Samanjasya सामंजस्य **Volume 02, Number 01, June 2025**
ISSN: 3049-3269 (Online) **Page Number: 55 - 70**

AN ASSESSMENT OF THE STATUS OF GENDER INEQUALITY IN EDUCATION IN THE CONTEXT OF THE COVID-19 PANDEMIC

TANUSREE DASH[1]*, HARI RAM PRAJAPATI[2], §

Abstract. This paper investigates educational attainment discrepancies across genders in India. Quantification of educational disparity is critical from both policy and societal perspective. The state-level disaggregated analysis becomes increasingly relevant in addressing the problem at the local level. This study uses Census, Ministry of Education (GOI), NFHS and AISHE data to investigate educational disparities and the impact of COVID-19 on educational attainment. The study used the Sopher index to determine the relative difference in enrolment between men and women. The effect of COVID-19 on pre-existing gender disparities in education was also investigated. The findings demonstrate a considerable gender discrepancy in literacy rates among Indian states, ranging from 3 percent to 27 percent. Furthermore, COVID-19 lowered female enrolment at all levels of education.

Keywords: Literacy Rate, Education Inequality, COVID-19.

JEL Code: I21, J16, I24.

* Corresponding author.
[1] Department of Economics, Kamala Nehru College, University of Delhi, August Kranti Marg, New Delhi - 110049, India. e-mail: tdash@knc.du.ac.in
[2] Economics Section, MMV, Banaras Hindu University, Varanasi - 221005, Uttar Pradesh, India. e-mail: harryeco@bhu.ac.in
§ Manuscript received: 08-06-2025; accepted: 25-06-2025.

1. Introduction

Education is the cornerstone for the progress of a society. It's one of the most powerful instruments for achieving sustainable development. After independence, India has focused on providing educational facilities to all sections of the population, irrespective of their caste, class, gender or place of residence. Despite these efforts, various disparities in education persist. Mainly children from diverse socio-demographic backgrounds experience unequal access to school and educational achievements. In this regard, some evident inequalities are gender inequality, social inequality, spatial inequality, and religious inequality. This study primarily focuses on the gender inequality aspect of education in India. Females constituted around 50 percent of the total population, while the literacy rate among females, it is 65 percent, however it's 82 percent among males (Census, 2011).

Elimination of inequality in education across genders and social caste structures is a serious issue in the Indian economy. This issue of educational disparity leads to lower women's workforce participation, decision-making, and economic empowerment (Simon & Hasan, 2025; Sundaram & Vanneman, 2008). Thus, reducing gender disparity in education can fulfil two primary objectives: enhancing economic progress and fostering unity within a heterogeneous and multilingual community (Lewis, 2008). Human capital theory posits that, analogous to physical capital augmenting economic output, human capital gained through education promotes individual productivity. If educating a girl enhances production and growth similarly to that of a boy, then gender discrimination in education is entirely unjustifiable (Fitzsimons, 2017; Becker, 1993). Investing in female education offers significantly greater societal advantages than investing in male education, as it notably reduces infant mortality and overall fertility rates along with improvement of health and nutrition of children.

This study seeks to assess the extent of gender inequality in education across different states and union territories of India. It has been divided into six sections. The second section examines the existing literature on the topic at hand. The third section addresses the study's objective, data and methodology. The subsequent section presents the findings and analysis of the study, encompassing literacy trends based on gender at both national and subnational levels. This section also meticulously examines the variation in enrolment among different states and Union Territories using Sopher's Index of Disparity. The final two sections encompass an investigation of the effects of COVID-19 on gender disparities in literacy and enrolment, followed by concluding remarks.

