle-income countries will exacerbate with COVID-19 and threaten countries' struggle to build human capital. For example, three possible scenarios done by Iqbal et al. (April 2020) on the learning curve provide evidence of the strong relationship between changes in school time and learning loss. They find that the learning curve becomes flatten due to the unequal effects of a pandemic on various income groups. In the worst scenario, children may drop out of school due to economic reasons, whether they are asked to work or parents could not afford their school costs (Iqbal et al., April 2020). For this group of students and their families, as the period spent away from school increases, it becomes more difficult for families to send these children to school and rational grounds for not attending school begin to justify.

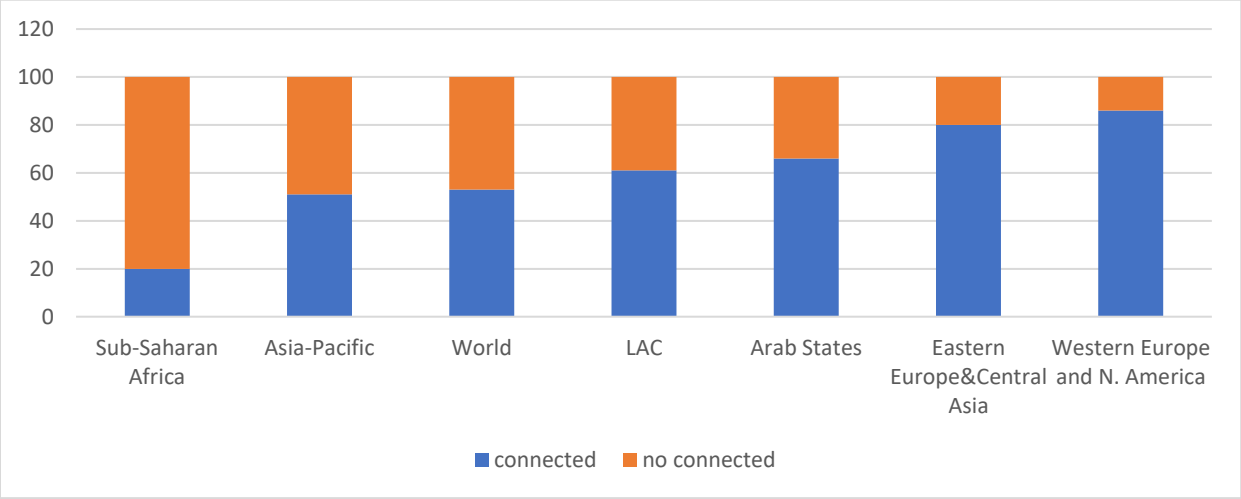
During the pandemic, learning losses have become the biggest problem. According to UNESCO-UNICEF and World Bank jointly conducted survey in June 2020, only half of the e-learning attempts are being monitored and remote learning is being used by less than half of the student population (Azevedo, Dec. 2020) According to the most pessimistic scenario by this study, COVID-19-related school closures could increase the learning poverty from 53% to 63% in low- and middle-income countries. It means extra 72 million primary-school-age children could fall into learning poverty. In Sub-Saharan Africa, this figure will close to 91%. School closure is not the only cause of learning poverty; it is stated that economic impacts also affect school dropouts. Under the Azevedo study projections, the given learning deprivation gap with COVID-19 will push those children more than one full academic year behind. Therefore, this situation causes another long-term negative effect on the future of children. Azevedo et al. (June 2020) argue that if schools are closed for five months, the impact of COVID-19 on quality school loss will be 0.6 years. This effect is more severe in some countries; for example, in sub-Saharan African, children were expected to complete 4.9 years of learning.

During the pandemic, another problem is the limited access to remote learning. In low-income countries, radio-based instruction is more common (80%), but middle-income countries mostly use television and internet-based education (more than 90%). Globally about 70% of students have access to specific necessities that would allow them to learn remotely. But the rest of them have not any access. Globally 40% of countries have not provided remote learning opportunities at the pre-primary school. Notably, at least 48% of students in Eastern and Southern African, and 64% of the students in lower-middle-income countries cannot be reached learning opportunities due to either a lack of remote learning system in their countries or a lack of necessary tools in their homes (UNICEF, 2020). For example, in sub-Saharan Africa, the share

of students with no Internet access at home is nearly 80%, while it is less than 15% in Western Europe (Giannini, May 2020) (Fig. 4). Even they have access, sometimes students have technical problems with their devices, or their programs and software can be down. As a result, the digital divide causes children in those countries are being left behind in their education.

