

# How Does the Socio-Economic Status (SES) Affect “Quality Education” during Covid-19? A Pre and Post Pandemic Observational Study of Language Comprehension Performance among Native Bangla Speaking Students in Rural India

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## Abstract

This study focuses on language comprehension skills of secondary students from rural India. Language skills are the most important factor to quality education followed by UN SDG-4. This study examines how socioeconomic status (SES) affects students’ language comprehension skills (L1 and L2) and Inductive Reasoning skills in pre- and post-pandemic situations. For quantitative analysis, advanced statistical techniques, such as two-way ANOVA have been utilized.

## Keywords

Language Skills, SES, IR Skills, Covid-19, Pre and Post Pandemic Effect, Bangla Speaking Pupils, Rural Education, India

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## 1. Introduction

India has made considerable strides towards implementing its plan for achieving Universal Education (ASER Centre 2006-2017). Free and compulsory education is the fundamental right of all children (MHRD, 1986; 2009). Multiple important programs and policies, such as Sarva Siksha Abhiyan (SSA) and Right to Education (RTE) act have been launched to achieve the goal of free and compulsory education, with specific focus on the age range of six and fourteen years. By including both enrolment and learning goals as part of the Sustainable Develop-

<sup>1</sup>UN SDG-4: <http://in.one.un.org/page/sustainable-development-goals/sdg-4/>

ment Goal (SDG 4)<sup>1</sup>, the developing countries in the world like India have a framework which measures and acknowledges the fact that getting children to school is not enough<sup>2</sup>. In both primary and secondary education, there has been substantial increase in the enrolment rates across the country, but challenges remain to be addressed (Drèze & Sen, 2002). Each year an estimated 6 million children complete elementary education in India but without having acquired even the basic skills which are required for future progress, whether academical or in professional front (Mohanty & Dash, 2016). As reported by the UN, greater than half of all children and teenagers worldwide<sup>3</sup> are not able to achieve minimum standards of proficiency in reading and mathematics. And by April 2020, as a result of Covid-19, approximately 1.6 billion children couldn't attend school, with thirty million from India<sup>4</sup>. Many schools and colleges in India (closed due to Covid-19) have successfully set up online classes for their students. But, a sizable number of children from rural, remote or backward areas are unable to access online education due to scarcity of infrastructure (gadgets unavailability, good and affordable internet). Developing nations already had a broadening education gap making it harder to achieve SDG-4 by 2030; Covid-19 further worsened the situation.

Lockdowns enacted by governments of developing nations in order to combat Covid-19 have created huge barriers for students (especially in rural areas) to access online education due to inequalities in infrastructure. That is why this academic year, all over India, high Socio-economic Status (SES) students in urban areas are outperforming low SES students in rural and remote areas, which is quite disconcerting. The Education 2030 Agenda brought a renewed focus on the quality of learning as reflected in the Sustainable Development Goals (SDG-4)<sup>5</sup>. It calls for countries to “*ensure inclusive and equitable quality education, and promote lifelong learning opportunities for all*”. As reiterated in UNESCO's Guide for ensuring inclusion and equity in education, “*This includes efforts to enable education systems to serve all learners, with a particular focus on those who have traditionally been excluded from educational opportunities*”. Language skill is one of the important factors of quality education although Socio-Economic Status (SES) has been shown to be a robust predictor of first language (L1) and second language (L2) development in earlier studies (Rose et al., 2016; Marianne Nikolova & Ben o Csapo, 2017), albeit remains unclear what role it cognitive skills plays in performance of language. Now the main question is “Are the students” language learning outcomes that can be deemed satisfactory in India after the global pandemic effect? Due to lack of empirical research on

<sup>2</sup>The education crisis: Being in school is not the same as learning, World bank (2019)

<https://www.worldbank.org/en/news/immersive-story/2019/01/22/pass-or-fail-how-can-the-world-do-its-homework>

<sup>3</sup>Right to education issue, Save the children

<https://www.savethechildren.org.nz/what-we-do/the-issues/education/>

<sup>4</sup>“Keeping the world's children learning through COVID-19|UNICEF.” 20 Apr. 2020,

<https://www.unicef.org/coronavirus/keeping-worlds-children-learning-through-covid-19>, Accessed 5 Jun. 2021

<sup>5</sup>Sustainable Development Goal-4 <https://sdgs.un.org/goals/goal4>

quality education especially in rural West Bengal; it is really hard to find such context combined with both empirical and action research study together. The authors have dig deep enough in several papers from various developed countries which are multilingual and EFL that established the importance of cognitive skills on language performance (Rose, Sabates, Alcott, & Ilie, 2016) similar to the role of SES on the language performance (Haman et al., 2017); therefore, it becomes a topic of importance to explore in rural West Bengal and can be deployed across India. Moreover, this calls for a compact study which will investigate the role of SES and cognitive skills on language (L1, L2) performance all together during pre and post pandemic situations. However, to the best of the author's knowledge, no proper empirical studies have been attempted to verify whether the same pattern also holds in a second language instructional context or not.