2. **Literature Review**

Gender disparity in education is an important issue of concern at the global level. It has been proved that education plays an important role in improving the economic status of both men and women. Further Education is also thought to be the most powerful tool for attaining gender equality and women's empowerment. Government efforts in school education have significantly reduced the gender discrepancy in enrolment. Many government-initiated projects, such as the National Programme for Education of Girls at Elementary Level (NPEGEL) and the Kasturba Gandhi Balika Vidyalaya (KGBV), have concentrated on girls' education. In an attempt to determine the gender disparity in literacy in three northern states (Haryana, Rajasthan, and Punjab) at the district level using Sopher's method, the study concludes that these states are experiencing gender disparity in literacy (Kumar et al., 2016). Pathania (2020) examines literacy inequality at both the national and state levels, using census data from 1951 to 2011. Additionally, the study seeks to quantify educational disparity across various educational levels from 2005 to 2014, revealing that it is more pronounced at higher education levels compared to others. Despite a reduction in literacy inequality at both national and state levels, it remains significantly higher among females. Chandra (2020) analyses the literacy rates in Indian states, emphasizing the gender disparity across various age groups from 1987 to 2018. The study has examined four age cohorts: children, youth, working-age people, and the elderly. Analysis of various NSS rounds concludes that India has achieved substantial advancements in literacy rates. The gender gap in literacy among children and teenagers has decreased substantially, but the reduction among working adults and the elderly has been minimal.

Duraisamy (2004) examines the impact of economic factors in reducing gender inequality in enrolment and grade attainment of students in schools by using NSS 42nd round data pertaining to the state of Tamil Nadu. Parents' decision regarding their children's school enrolment is modelled in an ordered probit framework. The specification tests propose to treat consumption expenditure per adult as an endogenous variable in the estimation framework. The study shows that improvement in the mother's education has a substantial effect in reducing the gender gap in schools. Enrolment of girls is also found to be dependent on economic well-being and the distance of schools in rural areas. The results show that the probability of attending school increases by 2 percent when the distance to school falls by one kilometer. The result also shows that school enrolment is found to increase at a decreasing rate with age.

Mitra & Moene (2017) examine the long-term effect of the cycle programme. This innovative program is an example of conditional kindness transfer (CKT) to girl students at

the secondary level. The survey was conducted in three states: Bihar, Jharkhand and Uttar Pradesh in 2016. The study uses a triple-differences approach and concludes that the girl who got a cycle under this scheme has a 22.9 percent higher chance of completing school. The literacy rate has increased in India for both genders in all states and UTs. Along with this, it has achieved near-universal primary school enrolment. But India's educational development has faltered in many aspects. Although enrolment has increased, attendance remains very low in certain states, particularly in Bihar and Uttar Pradesh. Apart from this, learning achievements are very low at both primary and secondary levels. Lack of infrastructure and teacher absenteeism are mainly believed to be the reasons for these low learning outcomes (Kingdon, 2007).

The literature confirms the existence of gender inequality in education. Various studies indicate that, despite government measures like NPEGEL and KGBV which have enhanced girls' enrolment, gender inequality in literacy remains prevalent, particularly in northern states. Literature indicates that inadequate infrastructure, teacher absenteeism, and subpar learning outcomes persistently obstruct educational equality, particularly in certain states. Thus, it is imperative to explore whether the status of gender inequality in access to education has been exacerbated by COVID-19 in India.

3. **Objective, Data and Methodology of the Study**

The objective of this paper is to investigate the progress of literacy, inequality in literacy and enrolment across genders. We analyzed the literacy inequality among different genders at both national and state levels, as well as the impact of COVID-19 on gender educational inequality. This study provides the status of gender inequality in education among the males and females at the state and national levels. This information will help to formulate policies at the national and state level to reduce gender inequality in education. The results of this study will assist the government and policymakers in making relevant changes to improve girls' educational attainment that can help narrow the gender gap in education.