However, other problems arise in online learning due to the spatial feature. Online learning is turning into a kind of homeschooling; capacities of parents, values, and motivation levels, spaces within the home for working are not standard. Some parents are also working in their homes, and they have responsibilities for taking care of additional family members, alongside homeschooling responsibilities. Studies have found that children of families with financial difficulties are more affected by the effects of this epidemic compared to the children of better-off families (Kuhfeld and Tarasawa, 2020). Although administrative leave for women with children have started to be implemented in some countries, naturally, production problems that may arise in these countries also come to the fore.

Fig. 4 Share of students with learning on-line platforms by regions, %



(Note**:** Only countries that mandated countrywide closures are considered in this analysis.
Source: Giannini, 2020

There is no guarantee that students who have the necessary tools (such as TV, computer, or internet) for remote learning follow the learning instructions. Notably, it is difficult to say that families of students in impoverished regions support their child's learning because parents are not well prepared for remote learning. It is especially true for parents with limited education and financial resources who live in low-income countries. For example, in a study conducted in the Netherlands during the pandemic, it is found that a significant learning loss for students from less-educated homes (Oreopoulos, Nov 2020).
Remote learning also has a disadvantage for quality learning and students who are not self-motivated to do their schoolwork and other assignments. Although virtual learning can enable changes in teaching and learning activities, various studies argue that it should be a supplement teaching method (Azevedo et al., June 2020).

Therefore, we don't have a plausible and supported answer about the efficiency of remote learning considerable.

3. Possible Scenarios, Solution Policies and Recommendations

The first and the most critical issue in recovery programs is to identify the damage detection after getting positive results of vaccine and treatment implementation in low and lower-middle-income countries. Because during the pandemic period, we need to know how much we have lost the gains achieved in the previous years in those countries. Almost all projections have concluded that the pandemic will upset the human capital accumulation of the last decade. Although the World Bank reports that the global economy contracted by 4.3% in 2020, and it is projected to increase 3.3% in 2021 for low-income countries, and 2.7% for sub-Saharan Africa. This shows that starting over in these countries will be even more difficult. In another study, Djiofack et al., find that if the pandemic crisis lasts more than 18 months, African countries' GDP would be 4% lower for more than a decade. Particularly in sub-Saharan countries' GDP would be expected 7.6% lower than in the baseline in 2020 and 9.8% in 2021 by using CGE estimation (Djiofack et al., June 2020). Similarly, IMF emphasized that the effect of COVID-19 on low-income countries is even worse, so they recommended that these countries should receive more help.

In this context, there is a widespread consensus that most of the low- and lower-middle-income country governments will not find to maintain the spending on their human capital sectors without large scale external support. For example, World Bank has decided to give $12 billion to low- and middle-income countries for buying and distributing COVID-19 vaccines, tests, and treatments (van Trotsenburg, Dec 2020). To organize all these processes, various organizations have prioritized their efforts and established COVAX. The COVAX aims to ensure at least 20% of the population is vaccinated. Additionally, the World Bank has also supported for especially keeping girls in school (SWEED project), providing essential sanitization and hygiene supplies in schools (in Bangladesh, Burkina Faso, and Nepal), and blended learning activities (for example, in Jordan and Turkey). (World Bank, Sep 2020) Similarly several NGOs, such as ECW (Education Cannot Wait) provide technical assistance, funding and infrastructure support to ensure that WASH is a part of children's lives and education.

