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SCHOOLS CLOSURES DURING THE COVID-19 PANDEMIC: A CATASTROPHIC GLOBAL SITUATION

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ABSTRACT

School closures (SC) were adopted globally as a COVID-19 disease pandemic containment strategy. This extreme measure provoked a disruption of the educational system involving hundreds of million children worldwide. The return of children to school has been variable and is still an unresolved and contentious issue. Importantly the process has not been directly correlated to the severity of the pandemic s impact and has fueled the widening of disparities, disproportionately affecting the most vulnerable populations. Available evidence shows SC added little benefit to COVID-19 control whereas the harms related to SC severely affected children and adolescents. This unresolved issue has put children and young people at high risk of social, economic and health-related harm for years to come, triggering severe consequences during their lifespan. In this article we describe the process of SC and the reopening timetable across the globe. We highlight the data regarding the international state of educational systems around the world, putting emphasis on the rights of children to come back to school.

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"Education is the most powerful weapon which you can use to change the world."

Nelson Mandela

INTRODUCTION

In early 2020, school closures (SC) were one of the first non-pharmaceutical interventions adopted almost simultaneously around the world as a COVID-19 disease containment strategy. With the exception of east Asia which commenced SC during January-February, by end of march SC affected the normal academic routine of 1.5 billion learners (84% worldwide total) across 169 countries of the world.[1] This drastic and unparalleled educational disruption was motivated by the uncertainty of the risks the SARS-COV2 virus posed to children and also by the assumption that children could be important vectors for the spread of the new disease. The rationale behind the usefulness of SC as a pandemic control measure could be found in different modeling studies which suggested to apply this public health measure for influenza virus pandemics.[2] The World Health Organization recommended SC as a mitigation strategy for these viruses after the experience with pandemic H1N1 in 2009.[3] These considerations seemed to justify the obvious harms related to SC in the short to medium term.

However, early on in the pandemic the international community realized than COVID-19 infection represented a significantly lower risk for children than adults, and that children seemed less important vectors for SARS-CoV-2 transmission than for previous respiratory virus pandemics.[4-8] A growing body of evidence subsequently showed that children were not super spreaders, and it became clearer than the harms related to SC outweighed the benefits.[9] Unfortunately, the global decision to get back to school did not mirror the rapid decision to close them. Whereas SC was almost a unanimous step, school reopening has become one of the most discussed and contentious issues of the current pandemic and a consistent wave of reopening did not occur. In fact the opposite; despite a general scientific consensus that schools were not COVID-19 hot spots,[10] still millions of children are not attending their optimal learning environment.

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In this article we aim to describe the process of school reopening and how it related to COVID-19 disease regional impact across the world. We interviewed professional contacts from around the world who based on their knowledge, or a simple search for local data, allowed us to describe the situation in different countries. We analyzed timelines according to the number of days schools were open, partially open, or fully closed based on the collected information. We geocoded (figure 1 and figure 2) maps and also created a heat map using online available information of deaths from COVID-19 per month by country (https://ourworldindata.org/covid-cases; accessed 20 nov 2020)[11] to contrast with the opening of schools.

SCHOOL CLOSURES AND REOPENINGS ACROSS THE WORLD DURING 2020

With few exceptions (such as Nicaragua, Sweden or Taiwan which never closed schools), SC were widely implemented across the globe during 2020. According to UNESCO monitoring, as of November 23rd, there were still over 220 million learners affected by SC, with 23 country-wide closures due to COVID-19.[1]

Strikingly, as shown in Figure 1, schools reopening was variable across countries and the process was not directly correlated to the severity of pandemic impact (measured by COVID-19 deaths). Africa and Europe demonstrate two sides of this spectrum. Although Africa has had an overall relative low death toll most countries currently still have SC enacted. Only 7 (Benin, Burkina Faso, Cabo Verde, Chad, the Republic of the Congo, Equatorial Guinea, and Sierra Leone) out of 24 countries in the Central and West African region have reopened their schools after COVID-19 mandatory lockdowns. and managed to prepare their schools and put measures in place to ensure that students can safely return.[12]

Conversely, most of Western Europe prioritized the reopening of schools despite having a significant second wave of COVID-19 during the autumn which has leading to broad social