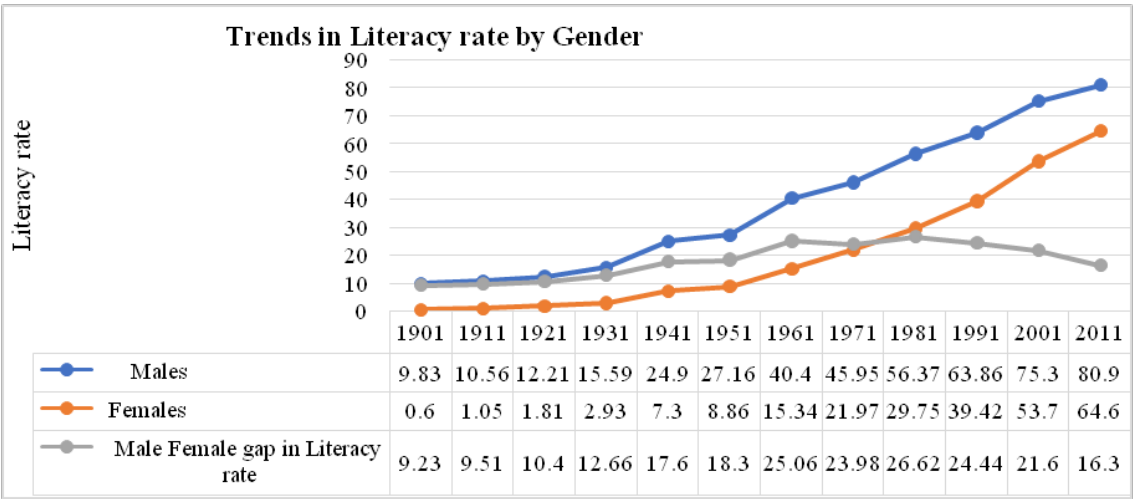
This study is entirely based on secondary data. The study uses literacy rates and gross enrolment ratios for both genders for the analysis. The data on selected variables has been collected from different reports of the Census of India, Ministry of Education, Government of India (2011-2012), NFHS-4, NHFS-5 (2019-2021), AISHE 2018-2019, AISHE 2021-2022, and the Centre for Budget and Policy Studies' (CBPS) report 2020.

The study employs simple statistical methods to calculate the gender difference in literacy rates across castes, religions, and locations of residence. We can use various strategies to assess gender discrepancies in enrolment. The Sopher (1974) index is a measurement technique for determining the relative difference between two groups. Thus, in the current study, Sopher's method for the disparity index is used, which is a tool for determining the relative disparity in enrolment between two genders.

4. Findings and Analysis

4.1. **Trends in Literacy Rates in India.** The figure 1 given below reveals that the literacy rate for people, both males and females, has been increasing continuously. The literacy rate has increased 4 times whereas the literacy rate of females has increased 7.3 times during 1951–2011. If we compare gender disparity in literacy across different years, we find that gender disparity was the lowest (9.23 percent) in 1901, while it was the highest (26.65 percent) in 1981. But despite all the efforts of the government, around 26 percent of population were still illiterate in the country with high gender disparity in literacy.

