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The Learning Gap of the Secondary School Students of Bangladesh due to COVID-19 Lockdown

Happy Kumar Das[1]
Afrida Jinnurain Urbee[2]
G M Rakibul Islam[3]
Shahida Afrose[4]
Md. Shahriar Shafiq[5]

Abstract

This study aimed to investigate the learning gap of Grade 6 and Grade 8 students in Bangla and Mathematics during the COVID-19 pandemic in Rajshahi division of Bangladesh. Despite continuous government supports and diverse initiatives of teachers and schools to continue education remotely, the 59-week closure of educational facilities had a substantial negative impact on students' learning. The major objectives of this study were to evaluate the amount of learning gap, identify the causes of the learning gap, and suggest solutions to the problems that students encounter. In doing so, purposive sampling was used to select 10 secondary schools, and simple random sampling was used to select 357 student respondents (180 from Grade 6 and 177 from Grade 8) for performance testing. Key informant interviews were conducted with 10 headteachers from the selected schools. Findings showed a substantial learning gap in mathematics between students in the two classes, whereas students performed significantly better in Bangla. Most of the students' performance belonged to band 2 or below in Mathematics, and a large percentage of students performed at band 3 or below in Bangla. The study further found that students performed lower in both Bangla and Mathematics compared to the LASI 2015. The study highlighted gender disparities in student performance, with girls outperforming boys in both subjects, particularly in Grade 6. The study highlighted several factors that have affected students' achievement, including limited access to technology and digital resources, lack of access to teachers, difficult economic conditions, poor mental and emotional health, and disruptions to routines and structures. The study concluded by highlighting the urgent need for policymakers to take immediate action to address the learning gap and recommends several interventions, such as targeted learning support, teacher training, and access to digital learning resources.

Key Words: Learning Gap, COVID-19 Education, Students' Performance, Bangladesh

[1]Associate Professor, Institute of Education and Research, University of Rajshahi, Bangladesh
[2]Lecturer, Department of Economics, Noakhali Science and Technology University, Bangladesh
[3]Corresponding Author, Assistant Professor, Department of Educational Administration, Noakhali Science and Technology University, Bangladesh; gmrakibulislam@nstu.edu.bd
[4]Training Specialist, National Academy for Educational Management (NAEM), Bangladesh
[5]Lecturer, Department of Education, Noakhali Science and Technology University, Bangladesh

1. Introduction

The closure of educational institutions in Bangladesh due to the COVID-19 pandemic started on March 18, 2020, and schools reopened on September 12, 2021. Schools have been closed for 59 weeks rating Bangladesh as the country with the longest duration of school closure (UNESCO, 2021). This has undoubtedly left scratches on education despite the efforts of private and public schools to continue the learning process through electronic means, such as broadcasting classes through television, radio, and online mediums. However, not all children have had equal access to these resources, especially children from poor and vulnerable families and communities. In order to continue the learning, in Bangladesh, the Ministry of Education and the Ministry of Primary and Mass Education have introduced alternative learning initiatives including radio and TV classes, online classes on various learning platforms and social medias, and mobile-based messaging to the parents. Furthermore, both ministries have developed comprehensive school reopening guidelines to ensure a safe back to school for all learners.

Closures of academic institutions and other learning places suddenly obstructed 94 percent of the world's student population, with up to 99 percent in developing and least developed countries. About 38 million students and nearly a million teachers were affected by Bangladesh's COVID-19 school closures. After the situation improved, classes partially resumed at the institutions on September 12, 2021. Students, parents, teachers, and education officials were faced with several challenges following the lockdown.

According to the Bangladesh Bureau of Educational Information and Statistics, there were 2.16 million students in 133,002 primary educational institutions and 1.02 million students in 20,849 secondary schools. The main government response was television-based learning programs (World Bank, 2021) for these students. However, within months of the schools closing, it was clear that student learning, particularly among teenagers, was at risk, and many students also went through learning loss (Pasani et al., 2021). A joint study by PPRC and BRAC Institute of Governance and Development (BIGD) showed that due to the prolonged school closures induced by the epidemic, around 22% of students and 30% of high school students were at risk of learning gap. This could lead to a greater dropout rate. There was no guarantee that simply reopening the schools would help students make up for the time they have lost due to the shutdown. As a result of the learning gap, learners gradually lose their ability to be human resources in the future. The learning gap happened in two ways, one, learning that did not take place while schools are closed, which was directly related to quality schooling, and another, the learning already acquired that was lost or forgotten when students lost their engagement with the education system (Rahman & Sharma, 2021). The COVID-19 pandemic was unique in that it caused widespread school closures and learning gaps, although those issues had always been key contributors to learning deficits and losses, particularly for Bangladeshi children (Hassan et al., 2021).

Consequences of such continual school closures include increased learning gaps, including mental suffering; a higher chance of dropping out of structured education; and an increase in child labor and marriage. More than a million children have already been affected,

and many more will be in the future. A generation's future is at stake; consequently, every effort must be made to guarantee to mitigate the learning gap. Otherwise, overcoming the learning gap will be difficult.

Therefore, the study underscored the importance of addressing the learning gap as soon as possible. This study would help the audience to gain a better understanding of the learning gap induced by the pandemic. It also calls on governments and partners to strengthen the strategies for bridging the gap. Therefore, this study would suggest supplementary remedial programs that are essential to bridge the gap for secondary-level students. This study also provided insights into how learning gap can be mitigated through prioritizing strategies. Furthermore, this study would help the authorities in preparing a roadmap for creating coherent, aligned systems of support for educators and students to address the learning gap encountered during covid-19.

Conceptual Framework

Evidence from empirical studies showed that COVID-19 exacerbated students learning worldwide significantly. For every 100 children in low and middle-income countries, 53 children were in learning poverty before covid, and ten additional children were in learning poverty due to COVID-19 (World Bank, 2021). Additionally, the closure of the school expanded the cultural, economic, and structural disparities, which affect how parents and kids behave psychologically and amplify learning gaps and inequities (Goudeau et al., 2021). Vulnerable people were less likely to have access to online learning resources and to resume their education after a crisis, such as children with disabilities, members of ethnic minorities, refugees, and displaced populations (World Bank, 2021). These were also applicable to the children of Bangladesh, and thus, this study considered these contributing factors to the learning gap. Examining their contribution to the learning gap would guide us to identify the required actions to recover the gap.

