INSIGHT BRIEFS

The Insight Briefs series are commissioned papers on topics that are not covered in the NIDS-CRAM data but are important for policy makers to understand. In the first series there are three Insight Briefs, two on education and one on recessions.

How is the COVID-19 pandemic affecting educational quality in South Africa?

Evidence to date and future risks

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15 July 2020

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Abstract

Educational quality has been improving in South Africa, off a low base, according to international testing programmes. Yet this trajectory was fragile already before the COVID-19 pandemic. Models recently developed to understand the impact of the pandemic on educational quality, when applied to South Africa, reveal trends which are worrying. Learning losses can be expected to exceed what is suggested by actual days of schooling lost, as prolonged closures result in the forgetting of skills acquired before the closure. Depending on how successful the efforts of the schooling system and individual teachers are in catching up lost learning, below-expected Grade 12 outcomes lasting to at least 2022, and possibly as far as 2031, could be experienced. This will compromise progress in the post-school education sector, and productivity in the labour market. Two drivers of past improvements in learning outcomes seem particularly vulnerable to the impacts of the pandemic: access to educational materials by learners could be reduced as budgets are cut; and participation in pre-schools could drop as poor households become unable to pay fees. Even before the pandemic, it was clear that further qualitative improvement would require innovation in the schooling sector. Two areas of innovation should continue to receive attention in the coming years: taking to scale new methods in the teaching of early grade reading which government's own research has found to be effective; and building better school accountability systems, within the framework offered by the National Development Plan.

Executive Summary

Where we are coming from

We are only beginning to understand the impacts of the COVID-19 pandemic on educational quality, and education more broadly. Educational quality, meaning here the basic competencies of learners in the schooling system, is among the most important matters to worry about when considering South Africa's future. Basic competencies are the foundation for all education, and are strong predictors of the life opportunities of individuals. The economic literature of the last fifteen or so years has moreover found enormous effects of learning outcomes in schools on long-term economic prospects. Lastly, educational quality has been improving in South Africa, off a low base, at a rate that is fast by international standards, meaning educational quality is an especially vital 'ray of hope' for the future when it comes to tackling the country's ills, above all inequality, poverty and unemployment.

The paper is divided into three main sections. Section 2 deals with where we are coming from. This is often poorly understood, so this is an important section. If we are to protect schooling in the COVID-19 context, we need to have a clear picture of what we are protecting, or we risk adopting inappropriate strategies. Section 3 turns to what we know about the relationship between COVID-19 and educational quality, and presents a few scenarios for South Africa. Section 4 discusses specific policy challenges for South Africa.

It appears that key drivers of qualitative improvement in schools have been: (1) a clearer set of curriculum documents; (2) a cultural shift towards learning outcomes; (3) better access to books; (4) higher participation in pre-school institutions; (5) and an improvement in the capabilities of teachers, largely because younger teachers joining the profession display above-average skills. Of these drivers, access to books, and pre-school participation are probably most vulnerable to the negative impacts of the pandemic.

Current understandings of the impact of COVID-19 on education

The COVID-19 epidemiology and schools

Conflicting understandings of how the coronavirus is transmitted by children has made decision-making in relation to schools difficult. Among experts, the understanding shifted in around April from the coronavirus as a flu-like virus spread easily by children, to the understanding that not only did young children hardly ever suffer serious illness, they were also exceptionally weak transmitters of the virus. This is in part what prompted global bodies to call for the end of school closures, and for countries such as South Africa to re-open schools fairly quickly. However, the epidemiological rationale has not been well communicated to the public. As a result, many parents and teachers over-estimate the personal health risks they face, which in turn can lead to excessive risk-avoidance which is detrimental to schooling. At the same time, the fact that older children and adolescents are more likely to transmit the virus, and that strategies at the primary and secondary level need to be different, has also not been clearly communicated. In this regard, it is important to monitor school re-closures due to people testing positive for COVID-19 by level. Some very preliminary analysis points to secondary schools being four times as likely as primary schools to re-close. This would be in line with the evidence on lower transmissions among younger children, and supports the argument that differentiated policy responses are needed.

Measures by schools to reduce infections

School re-openings have brought with them complex policy problems around how to manage the virus in the school environment, while minimising the negative impacts on learning. There are four particularly difficult policy areas: (1) physical distancing arrangements for the school as a whole; (2) physical distancing in the classroom; (3) the use of special equipment such as personal protective equipment (PPEs) and infrared thermometers; and (4) the rights of at-risk teachers to stay at home. The range of practices seen in a few countries with easily accessible policies on these matters varies enormously. This, in turn, reflects vastly different assumptions around the COVID-19 risks and the various financial and non-financial costs of mitigating these risks. There needs to be more discussion of the various options, and the science that underpins them.

School closures and learning losses

It should not be assumed that, for instance, 40 days of school closures leads to 40 days of learning losses. The evidence suggests strongly that learning losses, at least as measured soon after the disruption, will be greater than what is suggested by actual days lost, in large part because disruptions result in learners forgetting some of what was previously learnt. Simulations presented here assume that actual days lost needs to be inflated by 25% to produce a learning-adjusted measure of time lost. Thus 40 days of school closures would result in the loss of 50 days' worth of learning. This would roughly be in line with the very limited evidence available on these effects. A key question is whether learning losses seen immediately after learners return to school, worsen, stay the same, or shrink, over time. Here again, the evidence is thin, and how one interprets it is debatable. Two South African pandemic-induced scenarios are generated, one where learning losses remain unchanged for the rest of each learner's schooling, another where there is a catching up to the pre-pandemic trajectory after three years. Without catching up, the skills of Grade 12 graduates would be lower than in the no-pandemic scenario up to 2031. In contrast, the catching up scenario takes the quality of graduates back to the no-pandemic trend in 2023. Even this is a worrying loss, but clearly much better than negative pandemic-related quality impacts being felt for a whole decade. Clearly, catch-up efforts driven by policy, schools and individual teachers are vital. Yet this should detract from the importance of maintaining the ongoing quality improvements which were occurring pre-2020. If this trend can be sustained, it serves as a buffer against losses in human capabilities. Such losses are inevitable, but they can be reduced if, for instance, the capabilities of the average teacher continue to improve. A further mitigating factor for South Africa is that our school year is relatively long, and that it seems our school closures may in the end be relatively short, meaning that compared to the rest of the world, the percentage of the school year lost in South Africa might be relatively low.

The limitations of remote schooling as a solution

The CRAM survey, Wave 1, confirms what one may expect, that the possibility of schooling from home is greater for wealthier households, in part because they have higher levels of access to the internet. It is now widely accepted that remote schooling in the context of the pandemic is neither feasible nor fair in developing countries. It raises difficult ethical questions for teachers, who often have classes where some learners can access online schooling from home, while others cannot. Teachers who proceed to teach advantaged learners who enjoy online access could be accused of abandoning disadvantaged learners.

COVID-19 and dropping out

Both the World Bank's simulation tool and specific realities in South Africa, in particular no-fee schooling for most of the poor up to the secondary level, and historically high levels of unemployment, suggest that dropping out of schools will not be among the most serious education consequences of the pandemic.

The pandemic and South Africa's education policy challenges

Dealing with shocks: Schools and poverty alleviation

The CRAM data have provided insights into the effects of the pandemic on child hunger. The findings are alarming. After successes over twenty years in reducing, though not eliminating, child hunger, two factors relating to the pandemic have undone this trend: income losses in households, and interruptions in access to meals at schools. The reductions in hunger over the longer term are likely to have contributed to educational improvements and, conversely, the COVID-19 nutrition shock could exacerbate learning losses. Tackling child hunger that has arisen as a result of the pandemic is arguably South Africa's most pressing social policy challenge currently. Better targeting of the resources of the National School Nutrition Programme (NSNP) would be one possibility. Currently, the NSNP provides meals to around 80% of learners, while under half of learners are from households unable to properly feed their children.

Protecting existing drivers of change

Of the five factors identified in the current report which appear to have driven the qualitative improvement of the last twenty years, two stand out as being particularly vulnerable to the effects of the pandemic: educational materials for learners and pre-school participation. Spending on non-personnel recurrent items by education departments, which includes spending on books and other materials, could easily be affected by the expected budget cuts. This budget item has already been negatively affected during pre-pandemic spending cuts, and is not protected in the same way school nutrition is, through a conditional grant. Pre-school participation is likely to suffer largely due to declines in household income. Before the pandemic, there were plans to expand public spending on pre-school education. Convincing budget arguments can and must be put forward to make this a reality, as far as possible.

COVID-19: A facilitator or suppressor of innovation?

Some of the guidance from global bodies focusses on the need to use the pandemic as an opportunity to accelerate necessary innovation that facilitates the achievement of SDG targets around learning outcomes. As much as it is necessary to protect the existing drivers of improvement in South Africa's schooling system, it is also clear that these drivers were insufficient, even in a no-pandemic scenario, to guarantee further improvement. Innovation in two vital areas had already been occurring in South Africa before the pandemic, and this work should continue. Firstly, South Africa has come far in exploring and evaluating practical ways in which the teaching of reading in the early grades can be improved. These new methods now enjoy broad support. The priority should be to take them to scale, and to monitor that they do in fact result in better reading competencies among learners. Reading is the central pillar for everything else in education. Secondly, the National Development Plan offers an excellent framework for building more effective school accountability systems. Such systems, which must be fair and take into account the socio-economic contexts of schools, have been shown around the world to be a prerequisite for educational progress, yet they remain weak in South Africa.

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1. Introduction

The COVID-19 pandemic is arguably the largest global shock since the Second World War. Its various economic and social ramifications are likely to be felt for many years, yet we are only beginning to understand their nature and magnitudes. This paper deals with possible impacts of the pandemic on educational quality in South Africa, and what this means for the actions that need to be taken to limit the damage. Educational quality, meaning here the basic competencies of learners in the schooling system, is among the most important matters to worry about when considering South Africa's future. Basic competencies are the foundation for all education, and are strong predictors of the life opportunities of individuals. The economic literature of the last fifteen or so years has moreover found enormous effects of learning outcomes in schools on long-term economic prospects. Lastly, educational quality has been improving in South Africa, off a low base, at a rate that is fast by international standards, meaning educational quality is an especially vital 'ray of hope' for the future when it comes to tackling the country's ills, above all inequality, poverty and unemployment.

While this paper attempts to take us forward in terms of understanding COVID-19 and educational quality, its findings must be considered tentative. The paper was produced in a short space of time, while the evidence and models required for looking forward are still thin, and to some extent in flux.

It is useful to look back at the kind of predictions being made when what is arguably a more manageable, though at the same time more deadly, pandemic, namely the HIV/AIDS pandemic, emerged[1]. For South Africa, extremely disruptive shortfalls in the supply of teachers were projected, largely due to mortality among teachers[2]. These negative consequences were barely felt, in the end, in part due to the availability of anti-retroviral treatment and the fact that the availability of older South Africans who were not teaching, but had teaching qualifications, had not been taken into account. This should serve as a reminder that projections around the impact of COVID-19 on education, and in general, are quite possibly over-estimating, or under-estimating, the harm caused by the pandemic. As important as it is to attempt to gauge the impacts of the pandemic, the high levels of uncertainty currently mean any projections must be continually questioned and periodically re-calculated.