Figure 1. Trends in literacy rates across genders in India

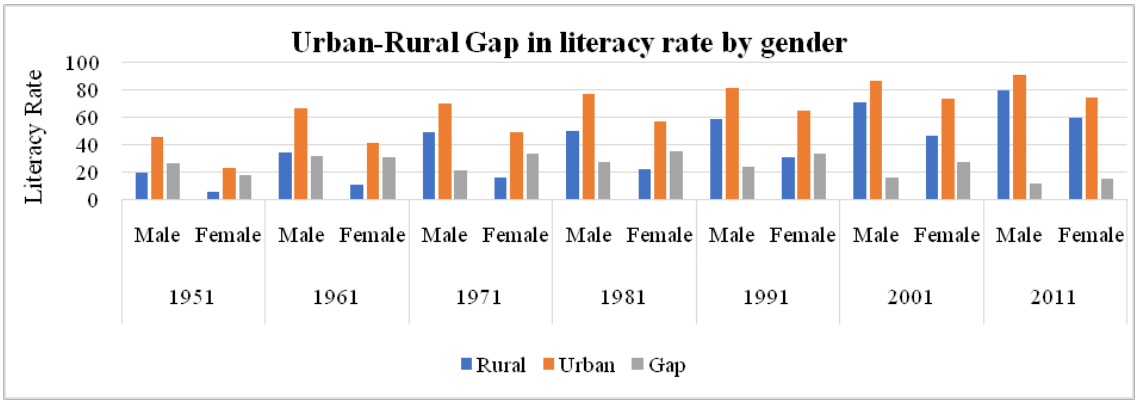


	1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001	2011
Males	9.83	10.56	12.21	15.59	24.9	27.16	40.4	45.95	56.37	63.86	75.3	80.9
Females	0.6	1.05	1.81	2.93	7.3	8.86	15.34	21.97	29.75	39.42	53.7	64.6
Male Female gap in Literacy rate	9.23	9.51	10.4	12.66	17.6	18.3	25.06	23.98	26.62	24.44	21.6	16.3

Source-Census reports of India

Rural-Urban gap in literacy rate by gender. Figure 2 shows that the rural female literacy rate is less than the urban female literacy rate, the national average and the literacy rate for males. The urban-rural gap among males was highest in 1961 at 31.7 percent, whereas among females it was highest in 1991 at 33.43 percent. Since 1961, the gap in literacy rates among females has consistently been greater than that among males.

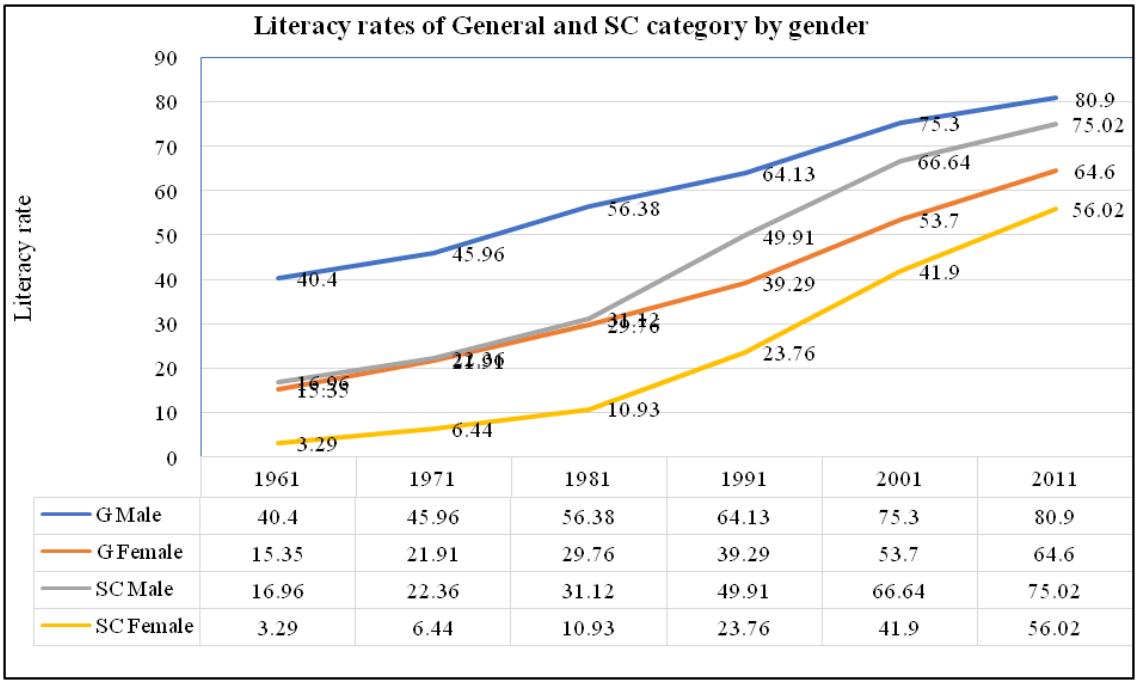
Figure 2. Trends of rural and urban literacy rate across genders



Source-Census reports of India

Trends of literacy rate of General and SC/ST categories across genders. Figure 3 demonstrates that until 1981, the literacy rate of females in the general category was approximately equal to that of males in the SC group. However, after that, the literacy rate of males in the SC category increased dramatically and has remained higher than that of females in the general category. However, a close examination reveals that female literacy is lower than that of males in both categories.