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106 restrictions again.[13] In early November, UK guidance for school reopening stated that "it continues
107 to be the aim that all pupils, in all year groups, remain in school full-time throughout the autumn
108 term" and that "returning to school is vital for children`s education and for their wellbeing".[14]
109 Current data from European countries with similar decisions is consistent with schools, especially
110 for younger children, not playing a defining role in amplifying community transmission. For
111 example the reopening of schools played a subordinate role in the spread of SARS-CoV2 during the
112 second wave in Germany.[15, 16] Similarly Northern countries like Finland and Denmark, that
113 reopened schools in the spring, after the first wave, did not report particular increases in cases of
114 contagion.[17] In particular, Denmark was the first Western country to reopen kindergartens and
115 elementary schools and subsequently recorded a steady decrease in cases nationwide.[18]
116
117 Despite the available empirical evidence[6, 16, 19] finding that SC have modest impact on community
118 transmission, and that that the resumption of lessons does not seem to have had a negative influence
119 on the growth of the epidemic even in hot-spot regions, schools reopening decision is
120 heterogeneous in Europe. Governments are acting with different strategies, some more prone to
121 keep all schools open (Northern and Western Europe), while others are more hesitant like Southern
122 and Eastern Europe. For example, in Italy the closure of secondary schools was envisaged (with
123 consequent distance learning) in the so-called "red areas" where the lock down was established
124 starting from 3 November.[20] Although data supports a low transmission of SARS-CoV-2 within
125 Italian schools (specially for younger students), entire schools are frequently closed in the fear of
126 larger outbreaks.[19] The Czech Republic and countries from the Balkans after reaching one of the
127 highest levels of contagion in the world, have decided to close all schools, except kindergartens,
128 with the prospect of reopening once a significant decline of cases is reached.[21, 22]
129
130 So far, the only published experience highlighting concerns with the safety of school reopening was
131 in Israel. After enacting SC early in March and experiencing a limited first wave of infections,

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Israel reopened schools in May alongside most other sectors of society. A series of decisions possibly arising from the practice of Orthodox Judaism,[23] has led to numerous outbreaks, forcing Israel to close hundreds of schools and blaming educational centers for the surge in cases and forcing a total lockdown again at the end of September. In October, new analysis from scientists of the University of Jerusalem investigated these outbreaks and stated the educational system was not the reason for the second COVID-19 wave in the country,[24] since many other factors including residential Orthodox education, the Arab sector wedding season and families simultaneously returning from summer vacations were all correlated to the timing of reopening. In recent weeks, some restrictions have been removed and, for example, kindergartens have been reopened, with the prospect of reopening the other schools as well.

Our research and the resulting map (Figure 2) demonstrates a profound inequality and lack of homogeneity between countries to the detriment, in particular, of the poorest countries in the world which are not yet able to guarantee the safe reopening of schools. In fact, while in other parts of the world schools have been gradually reopened and different strategies are adopted to keep most of them open, in regions such as Latin America and/or Africa the vast majority of schools remain closed with no prospect of reopening in the immediate future.

The current situation in Latin America is dramatic. As of November, there were more than 13 million cases of coronavirus reported,[25] almost half of country-wide closures came from this region where the schools of 18 out of 36 countries remain closed and most of countries do not have clear reopening plans for the months to come. A recently released analysis from UNICEF reported that 97% of students of the region (accounting for 137 million children) remain with their normal education disrupted.[26] The report estimates that 3.1 million boys, girls and adolescents will drop off the schools for ever due to COVID-19 crisis.

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The country with the highest COVID-19 death toll in the world, the United States, took the first step for reopening during the fall after months of SC with supporting scientific editorials declaring that public schools (where more than 90% of north American students attend) should be recognized as essential services and CDC guidelines recommending mitigation measures for a safe reopening.[17, 27] State governments have adopted different positions and reopening across the country has been erratic, with prolonged SC poorly correlated to regional burden of infection. Implementation of distance/virtual learning has been piecemeal, with studies showing children from minority or low socioeconomic backgrounds to be receiving the lowest quality of education.[28] The first major city to reopen schools was New York in September. Surprisingly, although viral transmission remained very slow and school chancellors declaring "our schools have opened and have been remarkably safe", policymakers decided to close them again in November with no data supporting the decision after a surge of COVID-19 cases within the city.[29] The situation in New York shows drivers for SC and reopening have not always been driven by scientific evidence as the American Academy of Pediatrics policy statement suggests needs to occur.[30]