The paper is divided into three main sections. Section 2 deals with where we are coming from. This is often poorly understood, so this is an important section. If we are to protect schooling in the COVID-19 context, we need to have a clear picture of what we are protecting, or we risk adopting inappropriate strategies. Section 3 turns to what we know about the relationship between COVID-19 and educational quality, and presents a few scenarios for South Africa. Section 4 discusses specific policy challenges for South Africa.

The paper, in particular section 3.4, draws from the limited set of school-related questions in the first wave of data collected through the Coronavirus Rapid Mobile Survey (CRAM). More school-related questions have been included in CRAM's second wave.

1 Though the World Health Organization does not consider HIV/AIDS a pandemic, it is often described as such by health experts. By 2019, an estimated 32 million people globally had died of HIV/AIDS ('Global HIV & AIDS statistics — 2019 fact sheet' at https://www.unaids.org/en/resources/fact-sheet). By end June 2020, around half a million people had died of COVID-19, and a medium scenario in the widely used, but probably over-estimated, projections of Imperial College London puts the total expected global deaths due to COVID-19 at 22 million (Excel accompanying Ferguson *et al* [2020]).

2 Crouch, 2001.

2. Where we are coming from

2.1. Progress off a low base since 2002

Despite disappointing trends in recent years in relation to unemployment and poverty, educational quality has been improving, according to reliable data. The three international testing programmes South Africa participates in point to improvements since around 2002 which are rapid by international standards, though the point of departure in South Africa is low. If historical rates of progress continue into the future, South African primary learners could, for instance, by 2040 reach the levels of reading competency seen today in Iran and Indonesia. This is the trajectory that seemed possible before COVID-19. The question is how the pandemic will affect this.

For reasons explained in section 2.3, improving the learning outcomes of schooling systems has emerged as an especially important matter in the development discourse in the last twenty years. The imperatives are at once simple and complex. Can children read? Can they do basic mathematics? Is the schooling system getting better at teaching children these fundamental skills? These concerns lie behind the introduction of a far stronger emphasis on learning outcomes in the Sustainable Development Goals of the UN – the earlier Millennium Development Goals had focussed mainly on school attendance. Participation by countries in international testing programmes to gauge progress with respect to learning in fundamental subjects, particularly language and mathematics, has grown[3]. More countries are developing rigorous national systems to measure progress.

Though different testing programmes use different metrics, work on equating these metrics has resulted in global 'league tables' of countries, which are relatively reliable. South Africa's performance ranks very poorly in these tables, even after recent improvements. There is also emerging work on how rapidly one can expect learning outcomes to improve, given the trends of the strongest improvers among countries in recent times. Two measures of progress are commonly used. The first is annual progress at some level of the schooling system in terms of standard deviations. The second, based on the first, is annual progress in terms of years of learning. Neither is a perfect measure, but they serve a useful purpose, and will be used extensively in the current report.

It has been estimated that an annual improvement of 8% of a standard deviation in learning outcomes is about the best a developing country could hope for, and that the higher the quality of education achieved, the more difficult it is to maintain such a rapid rate of improvement[4]. What is in fact seen in the least educationally developed countries, where data are available, is an average annual improvement of around 0.04 standard deviations a year, with much variation across countries. The data thus suggest that the quality of schooling has gradually been improving, but often at rates which are slower than they could be.

As in many developing countries, in South Africa the educational quality trend is too often poorly understood. This is in itself a hindrance to progress, as any constructive debate around improvement needs a clear understanding of what one is trying to improve. Perhaps COVID-19, with its graphs, hotspots and focus on testing, will help to bring more science into the discourse around educational improvement. While the science and numbers cannot answer all the questions, and the ideological and philosophical sides of the debate are vital, better use of the available quantitative knowledge is needed.

That there should be progress in educational quality in the South African schooling system is not something that many South Africans would readily believe. Despite what can now be considered irrefutable evidence of progress from the international testing programmes, there are several reasons why the matter has been a confusing one. First, at a basic conceptual level, there is sometimes an assumption that things must look ***good*** before it can be said there has been ***improvement***. Clearly,

3 UNESCO Institute for Statistics, 2018.

4 UNESCO Institute for Statistics, 2019.

the quality of schooling on the whole is not good currently. Yet, as explained below, the progress that has occurred has been relatively fast, and important. Crucially, 'fast' is used here in a relative sense. Even in the most successful schooling systems, qualitative improvement could be described as painfully slow.

Second, many still view the widely publicised Grade 12 examinations as the only real indicator of progress. Confusion around what these examinations are telling us can lead to scepticism. Third, extremely worrying negative trends with respect to poverty and unemployment in South Africa have brought about pessimism about the general trajectory of the country, including the educational trajectory. Fourth, even in the international testing programmes there have been some problems, specifically a couple of revisions of results which can be confusing to follow.

What do the international testing programmes show? There are three programmes which all point to progress of a similar magnitude: TIMSS[5], in Grade 9 mathematics and science since 2002; PIRLS[6], in Grade 4 reading since 2006; and SACMEQ[7] in Grade 6 mathematics and reading since 2000. These three programmes point to rates of improvement which have reached the 0.08 'speed limit' during the last twenty years, but have reduced somewhat to around 0.06 in more recent years. While South Africa's ***level*** of quality remains low in an international comparison, the country's ***rate of improvement*** has been among the fastest. And importantly, improvements have been largest among worse performing schools, meaning inequality has diminished[8].

What has been confusing is that both SACMEQ and PIRLS saw trends released which were subsequently revised following further inquiry. Moreover, the rigour of the test administration process in SACMEQ has been questioned, though such problems do not appear to unduly influence the general patterns[9]. In the case of SACMEQ, the revision resulted in a less steep rate of improvement for South Africa, while in the case of PIRLS, the revision raised the rate of improvement.

The standard deviation can be thought of as a measure of inequality. A standard deviation of 106 PIRLS points, for instance, indicates more inequality in the learning outcomes of learners than a standard deviation of, say, 90 PIRLS points. South Africa's Grade 4 standard deviation in PIRLS has been 106. In recent years, South Africa's annual improvement in PIRLS has been 5 PIRLS points a year, which gives 5% of a standard deviation a year. Moreover, two different sources, one being PIRLS, point to grade-on-grade gains in lower primary performance in reading in South Africa being 49% of a standard deviation[10]. The fact that the two sources provide exactly the same value is a coincidence. Dividing 5% by 49% gives 10%. We can thus say that Grade 4 reading is improving each year by one-tenth of a year's worth of learning. Put differently, at this rate of improvement, Grade 4 learners in 2030 will read as well as Grade 5 learners did in 2020 – the difference between the two years is 10 years.

The following graph captures what the PIRLS trend has been, and what a realistic though optimistic future trend might be. 'Confirmed' is from the PIRLS 2006, 2011 and 2016 results we have, 'Projected' assumes that the historical trend can be maintained. Though it is not clearly visible in the graph, the annual gain in the projection falls gradually, from 10% of a year's worth of learning in 2016-2017 to 8% in 2039-2040. This would be in line with the international evidence. The standard deviation of 106 referred to earlier is used for all years. The current trajectory would place South Africa's reading in 2040 on a par with that of Iran in 2016 and Indonesia in 2011 (Indonesia did not participate in PIRLS 2016). In terms of South African learners passing the 'low international benchmark' in PIRLS, which is set at 400 PIRLS points, the trajectory implies moving from the still very low 22% of learners 'passing' in 2016, to around 65% reaching this benchmark in 2040.

5 Trends in International Mathematics and Science Study.

6 Progress in International Reading Literacy Study.

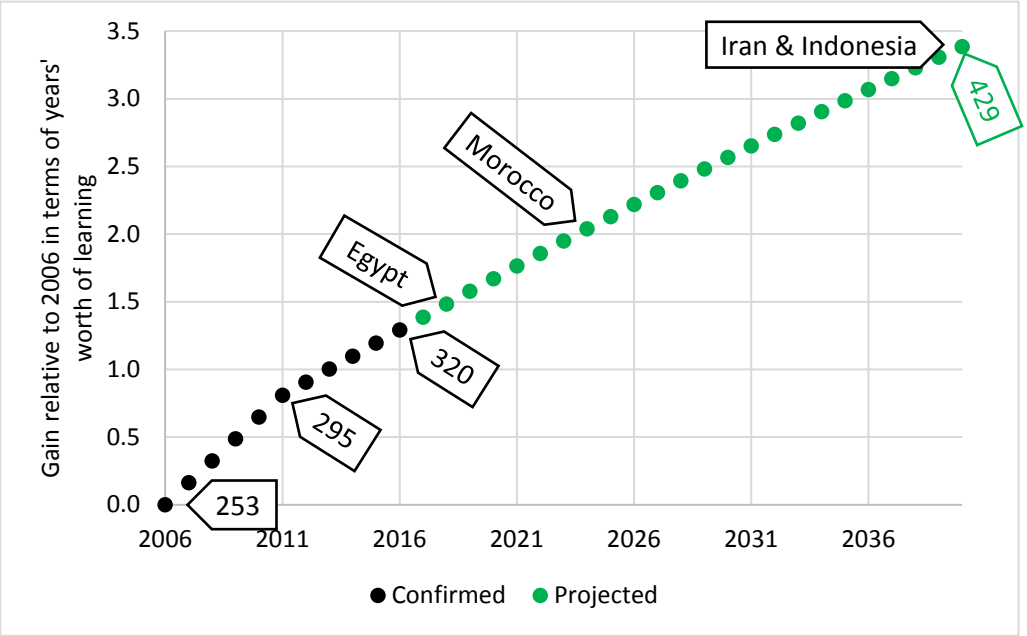
7 Southern and Eastern Africa Consortium for Monitoring Educational Quality.

8 Van der Berg and Gustafsson, 2019.

9 Gustafsson and Nuga Deliwe, 2017.

10 Gustafsson, 2020a: 4; 2020b.

Figure 1: South Africa's Grade 4 reading trend



Note: Values within arrows are PIRLS Grade 4 mean scores.

The above graph provides a scenario for the primary level that is similar to an analysis done previously for the secondary level and published by the Department of Basic Education (2020a: 12). The latter draws from South Africa's TIMSS Grade 9 trend and forecasts South Africa's Grade 9 learners reaching the current ***Grade 8*** performance of Malaysia by 2030.