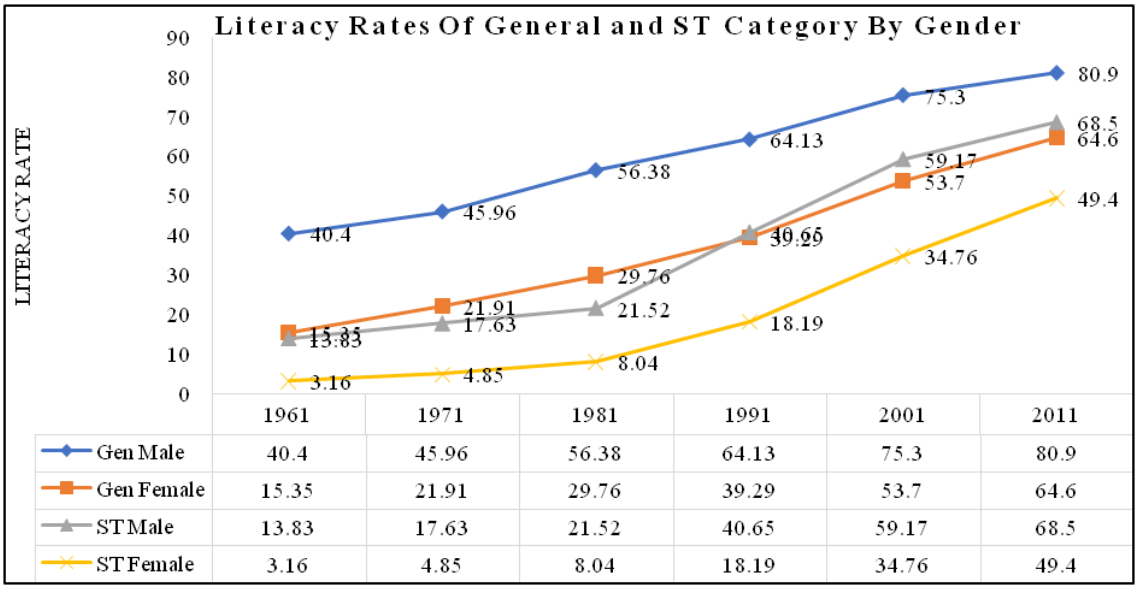
Figure 3. Trends of literacy rates of General and SC category across genders



Source-Census reports of India

As shown in figure 4, the literacy rate of males belonging to the ST category was lower than that of females belonging to the general category up until the year 1991. However, since then, it has maintained a literacy rate that is higher than that of women in the general group. It's worth noting that both groups' female literacy rates are lower than their male counterparts