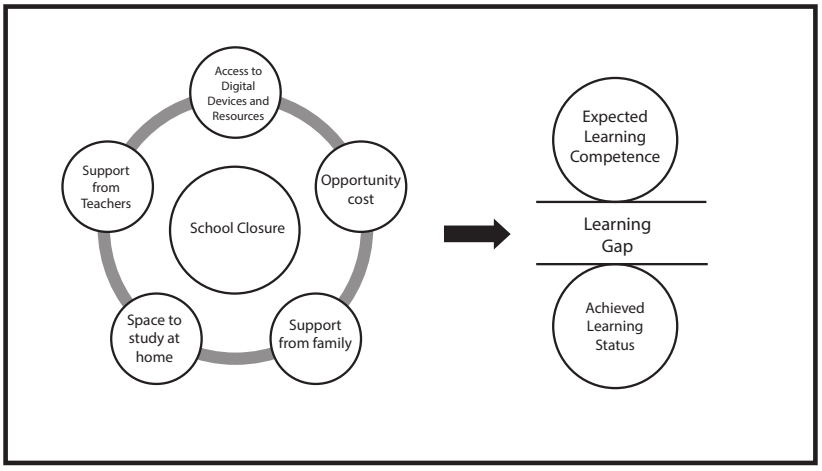


Figure 1: Conceptual Framework of the Study

Objectives of the study

The primary purpose of the study was to figure out the learning gap of students of grades 6 and 8 at secondary schools due to the last 1.5 years of school closure induced by the COVID-19 pandemic. The specific objectives of the study were to-

- Assess the learning gap of secondary school students in Grade 6 and Grade 8 resulting from 1.5 years of school closures.
- Evaluate students' performance in Bangla and Mathematics based on NCTB competency, differentiating between Grade 6 and Grade 8.
- Identify the contributing factors to the learning gap among secondary school students in Grade 6 and Grade 8 and propose strategies to mitigate this gap.

Scope and Limitation of the Study

This study covered only language and mathematics, as literacy and numeracy were considered the most crucial tools of learning for children. This study included students of class 6 and class 8 as the current study budget was not sufficient to cover all the grades. However, grade 6 was the beginning of the secondary level, while grade 8 was the end line of the lower secondary level. Along with students' performance tests, other stakeholders i.e., teachers, relevant to the school were also consulted in this study as their experience and observation were important.

Though the study was intended to disclose the learning gap of secondary-level students, there were a few limitations that may influence this study -

- The study covered a limited part of the population to draw conclusions for all secondary-level students.
- Perceptions of the respondents could have added value to this study, which could depict the societal and cultural hindrance that impedes potential learners from accessing technical education.

2.1 COVID-19's contribution to learning gap: Global Perspective

The world has made decades of strides in education, achieving the highest enrollment rates in history. With the outbreak of COVID-19, progress in education was in jeopardy (Parker, 2021). In a recent report, the Global Education Evidence Advisory Panel (GEEAP) found that school closures have a negative and long-lasting effect on children's learning and well-being, which will have an effect on all long-term development objectives for education (World Bank, 2022). As the third year of the COVID-19 pandemic approaches, classrooms remain partially or fully closed for up to 647 million schoolchildren around the world, even where schools have reopened, many students are still falling behind (Fore & Malpass 2021). It is a spiteful practicality that students have learned less during the COVID-19 pandemic.

Coronavirus disease was first detected in December 2019 in China Wuhan (Ngwacho, 2020). With 55 million students in the United States out of school owing to the COVID-19 pandemic, education systems are struggling to meet the demands of schools and families. Due to closure, the majority of school districts offer some virtual instruction during the final months of the school year, as cited in (Aurini & Davies, 2021). However, it remains unclear how effective virtual learning will be, given that most students and teachers have little experience with online instruction and large gaps in technology access exist in many parts of the country. Through ICT integration and remote learning efforts, all countries have attempted to cope with the overwhelming situation. There is a lot of evidence that remote learning efforts are ineffective. Across the world, educational disruptions have caused millions of children to significantly miss out on the academic learning they would have gained had they been in the classroom, with younger and more marginalized children suffering the greatest loss (UNICEF, 2022).

A learning gap can be defined as a specific or general loss of knowledge and skills or a reversal in academic progress, most commonly due to prolonged gaps or discontinuities in a student's education (Hevia et al., 2022). Before the pandemic, learning loss and competency gaps were associated with the summer holidays, when a decline in school performance and a widening achievement gap among students were observed (Kuhfeld et al., 2020). However, with the pandemic, there has been increased interest in measuring learning gap to reduce learning gaps and inequalities in learning and dropping out (Azevedo et al., 2020; Donnelly & Patrinos, 2021; Hevia et al., 2022).

Basic numeracy and reading skills could be declined among children for many reasons. According to the World Bank, school closures caused by a pandemic could push the proportion of 10-year-olds who can't read simple text to around 70% in low- and middle-income countries (Fore & Malpass, 2021). The COVID-19 pandemic, as well as the resulting disruptions in teaching and learning, posed a serious threat to approximately 110 million students in the Middle East and North Africa region, ranging from pre-primary to higher education. Even before the pandemic, an estimated 15 million children in the region aged 5 to 14 were out of school, with nearly two-thirds of children unable to read proficiently by the age of ten. This unprecedented disruption is estimated to have impacted an entire generation of children, with long-term implications for mental health, wellbeing, socialization, and employment prospects (UNICEF & UNESCO, 2021).

In a study in the US of McKinsey and Company (Dorn et. al., 2020), it was found that the hastily assembled online education currently available is likely to be both less effective, in general, than traditional schooling and to reach fewer students as well. In Ethiopia, it was estimated that primary school students learned 30 to 40% of the math they would have learned in a normal school year (UNICEF, 2022). Schoolchildren in South Africa were between 75% and a full school year behind where they should be.

According to a study on the general and differential effects of COVID-19-related school closures in spring 2020 on student achievement in primary and secondary education, school

closures had a negative impact on student achievement, particularly among younger students and students from low-income families (Hammerstein et al., 2021).

According to UNESCO, approximately 420 million people could be lifted out of poverty if all adults completed secondary education (Parker, 2021), which has become uncertain due to the pandemic. COVID-19 has been linked to high rates of anxiety and depression in children and adolescents, with girls, adolescents, and those living in rural areas being the most vulnerable. More than 370 million children lost daily nutrition as a result of school closures around the world (UNICEF, 2022).