2.2. Likely drivers and constraints up till now

Research on what lies behind the relatively steep qualitative improvements at the primary and secondary levels since around 2002 barely exists, and would be difficult methodologically. In part, one must speculate, using the information we have and evidence from other countries. It appears that key drivers of change have been: (1) a clearer set of curriculum documents; (2) a cultural shift towards learning outcomes; (3) better access to books; (4) higher participation in pre-school institutions; (5) and an improvement in the capabilities of teachers, largely because younger teachers joining the profession display above-average skills. Of these drivers, access to books, and pre-school participation are probably most vulnerable to the negative impacts of the pandemic. Budget constraints could compromise spending on materials for learners, while worsening household poverty is likely to reduce pre-school participation.

While there is now clear evidence that the improvement exists, the reasons behind this are not clear, in part because they would be intrinsically difficult to identify, and because there has been limited research into this matter. The PIRLS and TIMSS data, which include background information on learners, teachers and schools, could be analysed in more depth in order to cast new light on the matter.

An extensive 2017 report to Parliament on tackling inequalities in the country draws from a background report on basic education in concluding what has contributed to the educational quality improvements. A clearer set of curriculum documents, a cultural shift towards learning outcomes brought about in part by the Annual National Assessments, and better access to books, are all seen as plausible causal factors[11].

11 Parliament, 2017: 146; Van der Berg and Gustafsson, 2017: 14.

To these three factors one could add two additional ones. Firstly, participation in pre-school institutions rose sharply during the period 2003 to 2013[12]. While the quality of much pre-school education has been questioned, it is likely that even low-quality pre-schooling is better than no schooling at all. Secondly, there is evidence that on average younger teachers display considerably better skills than their older peers[13]. This is probably linked to the decision taken in the late 1990s to move all teacher training to universities. The fact that a bulge of older teachers is currently approaching retirement age not only poses the risk of an under-supply of young teachers, it also creates an opportunity to further improve the quality of schooling by accelerating the shift towards more university-trained teachers in the system.

Not all qualitative change in schools is due to changes occurring in the education system. Changes occurring across households typically play an important role too. The fact that the proportion of learners from households with at least one Grade 12 Matriculant has been increasing during the last twenty or so years would have assisted the improvement in learning outcomes[14].

2.3. Why learning outcomes in schools are so important

A small revolution in the thinking about how countries develop occurred around twenty years ago as new internationally comparable data on the quality of schooling became available, and historical relationships between educational quality and income per capita were analysed. It became clear that where certain countries and world regions had lagged behind, this was largely because they had failed to bring about the effective teaching of basic reading and mathematics in schools.

Up until around 2000, economists attempting to understand economic growth would use highest level of education successfully completed as a measure of human capital. This started to change after 2000, in large part because various international testing system began collecting data on student competencies in developing countries. This revolutionised development thinking, and prompted a major shift in the policy emphasis across the world towards learning outcomes in schools. UNESCO's 2005 Global Monitoring Report[15] provides an excellent and accessible summary of the research, and its policy implications. In South Africa, the revelation provided by the 2000 SACMEQ study that the country's Grade 6 performance was well below that of many less developed African countries was arguably the trigger than brought about a stronger emphasis on learning outcomes, and on measuring this, in the national policy debates.

3. Current understandings of the impact of COVID-19 on education

Section 3 sums up what we know now, and what we do not know yet, about children and the new coronavirus, and what this means for schooling. It also evaluates, from a South African angle, the emerging arguments, models and theories around the impact of the pandemic on educational quality.

3.1. The COVID-19 epidemiology and schools

Conflicting understandings of how the coronavirus is transmitted by children has made decision-making in relation to schools difficult. Among experts, the understanding shifted in around April from the coronavirus as a flu-like virus spread easily by children, to the understanding that not only did young children hardly ever suffer serious illness, they were also exceptionally weak transmitters of the virus.

12 Van der Berg, Gustafsson and Malindi, 2020: 25.

13 Armstrong (2014) has found this using teacher test score data from SACMEQ 2007. This has been confirmed using the 2013 SACMEQ data.

14 Parliament, 2017: 146.

15 UNESCO, 2005.

This is in part what prompted global bodies to call for the end of school closures, and countries such as South Africa to re-open schools fairly quickly. However, the epidemiological rationale has not been well communicated to the public. As a result, many parents and teachers over-estimate the personal health risks they face, which in turn can lead to excessive risk-avoidance which is detrimental to schooling. At the same time, the fact that older children and adolescents are more likely to transmit the virus, and that strategies at the primary and secondary level need to be different, has also not been clearly communicated. In this regard, it is important to monitor school re-closures due to people testing positive for COVID-19 by level. Some very preliminary analysis points to secondary schools being four times as likely as primary schools to re-close. This would be in line with the evidence on lower transmissions among younger children, and supports the argument that differentiated policy responses are needed.

Though widespread school closures appear not to have been advocated by global bodies such as the World Health Organization (WHO) and UNESCO, past experiences with flu epidemics, as well as the example provided by Wuhan, in China, led virtually all countries around the world to implement blanket school closures. This very strong reaction can in part be explained by the very high mortality figures presented in the influential Ferguson ***et al*** (2020) projections of Imperial College London, published in March. Those projections put deaths in South Africa, even with social distancing, at around 150,000. Subsequent projections were considerably lower, though still alarming, for instance a maximum of around 50,000 deaths towards the end of the pandemic's evolution in the May report of the South African COVID-19 Modelling Consortium (2020).

A key factor which prompted organisations such as the World Bank and UNESCO to call for the re-opening schools as soon as possible was mounting evidence that not only were children seldom falling ill from the virus, they were exceptionally weak transmitters of the virus[16]. The other key factor was the mounting realisation of how damaging school closures were for the long-term health and education prospects of children. Unfortunately, there has been no authoritative clearinghouse of the medical evidence relating to schools by bodies such as UNESCO. There have fortunately been important meta-analyses made available by researchers, such as the periodically updated Munro (2020). However, the evidence is clearly being used in the guidance of, for instance, the WHO, as in the following from a May 2020 guide directed at schooling sectors[17]:

> To date, there have been few educational institutions involved in COVID-19 outbreaks, but from these studies, it appears that disease transmission was primarily related to social events linked to school or university life rather than transmission within classrooms. These studies also suggest that the introduction of the virus was likely by an adult member of staff.

The South African Paediatric Association (2020) has put out a statement along the same lines:

> Teachers are not at high risk of being infected by children. Teachers are at a higher risk of contracting the virus from other adults (e.g. colleagues), at home or in the community (outside school). Teachers with comorbidities are at increased risk for severe Covid-19.

Apart from the medical evidence, there is important evidence emerging from analyses of the relationship between school closures and school re-openings, on the one hand, and COVID-19 cases and deaths, on the other. Such evidence suggests that school closures were a particularly weak inhibitor of COVID-19 effects, compared to other 'non-pharmaceutical interventions' (NPIs), specifically banning other mass gatherings[18]. This would be in line with the medical evidence on low transmissions by children. The WHO has acknowledged the importance of this evidence[19]:

> Consideration of socioeconomic costs and public perception is important, especially when there is little or no evidence on the efficacy of specific NPIs (for example, school or business closures).

16 See summary in Gustafsson (2020c) and Spaull (2020).

17 World Health Organization, 2020a: 1.

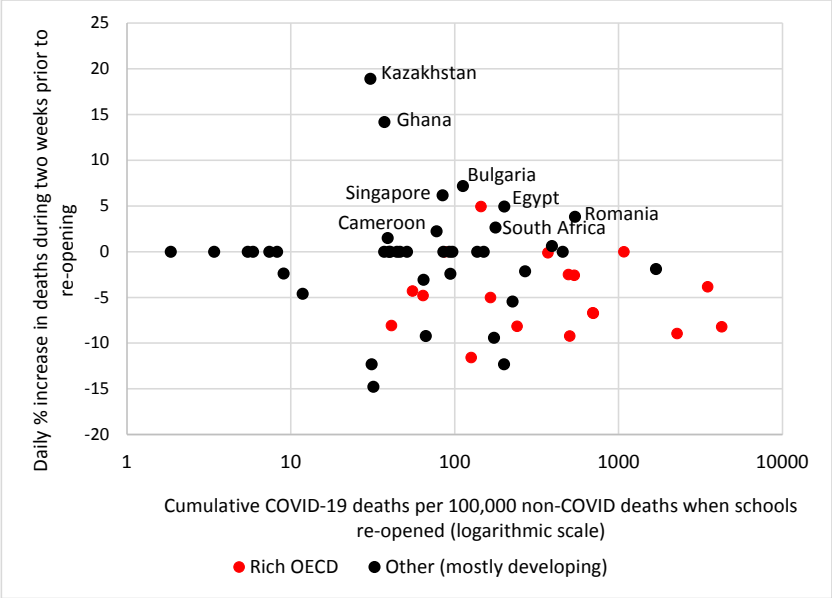
18 A prominent example is Banholzer *et al* (2020).

19 World Health Organization, 2020b: 6.

South Africa responded relatively quickly to the call to re-open schools[20]. Of 151 countries with over a million inhabitants which imposed stringent school closures, South Africa was the 56th country to re-open its schools, according to the University of Oxford's OxCGRT[21] dataset. Around two-thirds of all re-openings, including South Africa's, have involved partial re-opening, for instance through the phased re-entry of particular school grades.

The timing of school closures and re-openings has looked rather different in developing countries, compared to rich countries. In developing countries, both the closing and re-opening of schools have often occurred while COVID-19 cases and deaths were rising, while in rich countries re-openings generally occurred while deaths were on the decline. This can be seen in *Figure 2* below. Most rich country markers are below zero on the vertical axis, in other words at a point where though total cumulative deaths (the horizontal axis) were high, deaths were on the decline. In contrast, several developing countries, including South Africa, are re-opening schools while deaths are increasing. Clearly, South Africa is not the worst off in this regard. Deaths were rising faster in, for instance, Ghana or Egypt when schools re-opened there.

Figure 2: State of the pandemic when schools re-opened



Source: Own analysis of OxCGRT data.
Note: The analysis excludes very small countries with a population lower than one million.

What is unfortunate is that important differences between the levels of the schooling system have not been acknowledged in the policy advice. For example, a guide produced jointly by UNESCO (2020), the World Bank and Unicef on re-openings refers to schools in general, without any differentiation between, say, the primary and secondary levels. Moreover, the importance of re-opening pre-school institutions is often overlooked. Epidemiological evidence by single age seems not to exist yet, but the evidence we have suggests that while infection of others by children aged below ten is extremely rare, adolescents between ages 10 and 20 display infection patterns that lie between those of adults and those of young children. This suggests that secondary schools, and perhaps the highest primary grades, require somewhat different strategies, compared to the lower primary and pre-school levels.

A rough analysis was conducted of the level of those schools which were re-closed in June and early July due to the presence of teachers or learners testing positive for COVID-19. Online news sites were searched, on 4 July, and references to 19 specific schools were found. It seemed difficult to find any more schools than this mentioned by name. An attempt was made to limit the analysis

20 Gustafsson, 2020d: 11.
21 Oxford COVID-19 Government Response Tracker. See Hale *et al* (2020).

to public schools. Of the 19 schools which re-closed, 11 were secondary schools and 7 primary schools. Given that there are around 6,000 public secondary schools and 14,800 public primary schools, the probability of a secondary school closing was four times as high as that for primary schools.