An important limitation when interpreting the figures 1 and 2 is the arbitrary term "partial" which must be considered since reopening process had huge variation between and within countries. For example, Uruguay, which decided full SC the day after detecting the first national case of COVID-19 (April 14th), was also the first Latin American country which reopened rural primary schools for face-to-face teaching in June 1st.[31] Then Urban schools were reopened in a staggered and voluntary approach throughout June in the rest of the country. During the whole process school attendance was not mandatory until October 2020 and the decision-making process involved multiple actors (Presidency of the Republic, Ministry of Education, Ministry of Health and the National Public Education with an advisory scientific honorary group) which made protocols and guideline for resumption of school-based education. The lack of infrastructure to attain the required physical distancing between students for many educational centers and the lack of investment in the

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development of new infrastructure made the process difficult to fulfill that every child could attend every day and centers decided to shorten the period of schooling, dividing groups of learners through the week. Unfortunately, as of mid-November, there is no central precise data of how many students have effectively returned to classes.

IATROGENIC SOCIAL HARM RELATED TO SCHOOL CLOSURES

There is substantial evidence demonstrating SC are a higher risk to children than COVID-19. Prolonged SC is a social crisis and a stolen future. Schools play an essential role in the education, health and wellbeing of children and the communities they live in. SC can fuel social, economic, and cultural inequalities with a domino effect which can last for generations.

For example, in World War II, one of the less obvious impacts was the disruption of school learning, which had a negative economic impact lasting at least 40 years according to some estimates.[32] Less schooling means less human capital, projected to negatively impact future earnings of children. Lower academic achievement would translate into long term economic costs for societies. It is estimated that every year loss of schooling would equate to a 10 % loss of future earnings and the additive effects across society could huge costs[33] Recently, the World Bank estimated that a school shutdown of 5 months could value of $10 trillion in terms of learning losses.[34] Moreover, the COVID-19 related economic recession could even increase the gap in funding, shorten by millions the projected budgets for education in the years to come and thus put at risk the agreed 2030 sustainable development goal on education in low and middle income countries.[35]

Impacts of loss of education on future opportunities can be estimated in life years lost. A recent study from the US suggest SC during the first wave (which involved mora than 24 million of children aged 5 to 11 years) may be associated with a significant decrease in life expectancy.[36]

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These estimates were based after losing of a median of 54 days of instruction. If we extrapolate this model worldwide and think about the red colored countries from our figure 2, we could imagine the scale of the catastrophe during 2020. Whilst the exact estimates will be subject to a large degree of uncertainty, the fact that there is a cost can be measured in reduced life expectancy for millions of children cannot be overlooked.

During the COVID-19 crisis, some experts have warned about the high risk of hysteresis of educational system induced by SC. This theoretical model describes the complex interaction between the intensity of learning with student engagement and the current "off grid" situation for thousands of children, which will have enduring consequences.[37] This hysteresis of course, will be much more prevalent among the more disadvantaged students coming.

SC could amplify gender inequalities and reverse equality progression from previous decades. Early in the pandemic, the United Nations warned SC could amplify gender inequalities and reverse equality progression from previous decades, particularly in regard to children´s main caregivers.[38] Pandemic-related job losses have disproportionally affected women, particularly those from disadvantaged groups such as immigrants, young adults and other minorities.[39] SC might have bolstered gender gaps in education and female empowerment, particularly those living in the most disadvantaged countries.[40] SC can worsen an already severe food security crisis during COVID-19 crisis.[41] According to the World Food Program from WHO, 80 million students in Latin America are losing healthy food and are now at risk of nutrition deficiencies. This will cost lives.

There are parallel silenced and hidden pandemics during the COVID-19. SC forces children to spend more time within their homes where most child abuse occur. The concomitant disruption in violence prevention and response services during 2020 might hide the real figures, with potential under diagnosis and under reporting of violence against children.[42] It should not be a surprise in

times of economic recession and severe socio-emotional stress and uncertainty that a wave of violence occurs against children. Besides physical harm, a rise on mental health disease could arise, as SC remain.[43] Children and adolescents are an especially vulnerable population as daily routines are disrupted and long-lasting social consequences (like social competence, logical deduction or self-control) are vast.[44] Researchers working in mental health were worried about the effects of social isolation on self-harm and suicide early in the pandemic.[45] Although there is no available data suggesting a rise of these mental disorders during the pandemic in children,[46] child psychologists highlight the rising anxiety, loneliness and the damaging long-term consequences of lack of face-to-face contact of young people with their peers.[47]