Figure 4. Trends of literacy of General and ST categories across gender

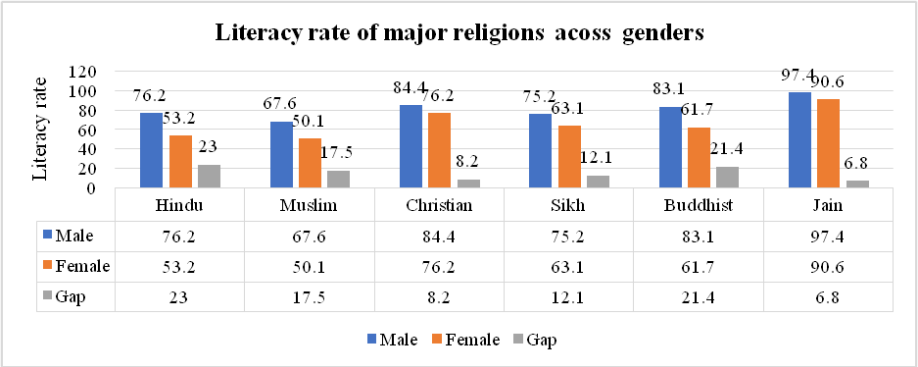


	1961	1971	1981	1991	2001	2011
Gen Male	40.4	45.96	56.38	64.13	75.3	80.9
Gen Female	15.35	21.91	29.76	39.29	53.7	64.6
ST Male	13.83	17.63	21.52	40.65	59.17	68.5
ST Female	3.16	4.85	8.04	18.19	34.76	49.4

Source-Census reports of India

Literacy rate of different religions across genders. Figure 5 illustrates that the literacy rate among Muslims is found to be less than that of other religious groups. The literacy rate among Jains exceeds 90 per cent for both genders, making it the highest. The disparity in literacy between genders is most pronounced among Hindus.

Figure 5. Trends of literacy rates of different religions across genders



	Hindu	Muslim	Christian	Sikh	Buddhist	Jain
Male	76.2	67.6	84.4	75.2	83.1	97.4
Female	53.2	50.1	76.2	63.1	61.7	90.6
Gap	23	17.5	8.2	12.1	21.4	6.8

Source-Census reports of India, 2011

Analysis of gender disparity in literacy across states/UTs in India. Table 1 presents the inter-state literacy gap across genders in India. Since education is one of the key indicators for the socioeconomic development of human beings, an improvement in the literacy rate is essential for women's empowerment. There was a gap of 16 percent in the literacy rate across genders in 2011 at the national level.