Given the scientific uncertainties, but also gaps in the communication of the evidence we do have, anxieties around the pandemic are high, and higher than they would be if we had clearer knowledge about the virus. In South Africa, parents have organised against school re-openings[22]. Yet the evidence also suggests that the demand for a return to schools is stronger among the less advantaged. A survey conducted in April found that around 85% of respondents in rural areas and poor townships were very concerned about their children not being in school, while the figure for those in what would be the top income quintile was just 52%[23]. This would reflect the fact that the wealthy have other options, such as remote teaching by the school, and other educational resources not linked to the school at all.

3.2. Measures by schools to reduce infections

School re-openings have brought with them complex policy problems around how to manage the virus in the school environment, while minimising the negative impacts on learning. There are four particularly difficult policy areas: (1) physical distancing arrangements for the school as a whole; (2) physical distancing in the classroom; (3) the use of special equipment such as personal protective equipment (PPEs) and infrared thermometers; and (4) the rights of at-risk teachers to stay at home. The range of practices seen in a few countries with easily accessible policies on these matters varies enormously. This, in turn, reflects vastly different assumptions around the COVID-19 risks and the various financial and non-financial costs of mitigating these risks. There needs to be more discussion of the various options, and the science that underpins them.

While there are many guidelines at the global and national levels around what steps schools should take when they re-open, in order to limit infections, there is little in the way of even descriptions of what various schooling systems actually do, let alone preliminary evaluations of how different approaches succeed in limiting infections, while not unduly compromising the learning process. This is an important knowledge gap as systems need to learn from each other.

This section draws from a short previous report by one of the authors looking into how to organise this information, and what a few countries with policies available online have decided to do[24]. Of course, policies are not necessarily an indication of what is actually practiced in schools and classrooms, but they provide a sense of the across-country variation.

It is clear that practices differ vastly, yet most countries at least implicitly say their position is based on the science. With regard to physical distancing arrangements for the school as a whole, there is relative consistency. Several countries emphasise the importance of staggering the start and end time of the school day to ease congestion as people arrive at and leave the school.

Physical distancing inside the classroom is, however, taken forward very differently. Spain insists on two metres between each learner, England views two metres as an ideal, while acknowledging that this would be difficult to implement in the case of younger children. The United States recommends a distance of 1.8 metres between learners. Singapore's requirement that ***desks*** be one metre apart is probably compatible with a two-metre distance between ***learners.*** In Sweden there is not even a recommended distance, at least for primary schools, the rationale being that the children in these schools hardly transmit the virus. In South Africa, the Department of Basic Education's guidelines[25] refer to an ideal of a 1.5 metre distance, but have not explicitly said learners should maintain this

22 Cruywagen, 2020.

23 Rule *et al,* 2020.

24 See Gustafsson, 2020f.

25 Department of Basic Education, 2020b, 2020c.

distance from each other in the classroom when seated. The WHO refers to the need for a metre between ***desks***[26].

With regard to the use of cloth masks in schools, this is encouraged by the Centers for Disease Control and Prevention (CDC) in the United States, discouraged by the England school authorities, required in Singapore, not mentioned at all in the policies in Sweden, and in the case of Spain required only when a distance of two metres cannot be maintained.

The right of teachers to work from home, clearly a difficult thing to uphold in a typical school context, ranges from no rights at all in Sweden, to rights only in extreme circumstances in England, to extensive rights in Spain, either because a teacher suffers from co-morbidities, or even purely (it appears) on the basis of being over sixty.

One measure which has clearly received inadequate attention is the dissemination of accurate information to learners regarding what we know about the science of the coronavirus. The WHO expresses this need as follows[27]:

Explain to the students the reason for school-related measures, including discussing the scientific considerations and highlighting the help they can get through schools (e.g. psychosocial support).

The fact that policies tend not to explain how they are based on the science, weakens the force of the policy, and the ability of users of the policy to interpret it in the best possible way.

3.3. School closures and learning losses

It should not be assumed that, for instance, 40 days of school closures leads to 40 days of learning losses. The evidence suggests strongly that learning losses, at least as measured soon after the disruption, will be greater than what is suggested by actual days lost, in large part because disruptions result in learners forgetting some of what was previously learnt. Simulations presented here assume that actual days lost needs to be inflated by 25% to produce a learning-adjusted measure of time lost. Thus 40 days of school closures would result in the loss of 50 days' worth of learning. This would roughly be in line with the very limited evidence available on these effects. A key question is whether learning losses seen immediately after learners return to school, worsen, stay the same, or shrink, over time. Here again, the evidence is thin, and how one interprets it is debatable. Two South African pandemic-induced scenarios are generated, one where learning losses remain unchanged for the rest of each learner's schooling, another where there is a catching up to the pre-pandemic trajectory after three years. Without catching up, the skills of Grade 12 graduates would be lower than in the no-pandemic scenario *up to 2031*. In contrast, the catching up scenario takes the quality of graduates back to the no-pandemic trend in 2023. Even this is a worrying loss, but clearly much better than negative pandemic-related quality impacts being felt for a whole decade. Clearly, catch-up efforts driven by policy, schools and individual teachers are vital. Yet this should detract from the importance of maintaining the ongoing quality improvements which were occurring pre-2020. If this trend can be sustained, it serves as a buffer against losses in human capabilities. Such losses are inevitable, but they can be reduced if, for instance, the capabilities of the average teacher continue to improve. A further mitigating factor for South Africa is that our school year is relatively long, and that it seems our school closures may in the end be relatively short, meaning that compared to the rest of the world, the percentage of the school year lost in South Africa might be relatively low.

The current pandemic has prompted various reviews of past studies dealing with the impacts of disasters and disruptions on learning outcomes in schools, and theorising on how estimates from previous studies can inform current planning. A consensus is emerging around what the key factors are, but specific conclusions vary considerably from one analyst to the next.

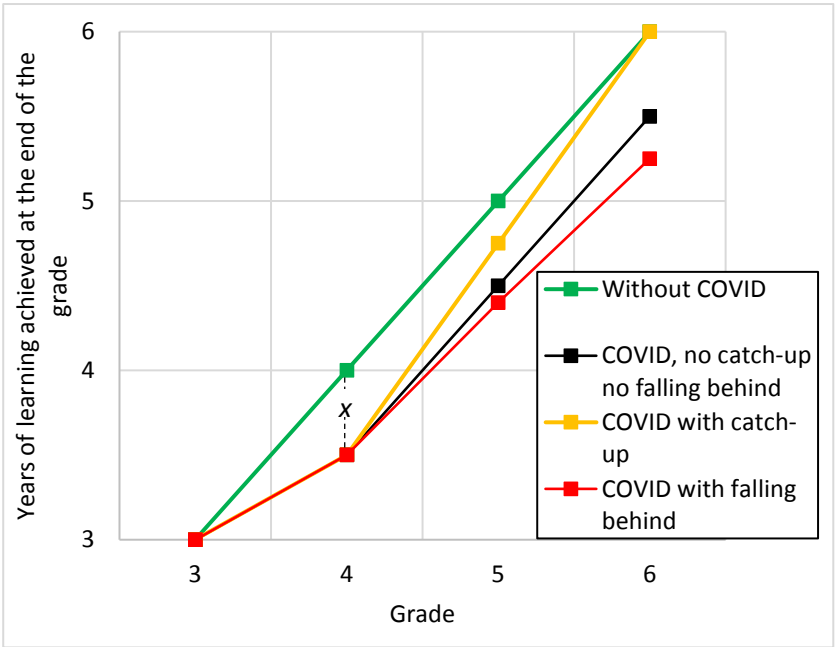
26 World Health Organization, 2020a: 4. This guide also says 'Maintain a distance of at least 1 metre^2 between everyone present at school', which is difficult to understand, given that a metre *squared* is not a distance, but an area.

27 World Health Organization, 2020a: 4.

It is useful to think first in terms of the trajectory of an individual learner, and then in terms of the trajectory of a single grade (as in *Figure 1* above). *Figure 3* below traces a hypothetical average learner. The curves start with the learner having achieved three years of learning at the end of Grade 3. Here and in the discussion that follows, ***what the average learner actually learns in a year*** is considered. It should be clear from section 2.1 that this is less than what learners would learn in a year if even low international standards were attained. Similarly, it is clear that learners, even those promoted to the next grade, do not acquire all the skills required by the South African curriculum. *Figure 3* thus depicts the actual and relatively low acquisition of skills in a year.

The green 'Without COVID' curve assumes that by the end of Grade 4, the learner would have acquired four years of learning, and so on up the grades. The black 'COVID, no catch-up no falling behind' curve assumes the learner was in Grade 4 in 2020, during the pandemic, and ended the year with less than four years of learning, or four years minus a fraction ***x*** of a year, due to school days lost. Here ***x*** is 50% – half a year of learning was lost. What ***x*** is likely to be is a key empirical question and is discussed below. After 2020, the curve continues parallel to the 'Without COVID' curve. The learner never regains the lost learning. If one extended the graph to Grade 12, the learner would still be ***x*** of a year behind at the end of Grade 12. The orange 'COVID with catch-up' curve assumes the learner gradually catches up, meaning the learning gain per year beyond 2020, in this case in 2021 and 2022, is ***greater than*** one normal year's worth of learning. By the end of Grade 6, the learner has caught up to where he or she would have been had there been no pandemic. Finally, the red 'COVID with falling behind' curve, the worst scenario, assumes that the learner falls further behind beyond 2020. In the graph, the learner is as much as 80% of a year behind by the end of Grade 6. In theory, this could occur if teachers do not adapt to how behind learners are, and stick blindly to the pre-pandemic curriculum. This could overwhelm the learner.

Figure 3: An average learner and pandemic effects



What does the emerging literature say about the likelihood of the three hypothetical pandemic scenarios of *Figure 3*, and the magnitude of the likely learning losses?

The World Bank (2020) has released a report on the challenges posed to education by the pandemic, and what policy responses to prioritise. The World Bank has moreover released, in June, a simulation of possible effects of the pandemic on learning outcomes, participation in schools, and future household income – see Azevedo, Hasan ***et al***, 2020 and Azevedo, Geven ***et al***, 2020.

In dealing with the impact of school closures on learning, the World Bank review refers to important

evidence, largely from the United States, but even Malawi, that under normal circumstances learning is lost during school breaks, or holidays. After a term or school year ends, learners forget some of what they learnt previously and thus return to school knowing less than when they left school. The United States evidence points to the three-month summer holiday typically resulting in a loss of learning equivalent to one month. The Malawi evidence points to an almost unbelievable loss of 38% of a standard deviation at the primary level during their recess of almost two months after the final term – the 38% figure suggests well over a half of all the learning in the year is wiped out[28]. To compare, South Africa's longest school holiday, after the end of the school year, lasts a month plus around two days. The evidence on school holiday learning losses is still limited, but the loss appears to be real and widespread. This has important implications for the current discussion. It suggests that one cannot just equate actual school days lost to days' worth of learning lost in a 1-to-1 manner. The United States evidence, for instance, suggests the ratio is more like 1.33-to-1 – three months lost translates into four, not three, months of learning forfeited.