Prior studies by researchers (Mohanty & Dash, 2018a) across the globe have shown the need to focus on the quality language performance (Henriksen et al., 2019) of the students during the pre-pandemic era as it's an important factor to achieve SDG-4 by 2030. Specifically, pre-pandemic time has shown that more attention needs to be directed towards rural and remote students. In the pre-pandemic era, more than the average number of students was unable to score more than 50% marks. The effect of school closure due to the pandemic will make the situation worse for the students, specifically rural students with low SES background. Rural pupils don't have the privilege of study online. Students who wish to attend Virtual classes will need a reliable internet and power connection. However, current estimates show that out of India's 1.2 billion population, hardly 600 million people have access to the internet via mostly smartphones. Even a small population of students who have access to the internet may not be able to watch online streaming video lectures for which 4G speed is required but not easily available to rural internet users. Thus, the current situation demands for a creative study (Henriksen et al., 2020b) design among rural under privileged students.

The world is facing a learning crisis and the scenario is going to get worse due to the effect of year long pandemic. Even though developing nations, such as India have significantly expanded access to education, enrollment in school isn't the same thing as learning. Achieving Inclusive Education is a distant reality in rural and remote regions of developing countries like India. During the pre-pandemic time, nearly three-quarters of third graders in rural India were not able to solve a two-digit subtraction problem such as 46 minus 17, and half of fifth graders were unable to solve (Report of ASER 2019). Ever since the pandemic happened, the situation has turned for the worse as rural students are deprived from learning during the lockdown for school closure. In some cases, the situation is so alarming that disadvantaged students were unable to manage basic meals for living. In the middle of this deadly pandemic, rural West Bengal (a state in the eastern part of India) got ravaged by Cyclone Amphan<sup>6</sup>. Rural areas

<sup>6</sup>“Cyclone Amphan-Wikipedia.” [https://en.wikipedia.org/wiki/Cyclone\\_Amphan](https://en.wikipedia.org/wiki/Cyclone_Amphan), Accessed 7 Jan. 2021.

were disproportionately affected by this cyclone. Thousands of people lost their homes, food, and livelihood. The West Bengal Government shifted these people into Govt Shelter houses and relief camps.

Since the pre-pandemic time has shown how much attention is needed for the quality performance of rural and remote students to follow UN SDG-4 “Quality Education Goal” by 2030. Where more than the average number of students couldn’t score So, the Amphan effects left them in a tremendous situation where even thinking about education is like a dream under such circumstances, however few NGOs are coming up with certain plans to get the ball rolling in terms of education for the ones who were affected the most in such torrid times. Besides these, other challenging questions are as follows: How can the continuity of quality education be assured, specifically the efficacy of distance teaching and learning as well as learning assessments in rural and remote regions. However, no research has directly assessed the extent to which a pandemic will affect language learning with SES impact.

Therefore, in the first section of the paper the author has summarized some of the relevant research previously attempted on students’ language performance as part of quality education and also compared it with the current education scenario during the pandemic. This study has focused on L1 (Bangla) and L2 (English) as language learning. The authors establish how students’ reading comprehension skills (L1 and L2) are interacted with SES pre- and post-pandemic era. In the second section, a detailed analysis has been performed by the authors based on the findings of a primary field and online survey from rural secondary students of West Bengal, India.

## 2. Methodology

### 2.1. Context

Socio-Economic Status (SES) patterns are fundamentally different and languages are huge and diversified all over India. Therefore, a diligent effort is required for this in-depth field study from which the authors will be able to learn about the barriers to quality education both during the pre-pandemic and post-pandemic era. The authors have adopted a deeper and thorough approach of “fourfold interaction” in the context that involves a few mechanisms to examine interaction effects among L1, L2 comprehension skills, factors of Socio-economic status (SES) and Cognitive Skills (IR) of rural students during pre-pandemic and post-pandemic scenarios.

The authors developed novel standardized assessments for measuring Bangla (L1) and English (L2) skills, inductive reasoning (IR) assessment for measuring intelligence level and language combinations for secondary class rural children. The authors also formulated another standardized assessment for the context questionnaire used for measuring participants’ SES using the guidelines of Programme for International Student Assessment (PISA) index of Economic Social Cultural status (ESCS)<sup>7</sup> which are tangible to the context of rural India. The authors have taken the research based on:

<sup>7</sup>ESCS Index by PISA, link: <https://stats.oecd.org/glossary/detail.asp?ID=5401>

1) Primary data collection for a set of students in sampled rural regions of West Bengal, India during pre-pandemic year of 2019.

2) Online primary data collection for the same sampled students during the post-pandemic year of 2020.