2.2 Learning gap in South Asia

Since its outbreak in 2020, the COVID-19 pandemic has interrupted education systems internationally, affecting the most vulnerable learners widely. It has created inequalities and increased a pre-existing learning gap (UNESCO, 2021). A sub-regional situational analysis provides a snapshot of educational responses and impacts of COVID-19 in education across South Asia, including the eight countries in the subregion (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) (UNICEF, 2021). In the South Asia region, there was a very serious risk of a learning gap because of school closures and lack of access to distance learning materials which would erode countries' cognitive capital in the future. The students showed greater achievement gaps in mathematics than in reading outside of school for school closure (Kuhfeld et al., 2020). The extent to which this was the case depended heavily on the scope and quality of learning gap mitigation interventions (UNICEF, 2021).

In Sri Lanka, the global pandemic has led to widespread disruption to teaching and a continuation of structured schooling for about 4.2 million students and 235,000 teachers (UNESCO, UNICEF & World Bank, 2021). With over 530,000 schools in Indonesia closed due to the COVID-19 outbreak, the importance of effective education technology platforms as a concrete response to curbing the loss of academic learning has been highlighted (UNICEF, 2021; Yarrow et al., 2020). An analysis shows that Indonesia, like most other countries around the world, was ill-prepared to deal with the impact of the COVID-19 pandemic, and this is already having a large negative impact on student learning outcomes.

The World Bank's pre-COVID-19 response to learning poverty showed that only 10 percent of children in low-income countries could read and understand a simple story by age 10, compared to 90 percent of children in high-income countries (Rahman & Sharma, 2021). Kuhfeld and Tarasawa (2020) performed a prospective analysis using data from students in grades 3 through 8. Two main findings are common to the analyzed countries. First, children who have recently left school perform far behind children who continue to attend school. Second, the gap in basic reading skills between these two groups widens with age. School closures caused by COVID-19 have affected more than 276 million children and youth enrolled in primary and secondary schools in India and 311 million, including tertiary education. Although the extent of learning loss in India is not known, it has very likely worsened sharply since COVID. The extent of learning loss depends on the reach and effectiveness of distance learning programs implemented by governments and schools (Van Cappelle et al., 2021).

Changing the way education systems work can be seen as a matter of global urgency, especially given pre-COVID-19 literacy levels across the Asian region and the expected learning losses for many children as a result of the pandemic (UNICEF, 2021). Twenty-six percent of low-income countries, 18 percent of lower-middle-income countries, 10 percent of upper-middle-income countries, and 6 percent of high-income countries have attempted to reduce learning losses through more classroom time (UNICEF, 2020, 2021). The expected learning loss in students consists of two components. First, learning does not occur on lost school days (i.e., days when schools are closed, and students are not effectively reached through an alternative modality). Second, some of the learning already acquired is lost or forgotten when students lose their attachment to the education system. Research shows that prolonged absences from schooling can result in a learning loss of 25 to 30 percent.

All countries in the region quickly developed plans and acted after schools closed to keep children learning and reach large numbers of learners. Despite this quick response, the learning loss will be high for many children across the region. Governments and teachers have limited data on the extent of learning loss, and teachers are often unprepared to respond to the specific needs of individual learners when whole-class didactic instruction is often the norm (UNICEF, 2021).

2.3 Learning Gap during the Covid-19 situation in Bangladesh

School closures related to COVID-19 in Bangladesh began on March 18, 2020, and continued through 2021, affecting approximately 38 million students and nearly a million teachers. The main government response was television-based learning programs (World Bank, 2021). However, within months of the schools closing, it was clear that student learning, particularly among teenagers, was at risk, and many students also went through learning loss (Pasani et al., 2021). According to Rahman and Sharma (2021), the total learning loss for any enrolled child is enormous, even with most learning losses for the Covid-19 situation. The learning gap was happening in two ways, one, learning that did not take place while schools were closed, which was directly related to quality schooling, and another, the learning already acquired that was lost or forgotten when students lost their engagement with the education system (Rahman & Sharma, 2021). Widespread school closures and learning gaps are distinctive to the Covid-19 pandemic; school closures and learning disruptions due to emergencies have always been major causes of learning deficits and losses, especially for children living in Bangladesh (Hassan et al., 2021). They suggested that the school closures triggered by Covid-19, which effectively kept most children out of school for long periods of time in 2020, could also have an immediate negative impact on children's learning and acquisition of basic skills. Determining the prevalence and extent of such a learning gap was key to designing preventive and corrective interventions (Conto et al., 2021). It should be noted that previous studies have indicated school closures signify that any disruption in learning can result in significant learning loss (Conto et al., 2021). The current situation disrupted the planned activities of the school year and, in the worst case, could lead to a complete loss of a learning year (Ahmed, 2019). The lockdown and closure of educational institutions have shown a negative impact on student academic performance. In particular, they lagged behind in spelling and math (Roy et al., 2021).

Closing schools to stem the spread of Covid-19 carried a significant risk of students underachieving when learning online, what was known as the learning gap. School closures also led to various social and economic problems. Learning losses were experienced more severely by students who come from families with parents who were less educated and have weak economic conditions (Pasani et al., 2021). Now, a key predictor of the new normal was school performance. This was seen as especially important during physical school closures, and their shortage further compounded the learning losses caused by the Covid-19 pandemic.

Approximately 90% of students worldwide were affected by these closures and had a learning gap. The average result showed that they experienced learning losses, which corresponds to 3 and 1.5 months of learning math and reading, respectively. (Pasani et al., 2021). Prolonged school closures and the length of time students stay in distance learning led to the experience of higher learning losses (Engzell et al., 2021). In both low-income areas and middle- and high-income countries, there was an unequal ability to respond and plan to cope with the learning losses from school closures (Nusrat, 2021). To ensure this, the first step was to assess student learning when they returned to the classroom and identify learning gaps through formative assessment of literacy and numeracy skills. It was crucial to train teachers in formative and summative assessment and remedial education to help students catch up on learning gaps after schools reopen. This was important because one of the biggest predictors of early school leaving is falling behind in academics, particularly from low-quality schools (Branson et al., 2014), and amid the impact of the pandemic, learning gap was likely to be severe for most children, particularly among the most vulnerable groups (Rahman & Sharma, 2021). Some educators even thought that schools and all other educational institutions should reopen soon to keep students and teachers safe, and a two-year learning recovery plan should be taken (Roy et al., 2021). For example, school attendance could be seen as a key indicator to be monitored after schools reopen to counteract the high risk of reduced school attendance and persistent learning gap. Administrative data could serve as an early warning signal to identify students who were most likely to drop out. Another potential indicator was the percentage of students who received regular support from teachers (Li et al., 2021). Furthermore, the learning gap encountered during online instruction, if not addressed, was likely to have a financial impact on society in the form of reduced productivity and development. (Oruche, 2021).