The World Bank (2020: 11) review, in drawing from a study of the impacts of the 2005 earthquake in Pakistan, concludes that 'the time out of school can actually lead to learning losses that continue to accumulate after schools reopen'. This would be line with the 'COVID with falling behind' curve of *Figure 3*. In Pakistan, learning losses of 1.5 to 2 years, measured five years after the earthquake, appeared to result from just three months of school closures immediately after the earthquake. In discussing the Pakistan study below, we interpret the Pakistan findings somewhat differently.

The World Bank simulation tool assumes a 1-to-1 relationship between learning-adjusted time lost and actual school days lost, in a context where remote learning programmes aimed at assisting learners at home have no impact. The documentation accompanying the model refers to the possibility of forgetting by learners and thus a ratio that would be worse than 1-to-1[29], but this is not catered for in the Excel tool. If remote learning is effective, the simulation in effect uses a ratio that is ***better*** than (less than) 1-to-1. Clearly, the World Bank's simulation tool is rather crude in gauging the effects of school closures, but it should be kept in mind that this is just one of several effects simulated in the tool.

There appears to be little evidence on impacts on learning outcomes flowing from past school closures resembling the current pandemic-induced closures. Perhaps what would resemble the current pandemic most is school closures caused by teacher strikes. Azevedo, Hasan ***et al*** (2020) find just one study linking a teacher strike to the magnitude of learning losses, and this study happens to be the South African study of Wills (2014, 2020).

Wills (2020: 336, 339), using 2007 Grade 6 SACMEQ data, and employing econometric techniques making use of the fact that some learners had different teachers for the two subjects mathematics and reading, points to a ratio of 2-to-1. For every day of the strike, the equivalent of two days of learning was lost[30]. However, as Wills acknowledges, the conclusion rests on the assumption that teachers who striked were not less effective teachers in general than colleagues who decided not to strike. This assumption is clearly open to question. Insofar as it does not hold, the 2-to-1 ratio may fall and be closer to the 1-to-1 ratio. The magnitude of the strike, according to Wills, was no strike days for around a quarter of teachers, between 1 and 14 days for another quarter, and 15 to 30 days for half of teachers. To compare, the currently projected Grade 4 loss in 2020 is 68 days, and 49 days for grades 1 to 3[31].

Apart from Wills, perhaps the only other study of its kind dealing with the relationship between strike days and learning losses, is that of Baker (2013: 1021, 1027). While Wills was only able to

28 Hyperlink in DeStefano *et al* (2020), also Malawi 'Academic calendar' at https://www.education.gov.mw/index.php/resources/academic-calender.

29 Azevedo, Hasan *et al*, 2020: 6.

30 Wills finds a loss of 0.5% of a standard deviation a day. Section 2.1 of this paper pointed to the annual gain at the primary level being 49% of a standard deviation. If we divide this by 198 school days, one arrives at 0.25% of a standard deviation a day. 0.5% and 0.25% give a ratio of 2-to-1.

31 Van der Berg and Spaull, 2020. These figures take into account reductions in post-opening school holidays aimed at partially compensating for the closures.

assess the impact of the strike a few months after the event, Baker was able to examine longer term strike impacts, and the possibility of the effects wearing off as learners recover lost learning. Baker examines the academic progress of the same Canadian learners from Grade 3 to Grade 6 during a period when there were various local and system-wide strikes. A key finding is that the impact does decline over time. In mathematics, if the loss seen after the strike, but in the same year as the strike, is ***L,*** then ***L*** is reduced by 80% a year later. In other words, there is considerable recovery among learners who experienced a strike. The corresponding reduction in the learning losses in the area of writing is 40%. Yet the effect of the strike was still felt a year later. It is not possible to extract meaningful absolute ratios of learning losses to time lost from Baker's analysis[32]. Of course, Baker's analysis uses data from a highly effective developed country schooling system. Similar evidence from developing countries does not seem to exist.

The Brookings Institution[33], a United States research body, and Research on Improving Systems of Education (RISE), based at Oxford University, have released influential statements around the likely impacts of the pandemic on learning in developing countries. Both have drawn strongly from Andrabi ***et al*** (2020: 5, 10, 21, 30), the Pakistan earthquake study. This study finds learning losses directly related to the amount of time schools were closed existing five years after the disaster. Schools were closed following the earthquake for an average of 14 weeks, or around 70 days (assuming a five-day school week). The magnitude of the learning losses, five years later, was around 1-to-1 – for every additional week lost, a week's worth of learning losses persisted five years later. However, the Pakistan study also finds very large learning losses not directly associated with the duration of school closures. Specifically, learners of all ages and grades five years after the earthquake were 24% of a standard deviation behind similar learners not affected by the earthquake. Given that typical year-on-year progress at the primary level is low in Pakistan, at around 17% of a standard deviation, this translates to a learning deficit of a whole 1.5 years of schooling. The authors speculate that this is due to effects not directly related to school closures, for instance psycho-social effects of the earthquake and a deterioration in child nutrition. Importantly, they find that having a mother who completed primary schooling significantly reduced learning losses among children. In the communities covered in the Pakistan study, three-quarters of mothers had no schooling. In comparison, in South Africa 87% of learners are in a household with a female aged 20 or more with primary schooling completed. The figure is 94% if both male and female household members are considered[34]. Because Andrabi ***et al*** only had data collected five years after the disaster, they were not able to gauge whether learning deficits grew, remained static or narrowed over time.

The empirical evidence that learning losses would grow over time, after a school disruption is over, does not appear to be strong. A South African study by Spaull and Kotze (2015: 21) points to large gaps between the historically advantaged and disadvantaged, but does not find this gap to widen markedly, in terms of years' worth of learning, as learners move up the grades. A different view of the same data by Taylor and Taylor (2013: 21) seems to confirm this. If lower performance in earlier grades was associated with exceptionally low annual learning gains, one could expect the gap to widen. Yet a lowering of the annual gain as a result of the pandemic is something contemplated by some, at least theoretically, for instance Pritchett (2020)[35] and DeStefano ***et al*** (2020). The possibility cannot be excluded.

Very importantly, analysts who have focussed on the effect of the pandemic on learning outcomes, have so far concentrated on the relatively direct effects of school closures on learning losses. Yet other effects have received attention. The World Bank model of Azevedo ***et al*** deals with lower school participation rates due to pandemic-induced household income losses, and this would of course result in learning losses. School participation is discussed in section 3.5. But worsening

32 Specifically, this seems unbelievably high in Baker. For instance, the mathematics loss from an average of 14 days of striking is a whole 27% of a standard deviation, which is almost a year's learning – Hill *et al* (2008: 173, *Table 1*) point to an annual gain of 30% of a standard deviation in mathematics in Grade 6. The student-weighted mean days for longer strikes, from Baker's *Table 1*, is 14 days.

33 Kaffenberger, 2020.

34 Analysis of 2018 General Household Survey microdata.

35 In this short article, Pritchett, in referring to 'escalating learning losses', draws strongly from the very large learning losses observed in the Pakistan earthquake study. However, as argued in the current paper, the Pakistan study does not provide evidence for learning losses which *worsen* over time for individual learners.

household poverty, coupled possibly with worsening public health and social grant systems, could also have large indirect and long-term impacts on how well children learn at school. Less cognitive stimulation in early childhood development programmes and centres, as these are disrupted, is also likely to impact negatively on learning later in life. These wider effects are not incorporated currently in, say, the World Bank model, though one can probably expect the scope these types of models to broaden soon. The impacts of poor nutrition on learning are discussed briefly in section 4.1 below.

What follows is some South Africa-specific modelling, drawing from the evidence and theories discussed so far.

The green curve in *Figure 4* below is the PIRLS trend without COVID from *Figure 1*. The black curve corresponds to the 'COVID, no catch-up no falling behind' curve from *Figure 3*. Thus no recovery of lost learning is envisaged, but also no widening gap between the pre-pandemic expected and the with-pandemic trends. In *Figure 4*, and for 2020, ***x*** is 41%, which is the 33% of the school year lost for Grade 4 in 2020[36], multiplied by 1.25, to acknowledge losses not due to lost days, but to forgetting. In terms of the ratio discussed earlier, what is thus used is 1.25-to-1. This is more pessimistic than what is seen in the World Bank model, and in the Pakistan study's measure of ***closure-related*** losses. As discussed above, a ratio of 1-to-1 is seen in both of those sources. The 1.25 inflation assumes less than half of the 'forgetting' identified in Wills (2020) is actually not forgetting, but the impact of worse teaching quality, a possibility Wills that acknowledges. The 1.25-to-1 ratio used here is slightly more optimistic than the 1.33-to-1 found in studies of summer holiday effects in the United States.

The black curve in *Figure 4* ends up 41% lower than expected in 2020, due to COVID-related learning losses. Historically, what this means is that educational quality by the end of 2020 drops to what is was in around 2015. The graph indicates that it would not be true to say that COVID brought about the worst reading levels ever seen in South Africa, or the worst in twenty years. It would be the worst in five years. What *Figure 4* thus helps to visualise, is the relationship between ongoing improvements and the pandemic. COVID produces a loss, but the ongoing improvements buffer the historical severity of this. This helps to put the policy emphasis on ***maintaining the historical improvement.*** In particular, this is about ensuring that the teaching abilities of the average teacher continue to improve, in part through not interrupting the flow of younger teachers into the system.