At the onset, we have emphasized both qualitative and quantitative approaches, as only one method is not sufficient to assess performance of sampled students and their interaction effects. During the pre-pandemic situation, a rigorous exercise of data collection has been conducted with students belonging to low SES and studying in eighth grade (viii) and ninth grade (ix). The study sample is generally representative of the student population of West Bengal. Sample size is validated by Yamane<sup>8</sup> sample size determinate test. A total of 300 Students of class VIII and IX belonging to low SES backgrounds participated in this survey. All the schools are of Bangla Medium consisting of Bangla mother tongue and student ages ranged from 14 to 17 years comprising equal number of girls and boys. This is a moderate sample size considering our work and we have collected data for each individual participant during 2019. The second phase of data collection was done through online surveys and telephonic interviews on the same sample size post-pandemic. The communication with the students started from July 2020 and continued for the next 6 months via online and telephonic assessment that took around 3.5 hours for each individual to complete the assessments.

## 2.2. Tools and Mechanism

The authors have deployed a structured questionnaire across 300 sampled students pre-pandemic and post-pandemic that included the following instruments as follows.

- 1) Bangla comprehension tests<sup>9</sup> used to assess students' L1 reading skills;
- 2) English comprehension tests<sup>10</sup> used to assess students' L2 reading skills;
- 3) Students' General cognitive abilities<sup>11</sup> measured by an inductive reasoning (IR) test;
- 4) Participants' Socio-economic status (SES) tapped by a short questionnaire followed by the guidelines partially based on the PISA ECSC index<sup>12</sup>.

The test results were recorded using "scale scores" from tests calculated using levels of proficiency as per ASER Reading tool<sup>13</sup> instead of the percentage of correct scores. Total marks for English, Bangla and cognitive skill assessments were 50 in each subject. The chosen scale values ranked from 0 to 10 for every topic under English (L1), Bangla (L2) and cognitive skill (IR) assessment. Achievement

<sup>8</sup>Calculation of sample size by using Yamane formula (See appendix).

<sup>9</sup>Bangla book of West Bengal Board of Secondary Education (WBBSE)  
<https://wbxpress.com/wp-content/uploads/2016/01/VIII.pdf>

<sup>10</sup>The basic reading tasks outlined by the Authors and designed based on an analysis of the state textbooks provided free of charge to students.

<sup>11</sup>It was used in previous research to measure the cognitive contribution to achievements in English and German listening and reading comprehension and writing skills.

<sup>12</sup>PISA ESCS Index: <https://stats.oecd.org/glossary/detail.asp?ID=5401>

<sup>13</sup>Levels of proficiency in ASER Reading tool: <http://www.asercentre.org/p/50.html>

scores (Total Marks) can be interpreted as an average of the six topics under L1, L2 and IR skills along with fluency/confidence as mentioned before in this paper. As can be seen in **Table 1**, Cognitive skill assessment (IR skills) comprises *Verbal analogies, Number analogies, Number series, Letter series, Exclusion* and *Coding* tasks in English and translated in Bangla. This test was found to have assessed students' general cognitive developmental level reliably.<sup>14</sup> For Bangla (L1) and English (L2) skills assessment, the items ranged from *Missing words, Choose the correct word, Spelling correction, Words with pictures matching* to *Short Questions and answers, Poem & Passage Reading* from their textbooks and the contents were developed from the chapters which the students are yet to learn. The items of L1 and L2 reading comprehension were divided into four equivalent versions; each of this version carried equal weightage. All of them consist of three text types (e.g., short narrative, descriptive program, brochure with pictures) and various task types (e.g., short answer, true or false, multiple matching, etc). The number of questions in each test ranged from 11 to 18; totals were between 41 to 45. An aspect of current study was also directed towards collecting detailed household characteristics of the sampled cohort of children to assess the impact of SES factors on their school performances for language learning and cognitive skills.

**Table 1.** Activities for the L1, L2 and IR skills assessment prepared by the Authors based on students' syllabus.

Assessments	Topics	Total no of questions	Total marks	Time duration
Bangla Skills assessments	কবিত্ত এক গল্প (Story & poem reading)	10	50	3 hours
	উপযুক্ত কক্ষগুলি মলা (না) (Finding correct words)			
	অর্থসঙ্গে বিত্ত মলা (না) (Word matching)			
	উত্তর দিয়ে মলা (না) (MCQ)			
	অনুপস্থিত শব্দসঙ্গে সন্ধি বিত্ত পন মলা (না) (Missing word finding)			
English skills assessments	বা না নক্ষ শে ধন (spelling correction)	10	50	3 hours
	Poem & Passage,			
	Word Matching,			
	MCQs,			
	Jumble words,			
Cognitive skills assessments	Missing words,	10	50	3 hours
	Spelling.			
	Number analogies			
	Verbal analogies			
	Number series			
	Letter series	10	50	3 hours
	Coding			
	Exclusion			

<sup>14</sup>It was used in previous research to measure the cognitive contribution to achievements in English and German listening and reading comprehension and writing skills.