The prolonged interruption of child education services deprives children of the learning experiences necessary for their full development, especially at this stage of their life when they need it most. Overall, school closures are having a significant negative impact on each student's learning and their ability to develop critical thinking and social skills.[36] UNICEF data shows that, in a region characterized by high levels of inequality, COVID-19 has exacerbated this situation in terms of education availability.[12] The most disadvantaged children -including those with cognitive and physical disabilities, refugees and migrants, and girls in particular- face even greater exclusion from the learning process. In countries where inequalities are more pronounced, boys and girls, without school to attend, are more vulnerable to issues such as early pregnancy, child marriage, and recruitment into local armed groups.[35]

Those living in poorer environments (who attend to public schools almost by default) will have greater difficulties if they do not have access to technology required for distance learning, including a computer, the Internet or even a desk as UNICEF recently underlined.[48] This will widen the gap between the poor and the richer layers from societies, accelerating inequalities and making the bridging of those gaps much more difficult for future generations. In Latin-American, whereas ¾

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262 students from private schools could access virtual on-line learning only half of those from public
263 schools were able to.[48] Distance learning approaches also do not work for younger children as they
264 require direct interactions through play or other motivational activities.[49] Distance learning -the
265 proposed substitute as educational mean during the pandemic- is still a chimera for millions.
266
267 **FUTURE STEPS TOWARDS A BLURRED HORIZON**

268 Available evidence throughout 2020 clearly shows SC, especially for younger children, had
269 relatively minor contribution to control of disease transmission and created significant and potential
270 long-standing harms for an entire generation of children and adolescents. Although children were
271 relatively spared from COVID-19, they have suffered disproportionally to the pandemic response
272 and have been neglected and subjugated to decisions adults have decided in the policy making
273 process as a result. Compelling evidence show that each day with schools closed adds little benefit
274 for COVID-19 but created fertile ground for irreversible damage to a generation of millions.
275
276 Countries that have yet to open their schools are putting children and young people at risk of
277 problems that could seriously interfere with their access to education. Beyond the immediate
278 impact, the losses this generation may suffer in education and human potential undermine the hopes
279 of the poorest countries for its economic recovery and long-term development.
280
281 Investments in public education need to be protected and incentivized so that schools can be
282 physically ready for opening by providing water, sanitation and hygiene as soon as possible.[12, 48] In
283 this way, in a future prospective, governments can "rebuild better", laying the foundations for
284 education systems to provide not only better learning, but also a safer and more resilient
285 environment than which existed before the pandemic. Many schools even in high income countries
286 are in dilapidated buildings which have proved difficult to provide sufficient ventilation for
287 optimum infection prevention.[50] “With every day that goes by, millions of children and young

people unable to safely access learning opportunities are missing out on their right to an education and putting their future at risk," regional director Marie-Pierre Poirier said in a statement.[48]

In words of United Nations Secretary-General Antonio Guterres "Now we face a generational catastrophe that could waste untold human potential, undermine decades of progress, and exacerbate entrenched inequalities".[35] In November UNICEF proposed a six-point plan to avert a "lost COVID generation".[51] The first one is "to ensure all children learn, including by closing the digital divide". There is no surprise in this prioritization. The longer schools are closed, the worse future they will have during their shortened lifespan. In a year of uncertainty, the evidence shows and children`s rights mandate that we should act urgently to restore school functioning as a top global priority without further delay.

SC are at the core of the crisis. Schools have always been at the heart of the rights of children and adolescents and their families. Leaving students at home from primary to high school undermines and tramples on the right to education and the rights of families. It contravenes the UN Convention on the rights of the child signed by the States parties "the right of children to education, and with a view to achieving this right progressively and on the basis of equal opportunity".[52] Over prolonged periods, schools closures are more damaging to children and to society in the long term than risks of transmission of COVID-19. We cannot let ourselves to treat them worse than the novel virus.

CONCLUSION

The international approach to the reopening of schools has been chaotic and fragmented, both internationally and even within national borders. There has been a lack of impetus in many countries to recognize the essential nature of educational facilities in the health and wellbeing of children, and a disproportionate focus on their potential role in disease transmission due to the

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framing of previous influence pandemics. The issues are exacerbating entrenched inequalities within nations, disproportionately harming children and families who are already the most vulnerable. At a global level, schools have been reopened predominantly in wealthy nations in North America and Western Europe whilst they remain closed across swathes of the continents of South America and Africa, lead to deepening health, social and economic divides between high and low/middle income countries. A coordinated global effort is required to urgently return children to in person schooling (with a focus on the youngest children) to prevent further harms to the futures of children and young people, and stem the tide of deepening inequality.