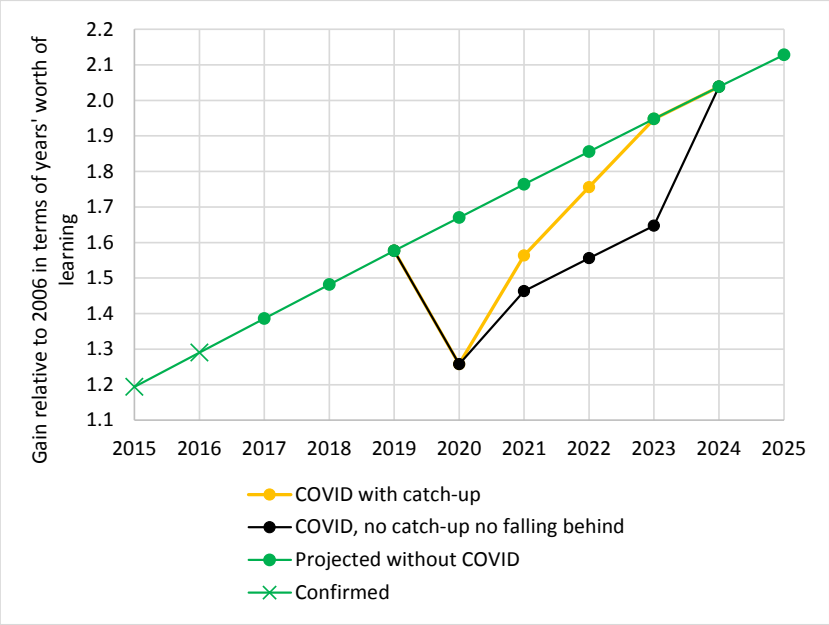
In 2021, one can expect learners who experienced the pandemic while in Grade 3, to enter Grade 4. In grades 1 to 3, estimated time lost is 24% of the school year, as these grades resume schooling before Grade 4. Hence for 2021, the expected level of performance in Grade 4 would be 24% below what was expected using a 1-to-1 ratio, but as we are using a 1.25-to-1 ratio, ***x*** becomes 30% in *Figure 4*[37]. The same applies to 2022 and 2023. In 2024, learners who in theory did not lose any learning would enter Grade 4, and there would be a return to the pre-pandemic trajectory. If one assumes that learning losses experienced as early as Grade R in 2020 were carried through to Grade 4, then the return to the original trajectory would be delayed by a year. Again, it should be emphasised that a key underlying assumption is that the upward trajectory in the quality of teachers is ***not*** interrupted by the pandemic. There are good reasons to believe this assumption holds. Teachers do not forget their skills during an extended school closure in the way children do. Moreover, there are strong financial incentives to continue supplying the required younger teachers to the system, and allowing older teachers to retire at the regular retirement age. The incentive is that younger teachers cost the employer considerably less than older teachers.

One could adapt *Figure 4* to examine a scenario where the historical quality trend was not maintained. This would involve tilting the green curve downwards, and making it flatter. It would result in a lowering of the black curve, meaning for instance that Grade 4 learners in 2023 would display even lower reading skills. But even with a flatter green curve, the black and green curves would still converge in 2024 (or 2025 if learning losses beginning in Grade R were counted).

36 The 33% is from Van der Berg and Spaull (2020).

37 Subsequent to this analysis, on 2 July, it was announced that grades 1 to 3 would be returning later than anticipated, though exact details were not clear. This would worsen the projections presented here.

Figure 4: Impacts of COVID on the lower primary reading trend



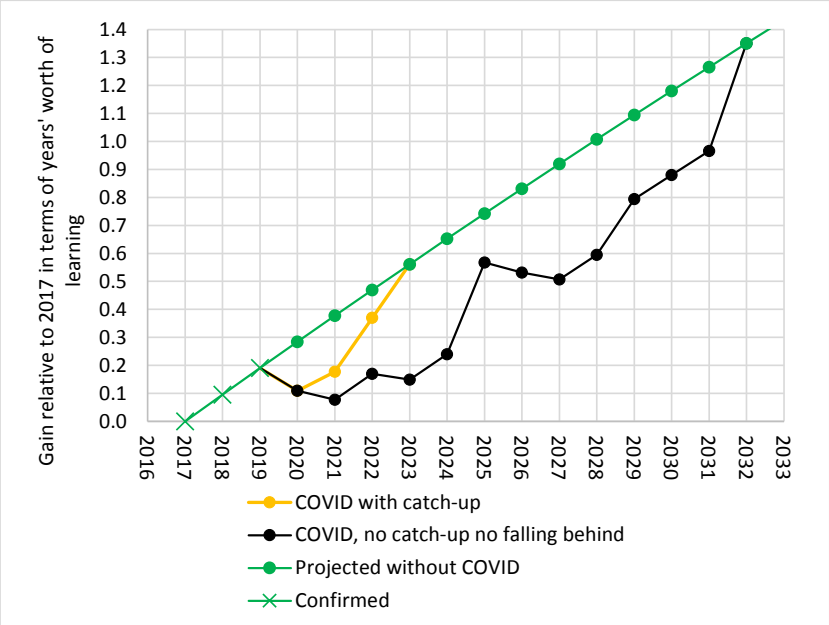
Catching up for lost time can be considered possible, either through well-designed system-wide interventions, including the partial cancellation of holidays beyond 2020, or through the work of individual teachers. With regard to the latter, it should be remembered that teachers are not just accountable for spending time in schools, they are also accountable for covering the curriculum, so in theory they have an incentive to make up for lost time. The yellow 'COVID with catch-up' curve in *Figure 4* illustrates a scenario where learners catch up to where they would have been without the pandemic, after three years. Thus, a learner in Grade 1 during the 2020 pandemic, would by Grade 4 have caught up. Clearly, realising effective catching up can make a large difference to this key national development trend.

Unfortunately, South Africa does not yet have the kind of sample-based national assessment some other countries have to gauge progress with the respect to basic competencies. The Systemic Evaluation, now scheduled to begin producing national results from 2021, will constitute such a monitoring tool, assuming the programme functions as it should. The international PIRLS tests will provide important data on what the actual, as opposed to projected, points in Figure 4 are. Specifically, by the end of 2022, PIRLS will tell us what the results of the 2021 PIRLS round of testing were, and by the end of 2027, will provide 2026 results.

Figure 5 applies the analysis to Grade 12. The set of assumptions employed for Figure 4 are used. The spike in the black curve for 2025 reflects the arrival of learners who experienced the pandemic while they were in Grade 7. Grade 7 was the first primary grade to return to school in 2020.

This graph magnifies the importance of succeeding in efforts to catch up to the expected trend. Without any catching up, in other words if learning losses are allowed to remain, the quality of Grade 12 graduates will be lower than expected ***up to 2031.*** This should be avoided at all costs, as among other things it would hamper efforts of the post-school sector to generate skills needed in society and the economy.

Figure 5: Projected impacts of COVID on Grade 12



To conclude this section, how long are South Africa's school closures in an international context? Azevedo, Hasan ***et al*** (2020: 8) estimate an average of 110 school days lost across countries which had actual and expected school closure information available in early June 2020. This is considerably longer than South Africa's anticipated range of 68 days (grades 4, 5, 8 and 9) to 29 days (grades 7 and 12). Of course, these figures exclude the possibility of localised closures as 'hotspots' emerge, but the same could be said of the global 110 value. South Africa's school year moreover seems relatively long, in terms of days. It is officially 198 days[38], against an average of 185 days for OECD countries[39]. The international estimate of 110 days divided by 185 would give 59%, considerably worse than South Africa's 33% for Grade 4. That South Africa should have a relatively long school year is confirmed by UIS.Stat, which indicates that among 211 countries with data, virtually all are in the range of 9 to 11 months between the start and end of the school year, 45% display a 9-month year, and South Africa is among the 20% of countries with an 11-month year[40].

3.4. The limitations of remote schooling as a solution

The CRAM survey, Wave 1, confirms what one may expect, that the possibility of schooling from home is greater for wealthier households, in part because they have higher levels of access to the internet. It is now widely accepted that remote schooling in the context of the pandemic is neither feasible nor fair in developing countries. It raises difficult ethical questions for teachers, who often have classes where some learners can access online schooling from home, while others cannot. Teachers who proceed to teach advantaged learners who enjoy online access could be accused of abandoning disadvantaged learners.

As the pandemic was declared in 2020, UNESCO and other global bodies paid attention to how countries could adapt to the new reality through provision of remote schooling options, such as online classes. This prompted a reaction essentially saying that it was naive to expect developing countries to implement such solutions, especially for the poor. Vegas (2020) is an example of this reaction. DeStefano ***et al*** (2020), in discussing the Kenyan government's ambitious attempts to hold classes via television, cite evidence that on average children would access just a few minutes of

38 Government Notice 6 of 2019.

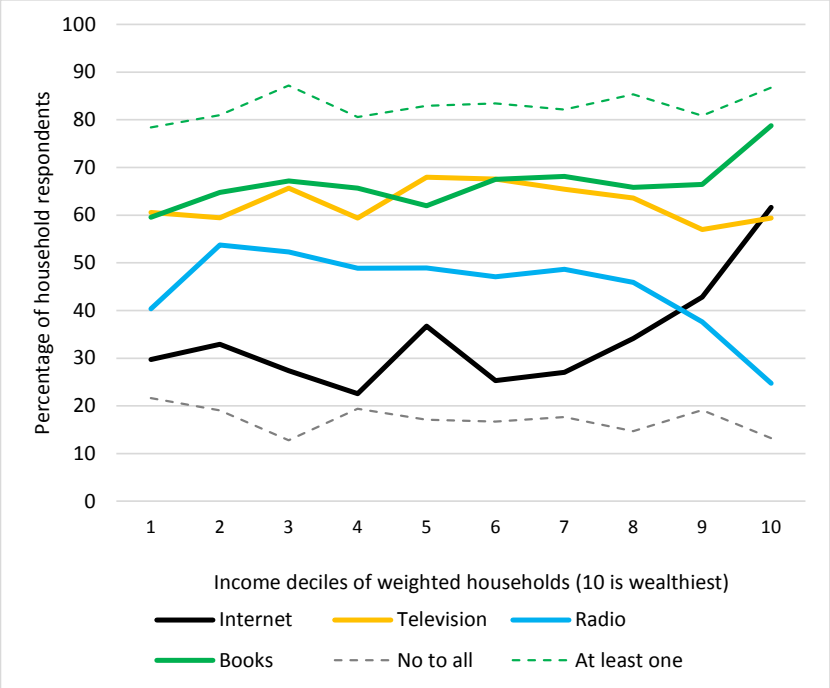
39 OECD, 2016.

40 From http://data.uis.unesco.org/. To illustrate, South Africa's 11-month year is derived from the start month being January and the end month being December.

these broadcasts, clearly not enough to compensate for the absence physical schooling.

One set of questions in the CRAM Wave 1 dataset deals with the impact of the pandemic on schooling. More education-related questions are expected in Wave 2. When the survey was run, during May and June 2020, while schools were mostly closed, four questions were asked to probe the feasibility of remote schooling. These questions asked whether education occurred in the household through the use of four separate tools: 'school books'; 'educational programmes on TV'; 'educational programmes on the radio'; and 'educational content on the internet'. The questions were asked wherever a household had children ***below*** age 18. This means a few households with, say, just one learner in Grade 12 aged 19, would not be covered. *Figure 6* below breaks the responses down by household income decile. Differences across deciles seem smaller than one would expect. This could be because of strategic responding, meaning respondents told interviewers what they believed they ought to be doing. Nonetheless, patterns one may expect can be seen: more use of the internet for the wealthy; less use of the radio among the wealthiest (they have other options) and among the poorest (who may not have a radio). Across all income deciles, between 10% and 20% of respondents said no for the use of all four educational tools.

Figure 6: Education at home according to CRAM Wave 1 data



Source: National Income Dynamics Study-Coronavirus Rapid Mobile Survey (NIDS-CRAM) (2020). NIDS Wave 5 data were used to obtain income data.