3. Methodology of the Study

Since both qualitative and quantitative data were required to determine the objectives of the study mentioned above, this study employed a multi-strategy mixed method research design (Robson, 2011). This research used performance tests for students and Key Informant Interviews (KII) for teachers to gather data from the field.

Sample and Sampling Strategy

The geographic coverage of this study was limited to Rajshahi district. The study population were-

- Total of 10 Secondary Schools from Rajshahi
- All the Grade 6 and Grade 8 students at these selected secondary schools
- Headteachers and teachers at these secondary schools.

Based on this tentative estimation, the representative sample size for the study was 355 students considering a confidence level of 95% and confidence interval of ±5. Finally, 180 students of Grade 6 and 177 students of Grade 8 from the selected secondary schools participated in the test as sample. The study team interviewed 10 head teachers and assistant teachers (where head teachers were not available) purposively selected from those schools to collect data related to teaching-learning practices during pandemic, challenges faced by schools, students' performances and the factors contributed to the learning gap.

Data collection tools

The performance test was conducted to explore the current education status and the learning gap of the children in the selected location following the framework of Learning Assessment of Secondary Institutions (LASI) 2015 (DSHE, 2016). In addition, for collecting data from head teachers and assistant teachers of secondary schools, a KII questionnaire was used. The data collection tools were piloted in two schools in November and were modified and finalized. The data enumerators were engaged in this stage so that they get acquainted with the tools and data collection process.

There was nothing in the study which are harmful to respondents regarding legal or medical grounds. No one was forced to provide information for the study. The objectives of the study were clearly explained to all the respondents before collecting data from them. The enumerators abstained from collecting data from those who denied or showed any kind of disinterest in providing information. Thus, verbal consent of the respondents was taken prior to any data collection or any interaction which contributed to the deliverables. Confidentiality of data was maintained, and in the report name of the respondents were not revealed. Nevertheless, the child safeguarding policy was employed at every stage of this research, and the team members complied with the Child Protection Policy.

Data analysis method

This mixed method study collected both quantitative and qualitative data. Quantitative data was analyzed using MS Excel and SPSS. These data were compared to the data from the LASI 2015 to measure the learning gap. In addition, qualitative data was analyzed following data-driven thematic strategy proposed by Braun and Clarke (2006, p. 87) in a systematic way, with quantitative findings feeding into qualitative findings to clarify provable reasons for quantitative findings and leading to compelling study conclusions.

4. Findings

The sample of students in this study consisted of a relatively equal number of girls and boys. In total, there were 171 (48%) girls and 186 (52%) boys, indicating a slight majority of male students in the sample. However, the difference between the number of girls and boys was not significant.

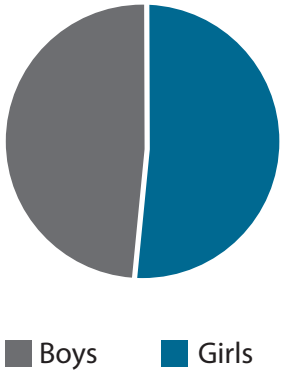


Figure 3: Demographic information of the students

When we look at the breakdown by grade level, we see a similar pattern in both grade 6 and grade 8. In grade 6, there were 85 girls and 95 boys, and in grade 8, there were 86 girls and 91 boys. Again, the difference between the number of girls and boys was not significant.

Table 3: Gender and Grade-wise Students' Information

Gender	Grade 6	Grade 8	Total
Girls	85	86	171 (48%)
Boys	95	91	186 (52%)
Total	**180**	**177**	**357**

This gender balance in the sample is important because it allows us to analyze the impact of the pandemic on both boys and girls equally. It also provides us with a comprehensive view of the performance of students in different grades and how it has been affected by the pandemic. However, we need to keep in mind that the sample is limited to a specific region and may not be representative of the entire population of students in Bangladesh.

4.1 Students' Performance in Bangla

Before assessing students' competencies, setting benchmarks for Bangla Language was necessary. The study followed a benchmark for Bangla Language proficiency with five bands adopted from LASI, DSHE, 2016.

According to the LASI 2015 (DSHE, 2016), as they move up the scale, students demonstrate the aptitude or capacity to carry out more challenging tasks. The scale clearly shows that Level 2 and below kids can only read simple texts when it comes to reading. Additionally, they can only access information that is prominently and openly expressed. The middle level students (Levels 3 and 4) read increasingly complicated texts and demonstrate the capacity to recover information from such texts even when it is not immediately obvious. They also start to make basic interpretations of the information. Students complete more challenging activities, such making inferences, at higher levels (Level 5 and above). They also demonstrate the capacity to understand more complicated data. This level corresponds to responses that ask

pupils to write back. Students can draw relatively sophisticated conclusions at the top level of this scale. Students advance in vocabulary by employing more challenging, less common phrases and words in context. They also become better at spelling longer, uncommon words. On this scale, a mid-level talent is the ability to apply punctuation and grammatical ideas like tense correctly in context.

The findings suggest that there has been a decline in Bangla language competency among students in both grade 6 and grade 8, as compared to LASI 2015. Specifically, a large majority of students in both grades performed at Band 3 or below. This is concerning as Band 3 indicates only a basic understanding of the language, which is not sufficient for effective communication or comprehension of complex texts.