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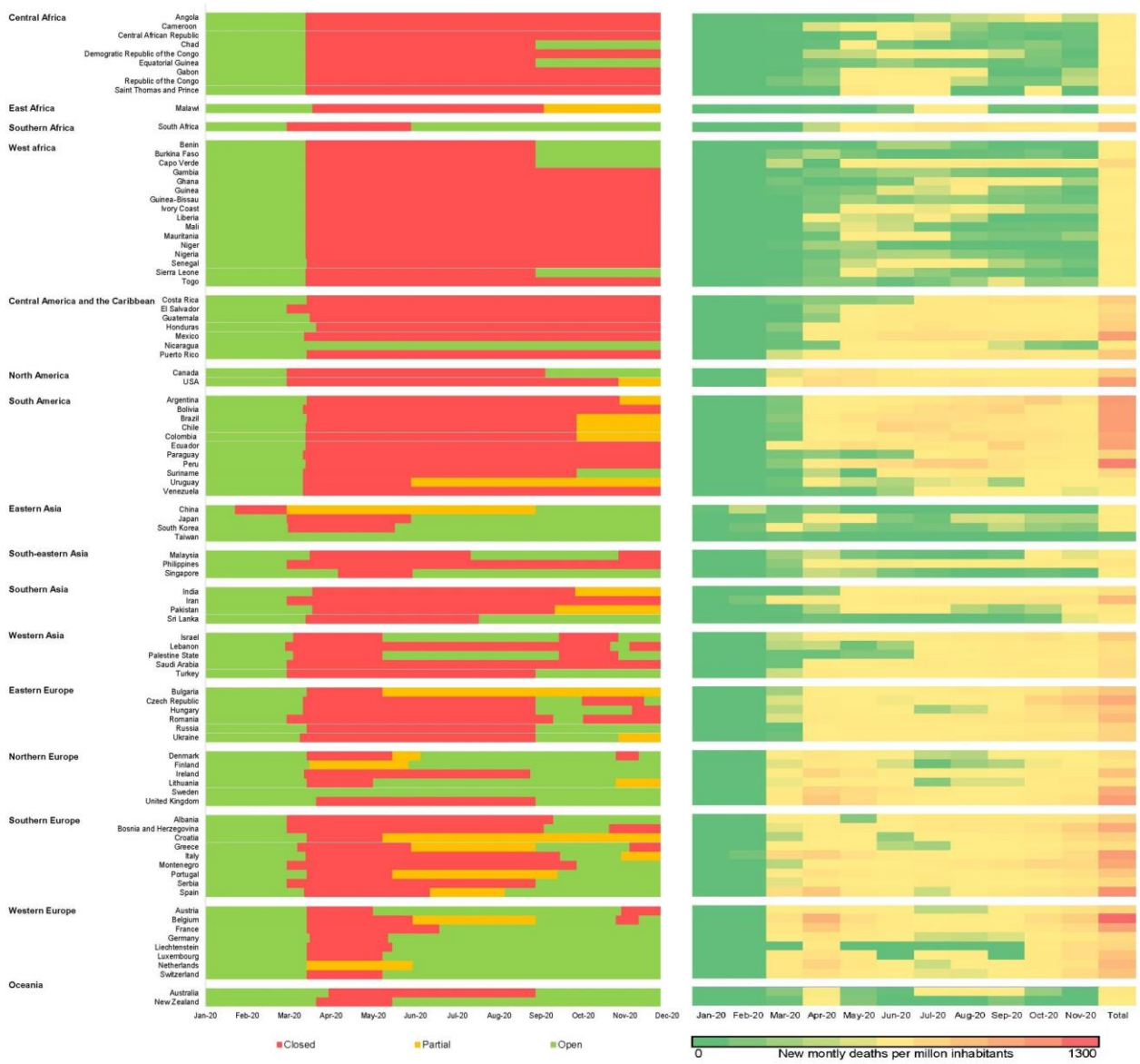
510 **Figure Legends**

511 **Figure 1: School reopening timelines by country and general mortality heat map over the**