Note: 95% confidence intervals are around 4 percentage point either way, for instance mean use of books in decile 6, at 70%, has a confidence interval of 66% to 74%. To determine deciles, total income, of any kind, per household was considered.

To provide some context, according to the 2018 General Household Survey (GHS), 88% of learners were in a household with a television, 55% with a radio, and 7% with neither of these two technologies. These statistics are compatible with what is seen in *Figure 6*.

With regard to communication between teachers and their learners during remote schooling, one should not overlook the very serious ethical dilemmas faced by teachers. Data collected through schools indicate that around half of learners in Grade 9 have access to a computer at home. Probably a large proportion of these would be linked to the internet. The problem, however, is that there are virtually no Grade 9 classes where ***all*** learners enjoy access to a home computer, even in the case of more advantaged schools. There are nearly always at least some learners who do not have this. Thus, even if one ignores the broader inequity of having some learners access online classes when others do not, even with respect to one teacher, it could be seen as unethical to provide online

teaching to some learners in the class, but not others[41].

3.5. COVID-19 and dropping out

Both the World Bank's simulation tool and specific realities in South Africa, in particular no-fee schooling for most of the poor up to the secondary level, and historically high levels of unemployment, suggest that dropping out of schools will not be among the most serious consequences of the pandemic.

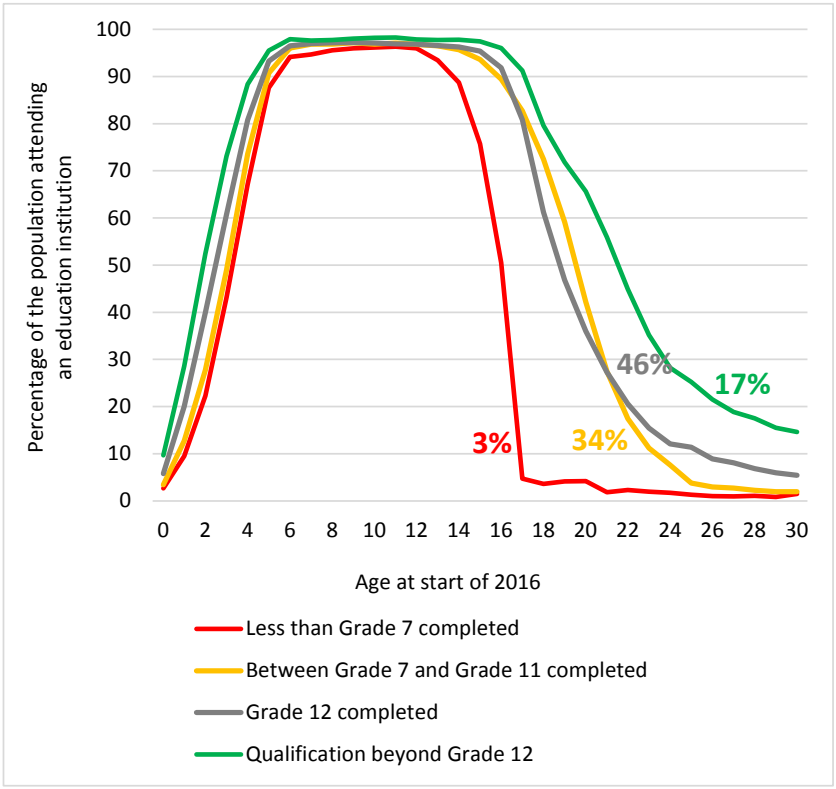
The World Bank simulation tool sees learning losses both as a result of learning lost during school closures, and learning lost when learners do not return to school, because of a loss of household income relating to the pandemic. The tool includes values reflecting the sensitivity of changes in school participation to changes in household income, drawing from household survey data. This sensitivity is relatively low in South Africa, according to values in the tool. Globally, the number of out-of-school children is expected to rise by around seven million, according to the World Bank analysts. The tool indicates that 31,000 of this would be South African children – 5,000 aged 4 to 11, and 26,000 aged 12 to 17. This translates into around 0.06% of children in the first age bracket, and 0.43% of those in the second age bracket. These figures are far less worrying than the learning losses figures seen in section 3.3.

Several features of the schooling system and the labour market would work against massive dropping out effects. Most of South Africa's learners from poor households attend schools, at the primary and secondary levels, which do not charge fees. High unemployment limits the opportunities for youths to drop out of school in order to earn wages.

The following two graphs serve as a reminder of where the pre-pandemic participation problems lay. They draw from the 2016 Community Survey of Statistics South Africa. The very poorest, for instance households where no-one has successfully completed primary schooling, experience exceptionally low educational participation beyond age 15 – see *Figure 7*. Among the four population groups, coloured participation levels are clearly worrying – see *Figure 8*. What these graphs hide is that successful completion of specific levels of education is far more unequal than participation would suggest. Despite apparent similarities of the curves for the black African, Indian and white segments of the population in *Figure 8*, successful completion of Grade 12 is very unequal. To illustrate, among whites and Indians aged 30, 86% and 82% respectively have Grade 12 or something higher, in contrast to a figure of 52% for black Africans aged 30. The figure for coloureds is 49%. This serves as a reminder of where the most serious inequality lies in education: learning outcomes. This underscores the seriousness of the possible learning losses envisaged in section 3.3. These losses are likely to exacerbate inequalities with respect to the attainment of, for instance, a Grade 12 qualification.

41 Gustafsson, 2020e.

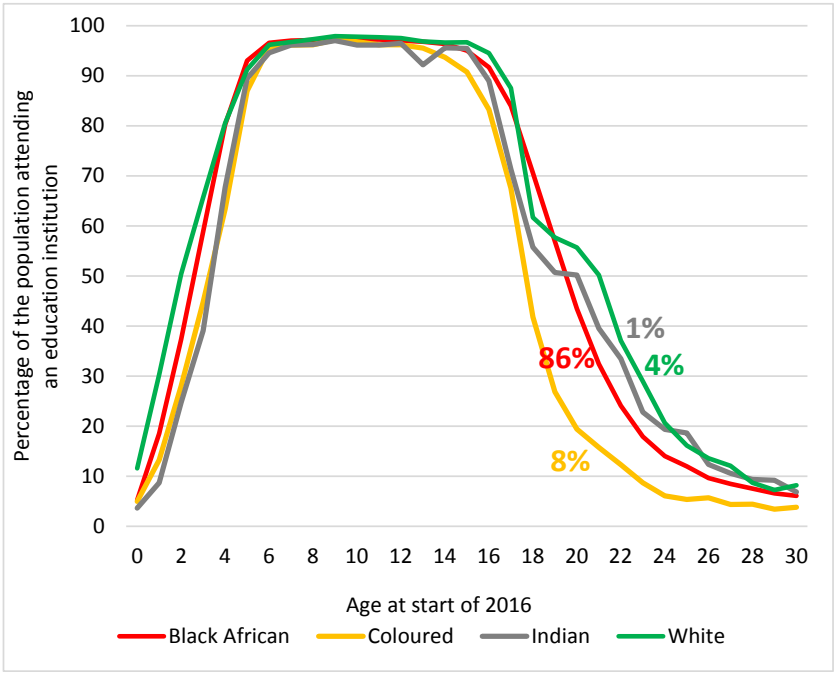
Figure 7: Education participation by most educated in household



Source: Stats SA 2016 Community Survey microdata, obtained through the DataFirst data repository.

Note: Percentages refer to the percentage of the population aged 0 to 30 in this category, where category is defined by the most educated person in the household.

Figure 8: Education participation by population group



Source: As for previous graph.

While no fee schooling at the primary and secondary levels is likely to limit severe dropping out, the situation is very different in the early childhood development (ECD), or pre-school sector, where fees are commonly paid by poor households. This is discussed in section 4.2.

4. The pandemic and South Africa's education policy challenges

4.1. Dealing with shocks: Schools and poverty alleviation

The CRAM data have provided insights into the effects of the pandemic on child hunger. The findings are alarming. After successes over twenty years in reducing, though not eliminating, child hunger, two factors relating to the pandemic have undone this trend: income losses in households, and interruptions in access to meals at schools. The reductions in hunger over the longer term are likely to have contributed to educational improvements and, conversely, the COVID-19 nutrition shock could exacerbate learning losses. Tackling child hunger that has arisen as a result of the pandemic is arguably South Africa's most pressing social policy challenge currently. Better targeting of the resources of the National School Nutrition Programme (NSNP) would be one possibility. Currently, the NSNP provides meals to around 80% of learners, while under half of learners are from households unable to properly feed their children.

Even before the pandemic, around a quarter of South Africans were in households which were below Stats SA's 'food poverty line', meaning there was not always enough income for food, and around 56% were below the 'upper bound poverty line'. This latter 56% of South African society contained 66% of all school learners[42]. Learners attending schools are thus a disproportionately poor part of society. The percentage of learners from households reporting some level of child hunger, according to the General Household Survey, was 11% in 2018. While worrying, this statistic had been steadily declining – in 2010 it was 17%[43]. Data from the CRAM survey suggests that during the lockdown, child hunger increased to levels that were perhaps twice those seen in 2010 (the CRAM data do not permit a precise comparison with previous statistics).

A noteworthy disparity in the statistics is the fact that although child hunger had been decreasing before the pandemic, and apparently never rising, households living below the 'food poverty line' have been on the increase, according to Stats SA analysis of income data[44]. A possible explanation for this is that meals provided by schools have served as a buffer against income declines. This obviously strengthens the argument for prioritising these meals strongly during the pandemic.

Hunger and malnutrition have serious long-term effects on learning. Concerns in this regard in the National Development Plan (NDP) centre around the problem of physical stunting, and the association between stunting and weaker learning[45]. The NDP reported in 2012 that a quarter of South African children were physically stunted, as a result of inadequate nutrition. The 2016 Demographic and Health Survey points to a similar figure[46]. The NDP quotes research indicating that poor nutrition over an extended period of a child's initial years can result in children being behind at school by a year in terms of learning.

The Pakistan earthquake study discussed previously found that children whose nutrition was adversely disrupted by the disaster displayed stunting five years after the disaster, if they were in their first 1000 days at the time of the earthquake, where these 1000 days include the nine-month *in utero* period[47]. This suggests that it would be particularly important to quickly address the nutrition

42 Gustafsson and Maponya, 2020: 4.

43 Analysis of the GHS microdata.

44 Statistics South Africa, 2017: 66.

45 National Planning Commission (2012: 298), which drew from Grantham-McGregor *et al* (2007).

46 Department of Health, 2019: 179.

47 Andrabi *et al,* 2000.

needs of the very youngest South African children. Budgets for publicly-funded meals at schools must be protected, and when schools are closed due to the pandemic, food should still flow to learners.