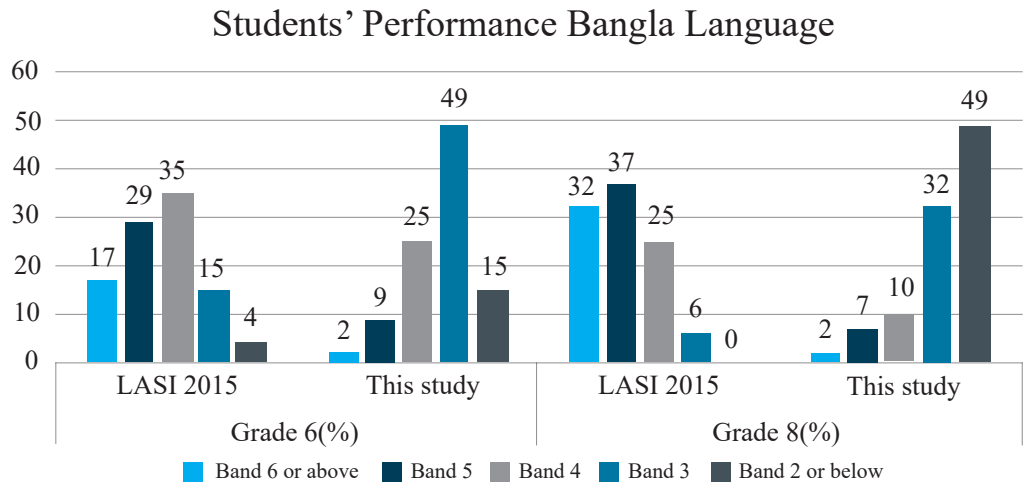


Figure 4: Students' Performance in Bangla

Furthermore, in LASI 2015, a small percentage of students in grade 6, and none in grade 8, performed at Band 2 and below. Whereas, in this study, findings show that 15% in grade 6 and 49% in grade 8 performed at this band level. At this level, students can only understand simple phrases and locate information in basic texts, indicating a significant learning gap.

A significant number of students performed at band five or above in LASI 2015, which decreased significantly after the COVID-19 pandemic in this study.

It is worth noting that the lower performance in the upper bands may be attributed to the pandemic-induced disruptions to the education system, as students may not have received adequate support or opportunities to develop their language skills. However, further research is needed to investigate the underlying causes of the decline in language competency and to develop effective strategies to address the learning gap.

4.3 Students' Performance in Mathematics

Assessment of students' competencies in mathematics required benchmarks. Thus, based on the items and skills assessed in LASI 2015, the following scale for Mathematics was adopted in this study.

As per the LASI 2015 report (DSHE, 2016), students in band two or lower in mathematics are capable of performing elementary arithmetic operations, formulating mathematical expressions from straightforward circumstances, making straightforward conclusions from data, and identifying well-known 2D and 3D shapes. Students in Bands 3 and 4 are capable of handling more challenging assignments including multi-step problem solving and setting up and resolving straightforward algebraic equations. working with geometrical concepts in straightforward situations where pupils are familiar with the mathematical techniques to solve them. The complexity of the exercises increases at the higher level, and students are expected to apply the mathematical concepts they have learned in one area to others as well as to challenging familiar scenarios that they may not be familiar with. Students in this band are expected to defend the procedures and work out feasible solutions.

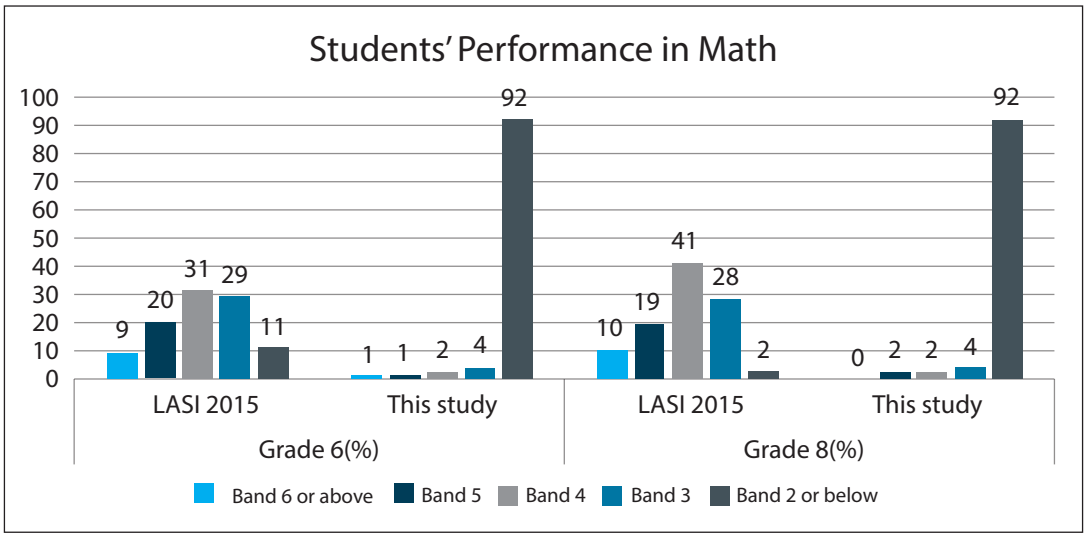


Figure 5: Students' Performance in Mathematics

Data shows that students performed at lower bands in mathematics in both grades 6 and 8. Most of the students (92%) performance belongs to band two or below in both grades, which was only 1% in grade 6 and 2% in grade 8 before the pandemic. About one-third of students of both grades in LASI performed at band five or above, which is completely reversed in this study. Students' performance in the LASI formed a normal curve throughout the bands, which has been changed in this study. For instance, the mathematical competence of 31% of students in grade 6 and 41% in grade 8 are in band 4, whereas only 2% of students in grade 6 and grade 8 were found in this band in this study. It shows a huge achievement gap in students' performance in math.

The findings of the study indicate a significant decline in students' mathematical competencies in both grades 6 and 8 during the pandemic. The majority of students performed at lower bands, which is a matter of concern as the ability to perform at higher bands is an important indicator of mathematical proficiency. The pandemic seems to have had a negative impact on student's ability to perform at higher levels of mathematical competence, as evidenced by the reduction in the proportion of students performing at bands 4 and above.

This significant decline in students' mathematical competence can be attributed to the COVID-19 pandemic, which disrupted regular classroom teaching and learning for a considerable period. The reverse trends of students' performance, from a large percentage of students in higher bands to most students in lower bands, indicate a widening achievement gap. This finding suggests that there is a need for interventions to support students' learning to bridge the learning gap. Teachers and education experts, along with policymakers, need to develop appropriate strategies to ensure that students acquire a strong foundation in mathematics, which is essential for their future academic success.

4.4 Grade and Subject wise Overall Performance

The test results indicate that there is a significant learning gap in mathematics among students in both grade 6 and grade 8. This could be due to a variety of reasons, such as a lack of access to quality online resources, inadequate support from teachers and parents, and the difficulty of learning mathematics remotely. On the other hand, the better performance of students in Bangla language skills could be attributed to the fact that it is their mother tongue, and they have more exposure to it in their daily lives.