512 **same period.**



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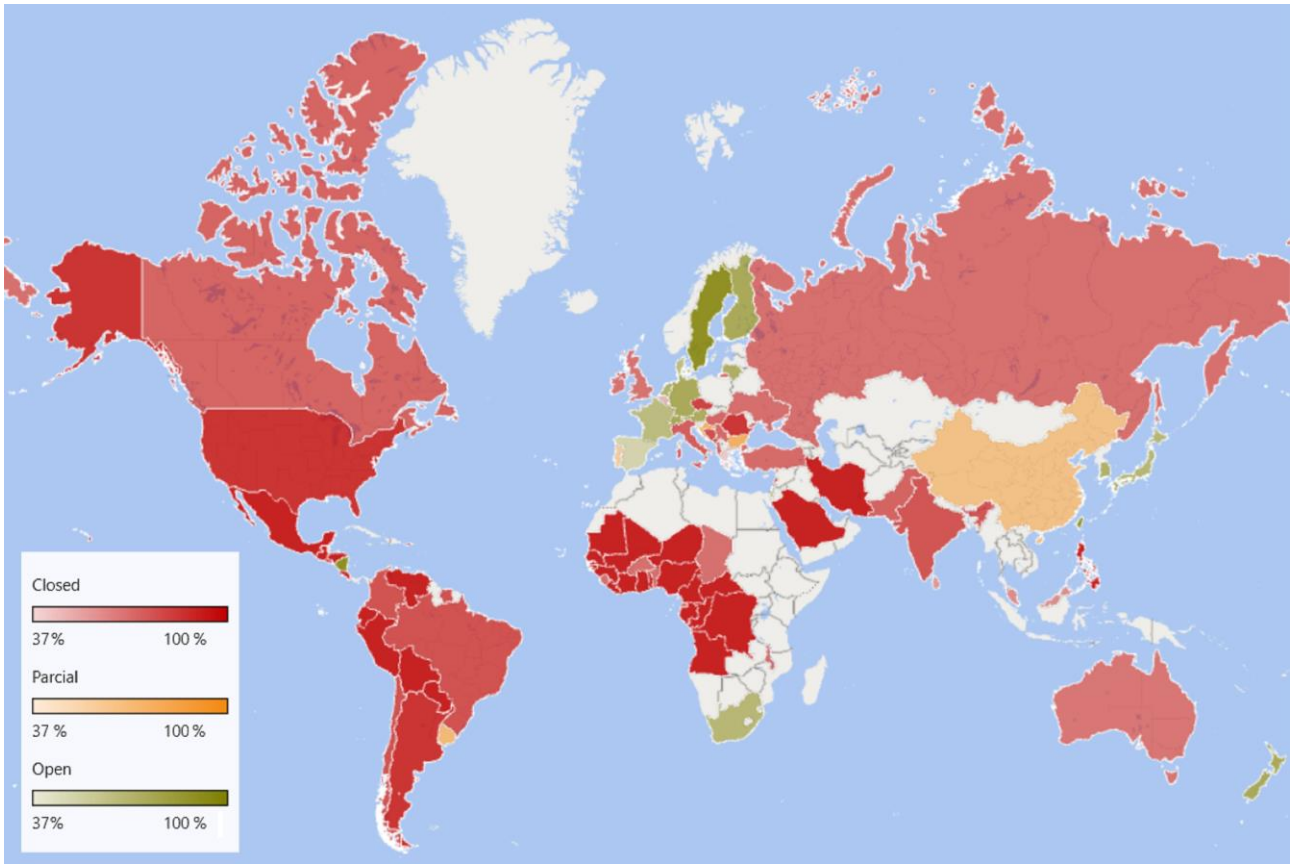
On the left, a Gantt chart for each country grouped by regions that shows the status of the country's schools' functional status (open/closed) per month between January and November 2020. In green, the schools that have their doors fully open are described. In yellow those with a partial opening. This opening may be due to differences by age (primary vs secondary), by financing (public vs private) or by partial attendance schemes. In red the schools are mostly closed. Source: Colleagues, publications, and local newsletters.

On the right, a heat map of the general mortality behavior of each country by month, based on the report of new deaths per million inhabitants. Source: https://ourworldindata.org/covid-cases (Accessed 20 Nov 2020).

Figure 2: Global map of predominant status regarding school opening/closure during COVID-19 pandemic.



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This global map describes the prevailing situation in each country in relation to the school's status (opening or closure) as of November 2020. In red, countries that have remained mainly closed are described, the intensity of the color indicates whether this closure represents 37 to 100% of the time. In yellow, the countries that have been mainly partially opened defined as a selective opening by age (primary vs secondary), financing (public vs private), or partial face-to-face assistance schemes. In green the countries that where fully open most of the time.