### 2.3. Statistical Reliability Test for Questionnaires

The authors have performed cronbach alpha to test statistical measure of reliability of subject assessments, inductive reasoning (IR) and SES questionnaires as shown in **Table 2**. “Internal consistency refers to the extent that all items on a scale or test contribute positively towards measuring the same construct”.

As indicated in **Table 2**, the mean of the Bangla (L1) comprehension test was significantly lower than that of the English (L2) comprehension test. The reliability of both L1 and L2 tests were high: Cronbach’s Alpha is 0.913 for the English (L2) comprehension test and 0.933 for Bangla (L1) comprehension test, suggesting that the items have relatively high internal consistency. The mean of the inductive reasoning test was higher (73.5) and the standard deviation is 76.2. The SD Value is significantly higher in the inductive reasoning (IR) test than the SD values of L1 and L2 tests. On the other hand, it can also be observed that SD values of L1 and L2 are more or less similar. Cronbach’s Alpha value for the inductive reasoning (IR) test is 0.715.

### 3. Results

For the next step, a set of two-way ANOVAs was conducted to examine the significant interactions between language skills, IR skills and SES factors in pre and post pandemic scenarios. When two or more independent variables are present, sometimes it is not sufficient to consider only the “*main effect*” of each independent variable on the response variable. We also need to consider interaction effects which incorporate simultaneous effects of two or more variables on the response. It has been attempted to see how SES (Family Income, fathers’ occupation and breakfast from home) interacts with L1, L2 comprehension skills and IR skill of 8th & 9th graders. Interaction effects in any sort of survey based study are important because it allows researchers to study the combined (multivariate) effects of two or more independent variables on the response variable, therefore providing researchers more precise information about the relationship between the response and independent variables. Moreover, it also helps explain more of the variability in the dependent variable. Hence the reason why interaction effects have been used in our study.

For the pre-pandemic situation, three SES factors are playing a major role in L1, L2 and IR performances as shown in **Table 3**, namely Father’s Income (FI), Fathers’ Occupation (FO) and Breakfast from home (BFH). For the post-pandemic scenario, dominant SES factors are totally different. **Table 4** shows us the three

**Table 2.** Mean (%), Standard Deviation (SD), and reliability (via Cronbach’s Alpha) of English, Bangla comprehension and Inductive reasoning tests.

Tests	Mean	SD	Cronbach’s Alpha
English (L2)	54.5	26.9	0.913
Bangla (L1)	44	26.8	0.933
Inductive reasoning (IR)	73.5	76.2	0.715

**Table 3.** Interaction effect among L1 skills, L2 skills, IR skills and SES pre-pandemic.

Independent Variables	Df	F	Sig
<b>Dependent Variable: English Skills (L2) Scores</b>			
Bangla Skills (L1)	11	1.207	2.151
Inductive Reasoning (IR) Skills	11	6.25	0.082
SES [1] (FI)	4	1.042	0.441
SES [2] (FO)	4	2.21	0.14
SES [3] (BFH)	4	2.25	0.156
L1 Skills * SES (FI)	44	1.21	0.033
L1 Skills * SES (FO)	44	6.15	0.041
L1 Skills * SES (BFH)	44	4.251	0.05
IR Skills * SES (FI)	44	7.012	0.211
IR Skills * SES (FO)	44	6.251	0.177
IR Skills * SES (BFH)	44	8.214	0.006
<b>Dependent Variable: Bangla Skills (L1) Scores</b>			
English Skills (L2)	11	1.324	0.052
Inductive Reasoning (IR) Skills	11	1.042	0.277
SES (FI)	4	5.111	0.361
SES (FO)	4	6.251	0.048
SES (BFH)	4	7.017	0.121
L2 Skills * SES (FI)	44	2.121	0.047
L2 Skills * SES (FO)	44	3.21	0.024
L2 Skills * SES (BFH)	44	8.151	0.031
IR Skills * SES(FI)	44	12.2	0.211
IR Skills * SES (FO)	44	9.21	0.05
IR Skills * SES (BFH)	44	17.2	0.011
[1] FI: Father's Income (Monthly)			
[2] FO: Father's Occupation			
[3] BFH: Breakfast from home			

Source: Author's own data; N = 300;  $p < 0.05$ .