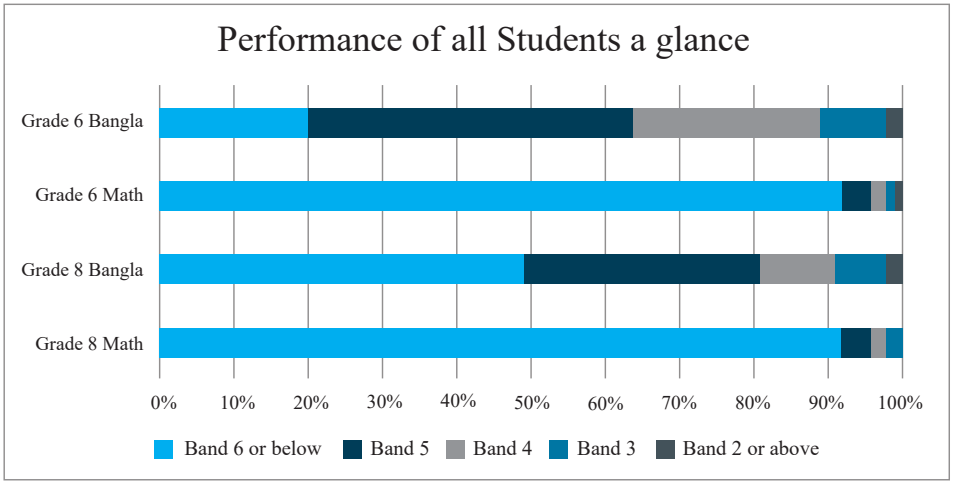


Figure 6: Performance of the students in the test

It is also noteworthy that the performance of grade 6 students is better than grade 8 students in Bangla. This could be because grade 6 students may have received better support and guidance from their teachers and parents during remote learning, as they are still new to the school environment.

Overall, the results highlight the urgent need for targeted interventions to address the learning gap in mathematics among students in both grades. Schools, teachers, parents, and policymakers must work together to identify and implement effective strategies to support students in their learning, especially in subjects like mathematics, where the gap is the widest.

4.5 Grade, Subject, and Gender wise Overall Performance of the Students

The data from the study suggests that in most cases, girls performed better than boys in both Bangla and Mathematics. Girls in grade 6 outperformed boys in both subjects, whereas girls in grade 8 performed better than boys only in Bangla but not in Mathematics. The reasons for this gender gap in performance could be multifaceted and complex. It is possible that girls were more motivated to study and perform well in academics, or they might have had more support from their families in terms of study time and resources. On the other hand, boys might have been more involved in income-generating activities, such as farming or other work, due to economic hardship during the pandemic. It is important to further investigate the factors that contributed to the gender gap in performance to design targeted interventions to address this issue.

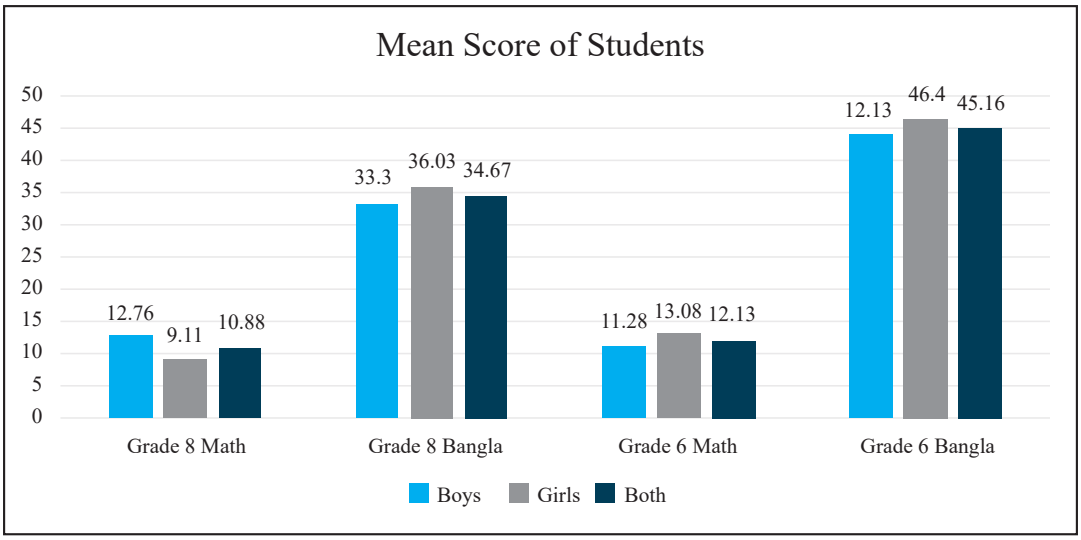


Figure 7: Grades and Subjects wise average score of the students in the test

4.6 Factors Impacting Students' Learning

There were several factors that impacted students' learning negatively during the pandemic. Some of these factors include:

- **Lack of access to technology and digital resources:** The shift to online learning during the pandemic left many students without access to the necessary technology or digital resources to keep up with their studies.

- **Lack of access to teachers:** Students had limited access to their teachers during the

pandemic, which made it difficult for them to get the help they needed to understand the material.

- **Economic hardship:** Many families experienced economic hardship during the pandemic, which made it difficult for them to provide their children with the necessary resources and support to continue their education.
- **Mental health and emotional wellbeing:** The pandemic had a significant impact on student's mental health and emotional wellbeing, which may have affected their ability to focus on their studies.
- **Disruption to routines and structures:** The disruption to students' routines and structures during the pandemic may have affected their ability to learn and retain information.

5. Discussion, Conclusion, and Recommendations

Most of the teachers agreed that the pandemic affected students' literacy and numerical skills drastically. Although the government broadcasted digital classes on TV and schools on their own initiated online classes through different social media platforms, most of the students were out of these arrangements due to not having access to devices and the internet. Other reasons included the illiteracy and unawareness of the parents and community people.

Besides the online classes, teachers assigned homework using worksheets and assignments provided by DSHE to the students, which could not succeed for the same reasons mentioned earlier. As one of the heads teachers opined-

> *"We have provided worksheets to evaluate students' literacy and numeric skills. In most cases, the initiatives have failed to evaluate the students as most of them didn't participate in this activity. The school authority has not taken any particular step to evaluate the learning loss, and still, they don't have any particular planning to do so in the future."*

The pandemic has created a great learning gap though the government and other stakeholders have taken several steps. To minimize the learning gap, many schools have taken various initiatives, e.g., establishing a community-based committee to find out the dropout children and bring them back to the schools, meeting with parents and caregivers, community-based small learning groups, etc. Although many students participated in the worksheet activities, this support was inadequate from every dimension, and students did not submit their worksheets to schools.