Table 1. Inter- state literacy gap by gender

State/UT	1991			2001			2011		
	Male	Female	Gap	Male	Female	Gap	Male	Female	Gap
A & N Islands	79.0	65.5	13.5	86.3	75.2	11.1	90.3	82.4	7.9
Andhra Pradesh	55.1	32.7	22.4	70.3	50.4	19.9	74.9	59.1	15.8
Arunachal Pradesh	51.5	29.7	21.8	63.8	43.5	20.3	72.6	57.7	14.9
Assam	61.9	43.0	18.9	71.3	54.6	16.7	77.8	66.3	11.5
Bihar	51.4	22.0	29.4	59.7	33.1	26.6	71.2	51.5	19.7
Chandigarh	82.0	72.3	9.7	86.1	76.5	9.6	90.0	81.2	8.8
Chhattisgarh	58.1	27.5	30.6	77.4	51.9	25.5	80.3	60.2	20.1
D & N Haveli	53.6	27.0	26.6	73.3	43.0	30.3	85.2	64.3	20.9
Daman & Diu	82.7	59.4	23.3	88.4	70.4	18.0	91.5	79.5	12.0
Delhi	82.0	67.0	15.0	87.3	74.7	12.6	90.9	80.8	10.1
Goa	83.6	67.1	16.5	88.4	75.4	13.0	92.6	84.7	7.9
Gujarat	73.1	48.6	24.5	80.5	58.6	21.9	85.8	69.7	16.1
Haryana	69.1	40.5	28.6	78.5	45.7	32.8	84.1	65.9	18.2
Himachal Pradesh	75.4	52.1	23.3	85.4	67.4	18.0	89.5	75.9	13.6
Jammu & Kashmir	Na	Na	na	66.6	43.0	23.6	76.8	56.4	20.4
Jharkhand	Na	Na	na	67.3	38.9	28.4	76.8	55.4	21.4
Karnataka	67.3	44.3	23.0	76.1	56.9	19.2	82.5	68.1	14.4
Kerala	93.6	86.1	7.5	94.2	87.9	6.3	96.1	92.1	4.0
Lakshadweep	90.2	72.9	17.3	92.5	80.5	12.0	95.6	87.9	7.7
Madhya Pradesh	58.5	29.4	29.1	76.1	50.3	25.8	78.7	59.2	19.5
Maharashtra	76.6	52.3	24.3	86.0	67.0	19.0	88.4	75.9	12.5
Manipur	71.6	47.6	24.0	80.3	60.5	19.8	86.1	72.4	13.7
Meghalaya	53.1	44.9	8.2	65.4	59.6	5.8	76.0	72.9	3.1
Mizoram	85.6	78.6	7.0	90.7	86.8	3.9	93.3	89.3	4.0
Nagaland	67.6	54.8	12.8	71.2	61.5	9.7	82.8	76.1	6.7
Odisha	63.1	34.7	28.4	75.4	50.5	24.9	81.6	64.0	17.6
Puducherry	83.7	65.6	18.1	88.6	73.9	14.7	91.3	80.7	10.6
Punjab	65.7	50.4	15.3	75.2	63.4	11.8	80.4	70.7	9.7
Rajasthan	55.0	20.4	34.6	75.7	43.9	31.8	79.2	52.1	27.1
Sikkim	65.7	46.7	19.0	76.0	60.4	15.6	86.6	75.6	11.0
Tamil Nadu	73.8	51.3	22.5	82.4	64.4	18.0	86.8	73.4	13.4
Tripura	70.6	49.7	20.9	81.0	64.9	16.1	91.5	82.7	8.8
Uttar Pradesh	54.8	24.4	30.4	68.8	42.2	26.6	77.3	57.2	20.1
Uttarakhand	72.8	41.6	31.2	83.3	59.6	23.7	87.4	70.0	17.4
West Bengal	67.8	46.6	21.2	77.0	59.6	17.4	81.7	70.5	11.2
India	64.1	39.3	24.8	75.3	53.7	21.6	82.1	65.5	16.6

Source: Census data, 1991, 2001, 2011

The gender gap in literacy among the Indian states varies by 3 percent to 27 percent, as shown in Table 1. Rajasthan is the worst-performing state in literacy gap across genders, with 27.1 percent, and Meghalaya is the best-performing state at 3.1 percent. In Table 1 it is clearly indicated that the literacy rate of all the states and UTs has increased in these 3 decades. But it also shows visible interstate variation in the literacy rate. In 2011, Kerala and Mizoram, Lakshadweep, had literacy rates above 90 percent. But for states like Bihar, Chhattisgarh, Jharkhand, and Rajasthan, it hovers between 60 and 70 percent. The literacy rate is highest in Kerala (94) and lowest in Bihar (62). Further, Table 1 confirms the gender gap in literacy across all states and UTs. But a lot of variation is seen in the gender gap across the states and UTs. The gender gap in literacy is highest in Rajasthan (27 percent), whereas it is lowest in Meghalaya (3 percent).

4.2. **Analysis of Gender Disparity in Enrolment: Kundu and Rao's Modified Sopher's index.** Analysis of gender disparity in enrolment in schools at different educational levels in various states/UTs is carried out using Sopher's Index, a well-accepted measurement technique (Sopher, 1974; Kundu & Rao, 1986; Katiyar, 2016; Manjunatha & Hurakadli, 2017; Mundhe et al., 2017; Hira & Das, 2018; Sarkar & Chakraborty, 2021), which is useful in measuring relative disparity between two groups. In this method, X1 and X2 represent the respective percentage values of variables from groups 1 and 2, with group 2 being used for the variable that has a comparatively higher value. In case there is no disparity (perfect equality), the value of D will be 0. This method reveals that the higher the value of D, the higher the extent of disparity.