**Table 4.** Interaction effect among L1 skills, L2 skills, IR skills and SES post-pandemic.

Independent Variables	Df	F	Sig
<b>Dependent Variable: English Skills (L2) Scores</b>			
Bangla Skills (L1)	11	1.207	.044
Inductive Reasoning(IR) Skills	11	6.25	.82
SES [1] (GU)	4	1.042	.041
SES [2] (IC)	4	2.21	.022
SES [3] (SM)	4	2.25	0.06

## Continued

L1 Skills * SES (GU)	44	1.21	0.033
L1 Skills * SES (IC)	44	16	0.041
L1 Skills * SES (SM)	44	121	0.01
IR Skills * SES (GU)	44	7.012	0.03
IR Skills * SES (IC)	44	6.251	0.177
IR Skills * SES (SM)	44	21.4	0.006
<b>Dependent Variable: Bangla Skills (L1) scores</b>			
English Skills (L2)	11	11.324	1.12
Inductive Reasoning (IR)Skills	11	1.042	0.277
SES [1] (GU)	4	112	0.05
SES [2] (IC)	4	6.251	0.048
SES [3] (SM)	4	7.017	0.121
L2 Skills * SES (GU)	44	12.6	0.047
L2 Skills * SES (IC)	44	3.21	0.024
L2 Skills * SES (SM)	44	8.151	0.031
IR Skills * SES(GU)	44	12.2	0.211
IR Skills * SES (IC)	44	19	0.05
IR Skills* SES (SM)	44	17.2	0.011
[1] GU: Gadgets Unavailability			
[2] IC: Internet Connectivity			
[3] SM: Scarcity of meal			

Source: Author's own data; Note: N = 300;  $p < 0.05$ .

SES factors (Gadgets Unavailability (GU), Internet Connectivity (IC), Scarcity of Meals (SM)) which played crucial roles in language comprehension and IR skills post-pandemic. It can be observed from the pre-pandemic results in **Table 3** that the main effect of Bangla Skills (L1) on English Skills (L2) is not statistically significant ( $p = 2.151$ ). The main effects of SES factors on L2 performance are also statistically insignificant ( $p = 0.441, 0.14, 0.156$ ) However, the combined interaction effects of SES factors (FI, FO, BFH) along with L1 on L2 are statistically significant ( $p = 0.033, 0.041, 0.05$ ). Students' IR skills also depict interesting results pre-pandemic. The main effect of IR skills on L2 is statistically insignificant ( $p = 0.082$ ). However, when IR interacts with SES (BFH) then their interaction effect becomes statistically significant ( $p = 0.006$ ). So, it can be concluded that substantial Breakfast from home (BFH) every day has a significant association with students' Inductive Reasoning (IR) ability before the pandemic which affects students's L2 performance.

Now, for the Bangla skills (L1) performance, **Table 3** shows that the main effects of English skills (L2), IR skills and two SES factors (FI, BFH) on L1 are statistically insignificant ( $p = 0.052, 0.277, 0.361, 0.121$ ) with the exception of SES

(FO) whose main effect on L1 is statistically significant ( $p = 0.048$ ). This shows that Father's Occupation (FO) had a strong association with L1 performance before the pandemic. Now, when we analyze the interaction effects of the variables, we see that the interaction effects of all the three SES factors (FI, FO, BFH) along with L2 on L1 are statistically significant ( $p = 0.047, 0.024, 0.031$ ). When we combine IR skills with SES factors, interaction effects of two combinations (IR skills and SES (FO):  $p = 0.05$ , IR skills and SES (BFH):  $p = 0.011$ ) on L1 are statistically significant. However, the interaction effect of IR skills and SES (FI) on L1 is statistically insignificant ( $p = 0.211$ ).

For the pre-pandemic situation, we observe that SES factors related to students' Father (Father's Income, Father's Occupation) are having major impacts on students' language skills. However, mother's education also matters a lot in several studies conducted globally across ages for measuring language competencies and learning outcomes of students. In our scenario, the situation is completely different. We are not able to find a notable effect of mother's education on students' language performance in both studies. Our study also didn't find any association between IR skill and mother's education.

Covid-19 pandemic adversely impacted students' education. Therefore, to continue education in the current scenario, access to technology and the internet is a pressing need and should no longer be considered a luxury. Digital skills, necessary infrastructure and connectivity must reach everyone in need, regardless of whether they live in urban or rural areas. In order to achieve universal quality of education (part of UN SDGs) for improving learning outcomes, the digital gap needs to be addressed to realize the full potential of technology. In the next paragraph, the authors will discuss the vital SES factors that affect students' language performances post-pandemic and check out the main effect and interaction effect of SES factors together with IR skills on language skills for the post-pandemic duration. The three critical SES factors are: Gadgets Unavailability (GU), Internet Connectivity (IC), Scarcity of Meal (SM) which has profoundly impacted students' language comprehension skills post-pandemic.