Furthermore, the teachers, students, and parents didn't have any training or orientation on distance learning or related issues. Similarly, they didn't get any advantage from the online teaching-learning activities run by the government. Almost half of the students missed or couldn't find any way to participate in online education activities.

The students (even many teachers also) did not understand the homework they were given. Teachers noticed that they got the homework given was written by someone else. It might happen that there was someone educated at home or students of senior classes who helped.

Students faced challenges regarding access to educational opportunities as a significant portion of them lacked devices and internet connections to join online classes. But a portion of the students got access and continued their education due to these initiatives. Sometimes, it affects them negatively as some children are reported for mobile addiction due to overuse of mobile phones during this period.

While addressing the crisis of the learning gap, we should take a strength-based approach, focusing on what they know rather than how far behind they have fallen. The possibilities are endless if we accept this approach. Funding for educational technology must be included in education investments, considering what has worked well in various contexts around the world. Evidence shows that keeping schools and preschools open should be prioritized, as should ensuring teachers have adequate support to help children learn, adjusting instruction to support children's learning needs, and focusing on important foundational skills.

Kuhfeld et al. (2020) suggest six fundamental guidelines that districts might put into practice in order to guarantee a pleasant and productive educational experience despite the difficulties caused by the pandemic. They first recommend developing customized three-year lesson plans for each child, taking into account their academic, social, and emotional requirements and using data to guide the planning process. Second, it is critical to give top priority to efforts that aim to re-engage and assist students who have been most negatively impacted by the disruptions caused by the pandemic. Thirdly, it is advised to use early diagnostic systems, longer learning time, and tutoring to help youngsters improve their early math and literacy skills. Along with the safe reopening of schools for in-person education, it is encouraged to offer at least one high-quality remote learning alternative. Another recommendation is to test out alternative learning frameworks, like flexible scheduling and new methods for subject mastery. A supportive learning environment must be fostered by developing systems of support for educators and families that are consistent and aligned. Schools can attempt to provide a comprehensive and successful approach to education during these type of difficult situations by putting these concepts into practice.

6. Recommendations and conclusion

To address the learning gap among students in Grades 6 and 8, several key recommendations are proposed. Firstly, prioritize teacher quality and training through comprehensive professional development and adequate teaching materials. Secondly, implement modern teaching methods, like active learning and problem-based learning, to foster student engagement and performance. Thirdly, integrate technology thoughtfully into the learning process to enhance student participation while considering the digital divide. Fourthly, conduct formal reviews of relevant content at the beginning of subsequent grades to remediate mild learning gaps. Additionally, develop curriculum materials and assessments aligned with national standards to

improve learning outcomes. Improving the learning environment with essential facilities such as libraries and labs is essential. Engaging parents and the community in the education process and supervising remedial activities through education offices can further support students' progress.

Based on the data collected from 10 purposively selected secondary schools in Rajshahi, it is evident that the COVID-19 pandemic has caused a significant learning gap among students in Bangla and Mathematics. The data shows that students' performance in both subjects has declined, with most students performing at band two or below in Mathematics, which was only 1% in grade 6 and 2% in grade 8 before the pandemic. Similarly, most students' language performance is at Band 3 or below in Bangla, which was better in LASI 2015. Furthermore, the data indicate that girls outperformed boys in most cases, especially in grade 8 in both subjects. This could be attributed to the fact that boys were more involved in income-generating activities, such as farming, during the pandemic, leading to reduced study time. Teachers, in their in-depth interview, mentioned that the online classes were not accessed by many of the students as they did not have access to devices and internet facilities. However, teachers followed another strategy by giving assignments to the students, which was also doomed to failure because of the unawareness of students and their guardians. Due to the pandemic, schools were closed for almost one and a half years. Thus, students forgot their learning, and thus, they performed poorly on the test.

However, it is important to note that this study only collected data from a specific region and a small number of subject areas, which limits the generalizability of the conclusions. Additionally, the data was collected from students when they were about to finish their school year, and by this time, already one year had passed after school reopening. Thus, the study can only tell part of the story of learning during the pandemic. In conclusion, the study highlights the urgent need for measures to address the learning loss and achievement gap caused by the pandemic, especially in Mathematics. Policymakers and educators need to come up with targeted interventions that address the needs of disadvantaged students, including boys and those from low-income families, to ensure that they are not left behind.

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Reference

Ahmed, M. (2019). Education Response to Covid-19 in Bangladesh – A Missing Opportunity? Bangladesh Education Journal. 18(1). pp 7-22.

Aurini, J., & Davies, S. (2021). *COVID-19 school closures and educational achievement gaps in Canada: Lessons from Ontario summer learning research.* Canadian Review of Sociology. https://doi.org/10.1111/cars.12334

Azevedo, J. P., Goldemberg, D., Montoya, S., Nayar, R., & Rogers, H. (2021). Will Every Child be Able to Read by 2030? *Policy Research Working Paper: World Bank*. https://gaml.uis.unesco.org/wp-content/uploads/sites/2/2021/03/Azevedo-et-al-2021_Will-Every-Child-Be-Able-to-Read-by-2030.pdf

Branson, N., Hofmeyr, C., & Lam, D. (2014). Progress through school and the determinants of school dropout in South Africa. *Development Southern Africa, 31*(1), 106–126. https://doi.org/10.1080/0376835X.2013.853610

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology,* 3(2), p.77–101.

Conto, C. A., Akseer, S., Dreesen, T., Kamei, A., Mizunoya, S., & Rigole, A. (2020). COVID-19: *Effects of school closures on foundational skills and promising practices for monitoring and mitigating learning loss* (pp. 1-30). UNICEF Office of Research-Innocenti.

Directorate of Secondary and Higher Education (DSHE). (2016). *Learning Assessment of Secondary Institutions* (LASI) 2015. Dhaka.

Donnelly, R., & Patrinos, H. A. (2021). Learning loss during Covid-19: An early systematic review. *PROSPECTS*. https://doi.org/10.1007/s11125-021-09582-6

Dorn, E., Hancock, B., Sarakatsannis, J., & Viruleg, E. (2020). COVID-19 and student learning in the United States: The hurt could last a lifetime. *McKinsey & Company*.