South Africa's National School Nutrition Programme (NSNP) is extensive, covering around 82% of all learners[48]. Its 2020/21 cost was around R7.7 billion, which constitutes 3.8% of current expenditure by provinces on education. The annual cost per learner is around R850. An obvious point that can be made about the programme is that it feeds more learners than is strictly necessary, if the aim was to only feed learners whose families could not afford pay for the midday meal at school (in fact, the meal is mostly a late morning meal). It might be possible to target the NSNP resources more towards the most vulnerable learners. This is in fact contemplated in a government evaluation of the NSNP released in 2016[49]:

> …introducing individual targeting in some schools where not all learners eat the NSNP meals regularly and income and poverty levels are mixed. Although there are concerns regarding stigmatisation, individual targeting has been successful in countries such as Chile…

Practically what could be done is to encourage households which can finance the midday meal to voluntarily give children a lunchbox to take to school, and then to provide the most vulnerable learners with two meals, or one larger meal, in the day.

Because the NSNP is funded through a conditional grant, it is a relatively well-protected budget item. The supplementary Budget Review of National Treasury, released in June 2020, envisages overall non-interest expenditure by government will decline by 6% in 2020/21 and 9% in 2022/23, relative to pre-pandemic projections for those years. In the inevitable cuts which will occur in education, the NSNP should be protected. It is easily more important than books – one can resort to using old books – and even more important than hiring teachers. The damage done by under-nourishment is permanent, and should thus be avoided at all costs.

4.2. Protecting existing drivers of change

Of the five factors identified in the current report which appear to have driven the qualitative improvement of the last twenty years, two stand out as being particularly vulnerable to the effects of the pandemic: educational materials for learners and pre-school participation. Spending on non-personnel recurrent items by education departments, which includes spending on books and other materials, could easily be affected by the expected budget cuts. This budget item has already been negatively affected during pre-pandemic spending cuts, and is not protected in the same way school nutrition is, through a conditional grant. Pre-school participation is likely to suffer largely due to declines in household income. Before the pandemic, there were plans to expand public spending on pre-school education. Convincing budget arguments can and must be put forward to make this a reality, as far as possible.

Of the five likely drivers of improvement discussed in section 2.2, two seem most at risk due to the pandemic, but for different reasons. The availability of books and other learning materials is likely to be threatened by budget cuts, while participation in pre-schooling is likely to suffer as household income declines.

Books and learning materials are paid for by what is known as the 'school allocation', which currently carries an annual cost of around R14 billion, or 6% of total provincial education spending. This allocation covers not just learning materials, however, and it is not easy to ascertain how much of it goes to these materials, in large part because much of the spending occurs at the level of the school. Though the schooling system has been relatively good at protecting non-personnel budget items in a context of real increases in the wages of personnel, and done so better than was the

48 Department of Basic Education, 2019a: 32.

49 Department of Planning, Monitoring and Evaluation, 2016: 6.

case in the late 1990s, compliance with the school allocation targets by provinces was found to decline slightly between 2011 and 2017[50]. Fortunately, this has not been serious enough to push up the proportion of schools requesting fees from parents, according to household data[51]. The policy explicitly allows even schools classified as 'no fee schools' to charge fees if the school allocation amount does not reach the national target value.

In the face of serious budget constraints, two alternatives to the current system are likely to be put forward. The one is that books from past years should be re-used to a greater extent. The other is that accessing materials through hand-held devices such as tablets should be pursued to cut costs. Both alternatives are certainly worth considering, but there are risks that need to be taken into account. Poor South African households are particularly 'book poor' in the sense that they have few books, yet the volume of books in households has been found to contribute to the learning process of children. Providing new books to learners every year has the advantage that this helps to build up the stock of books in the household, which learners of various ages in the household can benefit from. This is particularly so in the case of the national workbooks programme, through which high-quality books become the property of learners. Re-using old books comes with the risk that books will be gathered in schools, and will not find their way to households. Digitising materials could also compromise access in households to texts, especially in the poorest households, given unreliable or lacking access to electricity, and the risk that devices will be stolen or malfunction.

Turning to the pre-school sector, it is estimated that only around 28% children in a pre-school below the Grade R level are funded publicly, and even for these children public funding constitutes on average two-thirds of total funding. The pre-school sector is mostly funded by fees, often paid by relatively poor households. As can be seen in *Figure 7* above, enrolment of very young children, even among the relatively poor, is substantial. The absolute numbers are high: around 2.4 million children are enrolled in pre-school below the Grade R level[52]. Participation rose considerably prior to 2013, and has remained roughly constant since then. The lack of progress since 2013 is in itself a concern, and is likely to be linked to the worsening economic climate. The pandemic raises the possibility that participation will drop to levels seen before 2013. This could occur as poorer households decide not to return children to pre-school after the closures due to financial constraints. The first casualty would be losing the cognitive and psycho-social stimulation children obtain through their pre-school. For the minority of children in pre-schools receiving a public subsidy, a further casualty would be not receiving a meal that was at least partially funded by the state. Even if the public funding continued as before, the fact that pre-schools charge fees means that the poorest households could be excluded from the service, due to non-payment of the fees, and hence the publicly funded portion of the service.

The current process whereby pre-schooling is being 'migrated' from the social development to the basic education authorities is intended to bring about more coherent planning in the pre-school sector, and to improve public funding. The high levels of attention that have gone towards understanding the data and financing of pre-schools, as a result of this process, during the last couple of years, will be helpful.

It is easy to think of protecting budgets, or securing new spending in the education sector as something which is largely out of the hands of education planners, because ultimately much of the power rests with National Treasury and the political decision-making process. However, as pointed out in a recent report to the National Planning Commission on taking the education goals of the NDP forward[53], there are things that can be done within the education planning sphere to protect and raise spending. National Treasury needs to justify decisions on the basis of clear information on spending trends, cost drivers, unit costs, indicators of efficiency and the social impact of spending. Very often this is lacking in the work of the education departments. The pandemic should be seen as catalyst for improving planning practices in general.

50 Department of Basic Education, 2019b: 83.

51 Department of Basic Education, 2019: 31.

52 Gustafsson, 2017: 24.

53 Van der Berg, Gustafsson and Malindi, 2020.

4.3. COVID-19: A facilitator or suppressor of innovation?

Some of the guidance from global bodies focusses on the need to use the pandemic as an opportunity to accelerate necessary innovation that facilitates the achievement of SDG targets around learning outcomes. As much as it is necessary to protect the existing drivers of improvement in South Africa's schooling system, it is also clear that these drivers were insufficient, even in a no-pandemic scenario, to guarantee further improvement. Innovation in two vital areas had already been occurring in South Africa before the pandemic, and this work should continue. Firstly, South Africa has come far in exploring and evaluating practical ways in which the teaching of reading in the early grades can be improved. These new methods now enjoy broad support. The priority should be to take them to scale, and to monitor that they do in fact result in better reading competencies among learners. Reading is the central pillar for everything else in education. Secondly, the National Development Plan offers an excellent framework for building more effective school accountability systems. Such systems, which must be fair and take into account the socio-economic contexts of schools, have been shown around the world to be a prerequisite for educational progress, yet they remain weak in South Africa.

While UNESCO has focussed largely on ensuring that basic educational and nutritional services continue to be offered, as far as possible, during the pandemic, the World Bank guidance goes further and sees the crisis as an opportunity to tackle in innovative ways inequalities and weak practices found in schooling systems across the world before the pandemic[54]:

> As the school system stabilizes, countries can use the focus and innovativeness of the recovery period to "build back better." The key: don't replicate the failures of the pre-COVID systems, but instead build toward improved systems and accelerated learning for all students.

While it is encouraging that educational quality has improved relatively rapidly since around 2002, South Africa's schooling system has many flaws which suggest that further improvements will become increasingly difficult. The report to the National Planning Commission discussed previously underlines the need for innovation in two areas: better approaches to teaching early grade reading, and better systems to support school accountability. Innovation here had begun before the pandemic, very clearly with respect to early grade reading, and to a limited extent with respect to school accountability.

In recent years, evaluations of new methods to teach reading, and to train teachers in the adoption of new methods, led by the Department of Basic Education (DBE), resulted in the publication of a few critically important studies[55]. Better teaching of reading can of course be considered part of one of one of the five drivers of change, namely better capabilities among teachers. The challenge lies both in ensuring that the new research in relation to early grade reading informs pre-service training at universities, and in using in-service training, including the individualised coaching techniques put forward in the research, to advance system-wide improvements in reading outcomes, along the lines of what was found in the evaluations. One should probably not expect system-wide effect sizes of the magnitude seen in the evaluations, as sample-based interventions nearly always produce larger improvements than system-wide interventions. Yet the evidence suggests strongly that it is possible to bring about substantial improvements at scale in the teaching of reading in the early grades, through cost-effective teacher training interventions.

Due to both political factors, relating largely to relations between the employer and teacher unions, and limitations in South Africa's technical capacity in areas such as psychometrics – the assessment of skills – the country has arguably fallen behind other countries when it comes to systems that facilitate school accountability. That better school accountability is vital and important for South Africa is clear from the international evidence. In fact, the National Development Plan, already in 2012, put forward relatively standard proposals for improvements in this area. Progress here has been weak, in part because of the halting of the Annual National Assessments programme in 2015.

54 World Bank, 2020: 5.

55 See for instance Department of Basic Education (2017).

This programme had several flaws, though it would arguably had been preferable to fix these flaws than to halt the programme. One important flaw was that it did not sufficiently take into account the socio-economic context of schools, districts and provinces. National assessment programmes which work well typically pay careful attention to this matter, which can be technically complex.

Limited innovation with respect to school accountability has occurred. At the secondary level, for instance, the DBE has started using better alternatives to the rather crude 'pass rate' indicators of school success. Work on the new sample-based Systemic Evaluation programme has included collaboration with experts beyond South Africa and building local capacity. Thus, capacity which is crucial for taking school accountability systems forward is being built. While the Systemic Evaluation will greatly improve national and provincial monitoring of progress, and learning losses arising from the pandemic, it does not encompass all schools and is therefore not directly usable for school accountability. A critical gap in South Africa remains weak data on learning outcomes at the primary level. The report to the National Planning Commission emphasises that a long-term view, which takes into account capacity constraints, must be taken. Second-best options, such as greater, but careful and appropriate, use of the relatively non-standardised assessment data currently submitted by primary schools, and more 'dipstick' monitoring of the reading competencies of learners by district officials, are seen as steps in the right direction.

5. Conclusion

This report has attempted to clarify what was already known before the pandemic about educational quality, but was not widely understood. It has argued that a proper understanding of where we come from is vital if the current COVID-19 crisis is to be tackled optimally. It has also summarised what we know currently about COVID-19 and schooling. This knowledge will advance rapidly in the coming months. It is particularly important to monitor and disseminate the emerging evidence on how children of different ages infect others, in the interests of informed behaviour by, for instance, parents and teachers, and informed policy responses.

The first wave of CRAM data emerging from the initiative that the current report is a part of, has brought to the fore important and worrying information about child hunger and household poverty in general, information which must be used to understand impacts on learning, and to shape policy. Future waves of CRAM during the coming months will include more questions dealing specifically with schooling, for instance the critical matter of non-attendance in education institutions after schools have opened.

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