**Table 4** depicts that SES factors, such as Gadgets Unavailability (GU), Internet Connectivity (IC), and Scarcity of meal (SM) have significant main effects on students' second language (L2) performance ( $p = 0.041, .022, 0.06$ ). However, IR skill does not have a significant main effect on students' L2 performance ( $p = 0.82$ ). On the other hand, Bangla skill (L1) does have a significant main effect on students' L2 performance ( $p = 0.044$ ). Identical to the pre-pandemic scenario, L1 skill of students along with SES factors have significant interaction effects on students' L2 performance ( $p = 0.033, 0.041, 0.01$ ). On the other hand, if we take SES factors and IR skill together, it can be seen that their combined interaction effects on L2 skills are significant (IR skills and SES (GU):  $p = 0.03$ , IR skills and SES (SM):  $p = 0.006$ ) except the interaction effect of IR skills and SES (IC) which is not significant with  $p = 0.177$ .

Now for the Bangla (L1) performance, **Table 4** shows that English (L2) skill and IR skills don't have significant main effects on students' Bangla performance

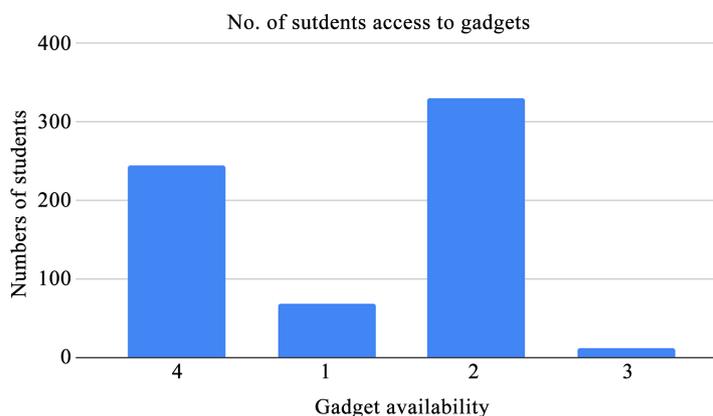
but SES factors, such as Gadgets Unavailability (GU) and Internet Connectivity (IC) does have significant main effects on students' Bangla performances ( $p = 0.05, 0.048$ ). However, Scarcity of meal (SM) does not have a noteworthy main effect on L1 scores ( $p = 0.121$ ). But the interaction effects of all the 3 SES factors along with L2 skills are significant for students' Bangla (L1) performance. Finally, on considering SES factors and IR skills together, only 2 SES factors (IC and SM) along with IR skills have significant interaction effects on students' L1 performance with the exception of Gadgets Unavailability (GU) where  $p$ -value of IR Skills and SES (GU) is  $>0.05$ .

From the next paragraph onwards, the authors have discussed the above mentioned important SES factors from **Table 4** which played an important role during the pandemic period. Descriptive study has been conducted to investigate the SES factors closely. It is important to see how these factors are distributed among the sample population. During the field study, the issues like lack of infrastructure have been witnessed by the authors already; the statistical analysis also showed that part again and again.

### 3.1. Lack of Gadgets at Home

Electronic gadgets, such as tablets and laptops are necessary to continue online education post-pandemic. However, parents with low SES or unprivileged backgrounds are facing tremendous difficulties to arrange even a single smartphone for their children. During our telephonic and field survey, we get to know that children have to borrow relatives/neighbors' mobile phones for their classes and sometimes have to study by sharing mobile phones with friends. Students' families with low SES couldn't afford a mobile set as they are more concerned with affording full meals twice a day. If few students' families somehow could manage mobile sets, they end up facing eye problems. Because most mobile set's screens are not big and don't have good resolution.

Therefore, students cannot see the details in the teachers' notes or PowerPoint presentations which are very concerning. Most of the time they get photos of handwritten notes by teachers which is not easy to understand from a small mobile screen. Parents of few students from low SES managed to buy smartphones. However, they are not good quality smartphones as they do not support zoom-in on image files, word files, and PDF files. On the other hand, for students who borrow mobile from others, phone calls and messages meant for their parents/relatives/neighbours cause persistent disruption during their classes. The authors have constructed a Likert scale to map the condition of gadget unavailability among the students as follows: *1: Don't have access to any gadget, 2: Do have time bound access to the friend's gadget by sharing screen, 3: Borrow gadgets from relatives/neighbors, 4: Using parents' smartphones*. In **Figure 1**, we show the mean percentage of students facing 4 different Gadgets Unavailability (GU) situations as per the Likert scale. It can be seen in **Figure 1** that most of the students only have time bound access to the friend's gadget via sharing screen followed by students who are using parents' smartphones. Therefore, phone calls



**Figure 1.** Mean Percentage of students facing different Gadgets Unavailability (GU) situations. 1) Don't have access to any gadget; 2) Do have time bound access to the friend's gadget by sharing screen; 3) Borrow gadgets from relatives/neighbors; 4) Using parents' smartphones.

and messages meant for their parents cause regular disruption during their classes. We also notice a significant percentage of students which do not have access to any gadget and therefore, totally deprived of online education during the pandemic.