Access to education through every possible alternative learning way must be a top priority for countries to guarantee the gap in education is as limited as possible. Temporary remote learning programs by radio, TV and internet, are short-term solutions, but we need a medium- and long-term measures to catch up students who have fallen behind or have difficulties to rejoin their level of schooling and competency. These measures also need a sound set up of the education system to manage the risks for the human capital formation in the future. According to Oreopoulos (Nov 2020), tutoring is an effective tool, even in virtual form. He gives an example of unpublished research that points out the 4.7% increase in math, English, and grammar for Italian middle school students who are trained by college students. In a decision draft taken into consideration in the United States, it is mentioned that providing online face-to-face tutoring would also create an opportunity for thousands of unemployed young college graduates. Oreopoulos also cites another study that examines the one-by-one remote tutoring with an online math game, and he says that this method is a crucial tool to compensate for the learning loss of COVID-19. Globally there has been a rise in demand for private tutoring, for example, according to Financial Times, the private tuition market in the US is expected to grow. However, this method is too costly to be afforded

individually in low- and lower-middle-income countries. Obviously, a rise in private tutoring also shows a further increasing divide between the rich and poor. Therefore, it can only apply in some countries with a public undertaking, but after the pandemic, it is also difficult to expect these countries to have the economic strength to bear this cost. Therefore, it may be necessary to create a particular organization under the UN just to find a specific solution for the learning loss.

All these show that the existence of the virtual course market, which has proved its legitimacy, is becoming essential. Therefore, it is time to think about the non-profit Khan academy model for the new period after the pandemic. Of course, we cannot expect that this transformation to be rapid for low-income countries. However, over time, it can be ensured that teachers in the formal system include virtual programs such as Khan academy into their curriculum or apply to particular software programs that provide feedback on homework (Oreopoulos, Nov 2020). But, to realize online learning, the governments must ensure equity of internet access for all students. The governments' investments in online learning materials and internet access will be beneficial in the post-COVID-19 era to compensate children's potential learning loss.

In order to compensate for the loss of learning, low-income countries try to introduce remedial programs that are targeted to help students the individual attention they need to build skills and confidence. Therefore, it is important to target education interventions, particularly to low-performing countries and regions even schools and individuals. Upper-middle-income and high-income countries mostly prefer other strategies, such as summer school and revision to the curriculum, besides remedial programs confidence (UNESCO, UNICEF and World Bank, 2020). However according to von Hippel (2020), the gaps between advantaged and disadvantaged children increase dramatically during summer. He also emphasized that some studies provide evidence that summer learning has failed to replicate the old positive results (Alexander, 2019; von Hippel and Hamrock, 2019). Other traditional interventions, such as suspension of school expenses, conditional cash transfers to parents, scholarships for girls, free school meals, should also be considered.

While acknowledging that the solutions brought by technology can be fast, feasible and practical, different measures should be applied by accepting that technology cannot always produce solutions. Good teachers are always the best change makers for low-income countries, but sustaining salary continuity and job security is also very important for teachers working in these countries. For countries suffering from economic devastation, it is essential that all kinds of remedial programs for teachers come into play. According to OECD report, some countries have prepared various initiative for supporting teachers' socio-emotional well-being and training on the use of ICTs (OECD, Nov 2020).

On the other hand, The Standing Together for Nutrition (STfN) economics, food, and health system, as a multidisciplinary consortium of nutrition, try to work on to COVID-19-related nutrition challenges. For example, it is suggested a program of free school meals and breakfast which reduces the financial burden on parents, should adapt as take-home or cash transfers. Thus, the children and their families can reach this source and food when they are not in school. Besides, after the re-opening, school meals should be integrated into the school day and organized within the framework of hygiene and distance rules. It is also possible to use school feeding programs as a tool to prevent school dropouts after the crisis.

Among the recommendations made to the governments of low- and middle-income countries, it is in the foreground that local governments rapidly implement economic measures to protect the well-being of children in order to keep the loss of human capital to a minimum. In this sense, these countries should be provided with privileged financing opportunities. As with the climate change agreement, country lists should be prepared, and human capital investments protected from future austerity measures. Besides, the restructuring of these countries' existing debts should be scheduled, and if necessary, deletion of some debts should be done.

Under international organizations' guidance, countries should adopt the inclusion of social protection packages for human capital in COVID-19 response and recovery plans. It is vital to prepare special programs, especially for low- and lower-middle-income countries. The UN needs to initiate the establishment of new human-capital-oriented organizations, apart from existing international organizations.

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