Engzell, P., Frey, A., & Verhagen, M. D. (2021). Learning loss due to school closures during the COVID-19 pandemic. *Proceedings of the National Academy of Sciences, 118*(17), e2022376118. https://doi.org/10.1073/pnas.2022376118

Fore, H. H., & Malpass, D. (2021, December 20). *Reversing the pandemic's education losses.* World Bank Blogs. https://blogs.worldbank.org/voices/reversing-pandemics-education-losses

Goudeau, S., Sanrey, C., Stanczak, A., Manstead, A., & Darnon, C. (2021). Why lockdown and distance learning during the COVID-19 pandemic are likely to increase the social class achievement gap. *Nature human behaviour, 5*(10), 1273-1281. https://doi.org/10.1038/s41562-021-01212-7

Hammerstein, S., König, C., Dreisörner, T., & Frey, A. (2021). Effects of COVID-19-related school closures on student achievement-a systematic review. *Frontiers in psychology, 12,* 746289.

Hassan, H., Islam, A., Siddique, A., & Wang, L. C. (2021). "Low-tech" distance education: A remedy of the learning loss due to the COVID-19 pandemic. CDES Policy Brief Series: Monash University. https://www.monash.edu/__data/assets/pdf_file/0008/2705057/CDES-PB2021N02-V1.pdf

Hevia, F. J., Vergara-Lope, S., Velásquez-Durán, A., & Calderón, D. (2022). Estimation of the fundamental learning loss and learning poverty related to the COVID-19 pandemic in Mexico. *International Journal of Educational Development, 88,* 102515. https://doi.org/10.1016/j.ijedudev.2021.102515

Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). *Projecting the potential impacts of COVID-19 school closures on academic achievement*. https://doi.org/10.26300/CDRV-YW05

Li, Z., Sharma, U., & Matin, M. (2021). Impact of COVID-19 *on Primary School Students in Disadvantaged Areas of Bangladesh.* Asian Development Bank. https://doi.org/10.22617/BRF210471-2

Ngwacho, A. G. (2020). COVID-19 pandemic impact on Kenyan education sector: Learner challenges and mitigations. *Journal of Research Innovation and Implications in Education, 4*(2), 128-139.

Nusrat, M. (2021). Educational Response Toward Covid-19 Pandemic: Perception, Problems and Prospects; A Bangladeshi Context. *European Journal of Education and Pedagogy, 2*(5), 25–32. https://doi.org/10.24018/ejedu.2021.2.5.163

Oruche, C. A. (2021). COVID-19 Pandemic: The Impact of Online Schooling on Students' Engagement with School Work and Physical Activity. *OIRT Journal of Humanities and Social Sciences, 1*(1), 1–4. https://doi.org/10.53944/ojhss-2101

Parker, A. (2021). Solutions to Pandemic-Induced Global Learning Loss. *Borgen Magazine*. https://www.borgenmagazine.com/global-learning-loss/

Pasani, C. F., Amelia, R., & Hassan, Z. (2021). Learning loss and education inequality in Indonesia (mapping the potential, consequences, and the covid-19 crisis). *Review Of International Geographical Education Online, 11*(10).

Rahman, T., & Sharma, U. (2021). *A Simulation of COVID-19 School Closure Impact on Student Learning in Bangladesh.* World Bank. https://doi.org/10.1596/35043

Robson, C. (2011). *Real-world research: A resource for users of social research methods in applied settings.* 3rd ed. Chichester: Wiley.

Roy, A. K., Mou, S. I., Kabir, H., & Hasan, M. K. (2021). The aftermath of prolonged academic institutions' closure: Time to reopen safely. *Bioresearch Communications, 7*(2), 1038–1041. https://doi.org/10.3329/brc.v7i2.54379

UNESCO (2021). Recovering Lost Learning: what can be done quickly and at scale? UNESCO COVID-19 *Education Response*. https://unesdoc.unesco.org/ark:/48223/pf0000377841

UNESCO, UNICEF & World Bank (2021). *COVID-19 Learning Losses Rebuilding Quality Learning for All in Middle East and North Africa. (2021)*. https://www.unicef.org/mena/media/14501/file/Executive%20Summary%20

UNICEF. (2022). *Learning loss must be recovered to avoid long-term damage to children's well-being, new report says:* Press Release. https://www.unicef.org/bangladesh/en/press-releases/learning-loss-must-be-recovered-avoid-long-term-damage-childrens-well-being-new

UNICEF. (2021). *The future of 37 million children in Bangladesh is at risk with their education severely affected by the COVID-19 pandemic: Press Release.* https://www.unicef.org/bangladesh/en/press-releases/future-37-million-children-bangladesh-risk-their-education-severely-affected-covid

UNICEF. (2020). *How COVID-19 Changed Lives - Voices of Children.* https://www.unicef.org/georgia/stories/how-covid-19-changed-lives-voices-children

UNICEF & UNESCO. (2021). *Bangladesh Case Study: Situational Analysis on the Effects of and Responses to COVID-19 on the Educator in Asia*. https://www.unicef.org/rosa/media/16481/file/Bangladesh%20Case%20Study.pdf

Van Cappelle, F., Chopra, V., Ackers, J., & Gochyyev, P. (2021). An analysis of the reach and effectiveness of distance learning in India during school closures due to COVID-19. *International Journal of Educational Development, 85,* 102439. https://doi.org/10.1016/j.ijedudev.2021.102439

World Bank. (2022, January 26). *Learning loss must be recovered to avoid long-term damage to children's wellbeing and productivity, a new report says.* Retrieved from https://www.worldbank.org/en/news/press-release/2022/01/26/learning-loss-must-be-recovered-to-avoid-long-term-damage-to-children-s-wellbeing-and-productivity-new-report-says

World Bank. (2021). *Keeping Bangladesh's Students Learning During the COVID-19 Pandemic.* https://www.worldbank.org/en/results/2021/04/18/keeping-bangladesh-s-students-learning-during-the-covid-19-pandemic

Yarrow, N., Masood, E., & Afkar, R. (2020). Estimates of COVID-19 impacts on learning and earning in Indonesia: How to turn the tide. https://openknowledge.worldbank.org/server/api/core/bitstreams/fe106b4f-edf3-5f1b-9272-7c52136edef0/content