### 3.2. Internet Connectivity Issues

For a good online learning experience, video sharing needs to be of high quality which requires high internet speed. The internet connection speeds in villages were found to be extremely unreliable. Few villages in west bengal do have access to any internet except normal phone calls. Therefore, children in these villages who have to be reliant on mobile internet connectivity are worst impacted post-pandemic. Due to poor network connection, image files, PDF files, and PPT files can't be downloaded most of the time; even if these files get downloaded sometimes, they couldn't be read properly for the picture resolution or small mobile screen due to substandard quality of smartphones used by the children. Identical to the Gadgets Unavailability (GU) issue, the authors have also constructed a Likert scale to represent 4 different Internet Connectivity (IC) issues among the students as follows:

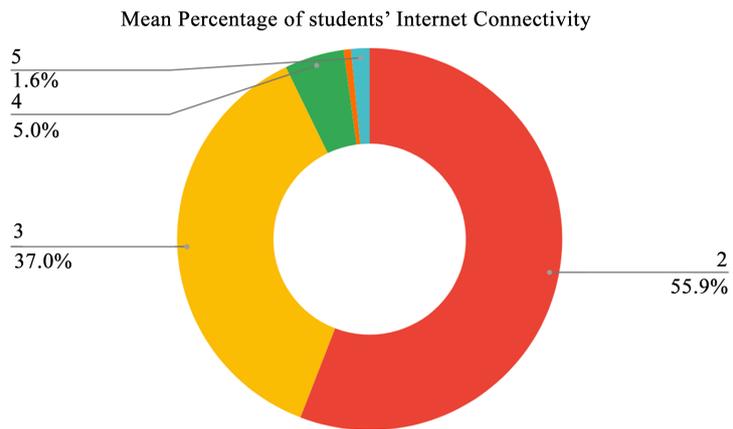
*2: Not having internet connection at all; 3: Have little bit of 2G/3G slow connection; 4: Have good amount of 2G/3G fast connection; 5: Have 4G connection.* In **Figure 2**, we show the mean percentage of students facing 4 different Internet Connectivity (IC) issues as per the Likert scale. It can be observed from **Figure 2** that most of the students do not have any internet connection at all followed by students who only have little bit of 2G/3G connection depicting the dire situation of online learning for students of low SES in rural areas due to Internet Connectivity (IC) issues.

### 3.3. Scarcity of Meals

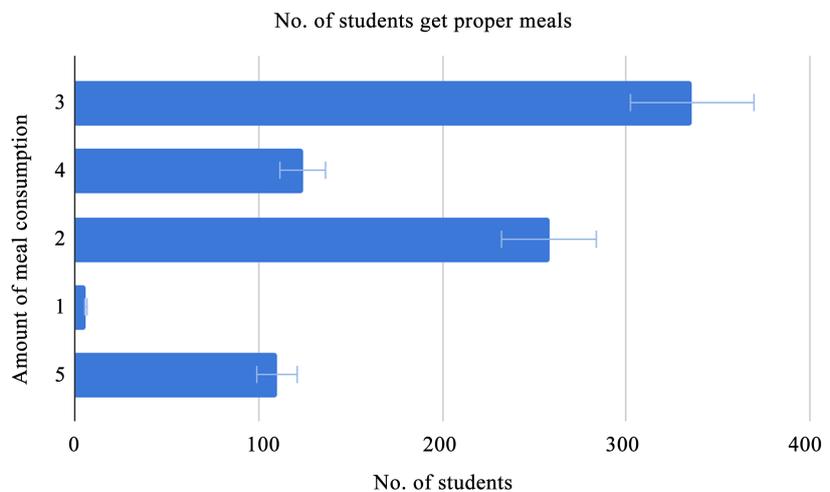
As a result of the pandemic, most rural parents from disadvantaged backgrounds

are suffering a lot. They are struggling to provide sufficient meals to their families as pandemic has taken away their jobs. When basic meals are a necessity, buying gadgets or affording internet connection for online classes is luxury for them. Although the SES conditions of some parents are relatively better as they can partially and sometimes fully afford meals twice a day daily. Identical to Gadgets Unavailability (GU) and Internet Connectivity (IC) issues, the authors construct a Likert scale to map the differences in meal consumption among students. 1: Getting 1 time meal; 2: Sometimes getting 2- or 3-times meals; 3: Getting meals at least for 2 times; 4: Getting meals at least 3 times; 5: Getting meals is not a problem at all.

In **Figure 3**, we show the number of students belonging to each category in the Likert scale described above regarding differences in meal consumption among students. **Figure 3** depicts an interesting scenario. We observe that there



**Figure 2.** Mean percentage of rural students facing differences of internet connectivity conditions. 2: Not having internet connection at all; 3: Have little bit of 2G/3G slow connection; 4: Have good amount of 2G/3G fast connection; 5: Have 4G connection.



**Figure 3.** Number of students facing differences in meal consumption. 1: Getting 1 time meal; 2: Sometimes getting 2- or 3-times meals; 3: Getting meals at least for 2 times; 4: Getting meals at least 3 times; 5: Getting meals is not a problem at all.

are a significant number of students which are getting meals at least for 2 times or 3 times. There are also a good number of students for which getting meals is not a problem at all. Therefore, we can conclude that most parents of rural students from low SES are focusing on providing basic meals to their children and less concerned about buying gadgets or affording internet connectivity for providing online education. At the same time, few parents are still struggling to provide 2 or 3 times meals to their children. Their children are either getting a 1 time meal or seldom getting 2 or 3 times meals. Therefore, thinking about providing online education to their children is a distant reality for these economically struggling parents.

#### 4. Conclusion

This research study will assist in discovering several factors that contribute to the overall language performance and cognitive achievement level of students. This article shows how the important SES factors vary before and after the pandemic situation in same sampled students. These factors can be considered by the researcher, academicians and policymakers for the further development of language learning and cognitive skills of bi-lingual students. This study may play a pivotal role in providing the comparative pre and post pandemic language performance in India and by considering locality specific socio-economic issues. The research findings will enable us to understand the key obstacles factors that barrier to quality language achievement of secondary students in rural West Bengal, India. It will also bring clarity to how our rural schools need to get more attention after the school opens during a pandemic situation. Since there is no conclusive evidence in India that IR skill and SES improvement can bridge the gap between children from less privileged and more privileged backgrounds in language learning after the pandemic; although analysis of this study provides some indications that this might hold true in the Indian context to some extent. A few exceptions were observed where the children from low SES families have scored well in three sections of L1, L2 and IR assessments before and after the pandemic. However, this analysis is based on limited sample size which may not be representative of the broader population, hence results should be interpreted with caution.

#### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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## Appendix

### Description box on PISA

PISA	73	15 year-olds	Reading Mathematics Science	3-year cycle	2000, 2003, 2006, 2009, 2012, 2015	Index based on parental education, parental occupation and home possessions, including books	Language spoken at home, country of birth of student and parents, reading habits	Grade repetition, self-reported performance, pre-school, extra tuition
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### Yamane formula for determining the sample

If the population size is known, the Yamane formula for determining the sample size is given by:

$$n = N / (1 + Ne^2)$$

where

$n$  = corrected sample size,  $N$  = population size, and  $e$  = Margin of error (MoE),  $e = 0.05$  based on the research condition.

Let's assume that the population is 10,000. At 5% MoE, the sample size would be:  $10000 / (1 + 10000 \times 0.05^2) = 10000 / 26 = 384.61 \sim 385$

In a finite population, when the original sample collected is more than 5% of the population size, the corrected sample size is determined by using the Yamane's formula.

### Levels of proficiency in ASER Reading tool

Level	Proficiency Description
Beginner	Cannot identify even 4 out of the 5 letters
Letter	Can correctly identify 4 out of the 5 letters
Word	Can correctly read 4 out of the 5 words
Paragraph	Can read a paragraph which is a Grade 1 level text. The paragraph has 4 sentence and approximately 19 words and it has to be read like one reads a sentence, rather than a string

### Scoring system of ASER

Competency	Assessment activity	Score	
Pre-math & number concepts	Pre-number concept	Given pictures of four apple trees, children were asked to point to the one with the least and most apples.	2
	Number/object matching	Children were asked to match three numbers with pictures showing the same number of objects.	3
	Relative comparisons	Children were asked to point to a number (among 9, 3, 7, 8) that was less than the number 5.	2
Cognitive & conceptual concepts	Space Concept	Given two illustrations of children and houses, children were asked to point to the one in which the child was behind the house.	1
	Sequential thinking	Children were shown illustrations of water filling up a bucket and were asked to determine the correct sequence for the pictures.	5
	Pattern making	Children were asked to repeat and complete a pictorial pattern.	5
	Classification	Children were asked to classify six creatures as either birds or animals.	6
Pre-literacy & language concepts <sup>3a</sup>	Following instructions	Children were asked to raise their hands, and then to pick up an object and bring it to someone.	4
	Reading readiness, identifies beginning sound	Children were asked to identify the beginning sound of words and to match the two words with the same beginning sound.	6
	Sentence making	Children were asked to describe two photographs in complete sentences.	6
<b>TOTAL</b>		<b>40</b>	

### Learning Outcome Index Method (Variable Description)

Variable Name	Description
Ans	Number of questions answered correctly If Zero = 0, One = 1, Two = 2, Three = 3
Grade	(Up to 50% or D) = 4, (51% - 60% or C) = 5, (61% - 70% or B) = 7 (71% - 80% or B+) = 8, (81% on 81% onward or A) = 9
Homework	If Yes = 1, No = 0