For measuring educational disparity in enrolment, Kundu and Rao's modified Sopher's index is used because Sopher's index can't be calculated if the gross enrolment ratio is more than 100 for a particular group. In this case, the modified version of Sopher's Index developed by Prof Amitabh Kundu and JM Rao is used.

$$D = log(\frac{X_2}{X_1}) + log\ \{\frac{(200 - X_1)}{(200 - X_2)}\} \tag{1}$$

The disparity index shows significant variation among various states/UTs, despite its small magnitude. The disparity index's positive sign indicates a higher enrolment rate for boys compared to girls. The disparity against girls' enrolment is highest in Mizoram at the elementary level. But girls' enrolment is more than boys in some states like Assam, Haryana, Meghalaya, and Sikkim.

Table 2. Sopher's disparity index for school enrolmentin 2011-12

Sl. No.	States/UTs	Class I-VIII SDI	Rank	Class IX-X SDI	Rank	Class XI-XII SDI	Rank
1	Andhra Pradesh	-0.014	24	-0.027	25	0.023	15
2	Arunachal Pradesh	0.042	2	0.059	7	0.051	10
3	Assam	-0.029	29	-0.102	33	-0.046	28
4	Bihar	0.020	8	0.040	9	0.054	8
5	Chhattisgarh	0.034	4	0.031	13	0.072	7
6	Goa	0.041	3	0.037	11	-0.039	26
7	Gujarat	0.015	11	0.124	3	0.103	5
8	Haryana	-0.067	34	-0.054	30	-0.020	23
9	Himachal Pradesh	-0.003	18	0.005	17	-0.014	20
10	Jammu & Kashmir	-0.011	22	0.038	10	0.032	13
11	Jharkhand	-0.017	25	0.020	16	0.006	18
12	Karnataka	0.018	9	-0.018	24	-0.051	29
13	Kerala	0.009	15	0.002	18	-0.116	31
14	Madhya Pradesh	-0.045	31	0.245	1	0.160	3
15	Maharashtra	0.013	13	0.022	15	0.048	12
16	Manipur	-0.041	30	-0.028	26	0.050	11
17	Meghalaya	-0.068	35	-0.095	32	-0.132	32
18	Mizoram	0.055	1	-0.035	28	-0.015	21
19	Nagaland	-0.008	21	-0.037	29	0.020	16
20	Odisha	0.017	10	0.050	8	0.204	2
21	Punjab	0.003	17	-0.005	21	-0.038	25
22	Rajasthan	0.029	5	0.182	2	0.207	1
23	Sikkim	-0.059	33	-0.114	34	-0.099	30
24	Tamil Nadu	-0.014	23	-0.032	27	-0.142	33
25	Tripura	-0.004	20	-0.012	23	0.113	4
26	Uttar Pradesh	-0.003	19	0.119	5	0.096	6
27	Uttarakhand	-0.025	28	0.027	14	0.000	19
28	West Bengal	-0.052	32	-0.086	31	0.006	17
29	A&N Islands	0.010	14	0.034	12	-0.020	22
30	Chandigarh	-0.017	26	0.000	19	-0.030	24
31	D&N Haveli	0.024	7	0.098	6	0.051	9
32	Daman & Diu	0.027	6	-0.118	35	-0.240	35
33	Delhi	-0.024	27	-0.005	22	-0.046	27
34	Lakshadweep	0.006	16	0.122	4	0.026	14
35	Puducherry	0.014	12	0.000	19	-0.156	34

Source-Statistics of school education (2011-2012)

But as we proceed to the higher levels of education, the magnitude of the disparity index increases. At the secondary level in Madhya Pradesh, the disparity index is 0.24. Further, in enrolment, the disparity against girls is greater in Madhya Pradesh, Gujarat and Rajasthan. In Assam, Haryana, Meghalaya, Sikkim, and Daman & Diu, girls enroll at the secondary level at a higher rate than boys.

It is seen that at the higher secondary education level in Odisha and Rajasthan, the disparity index is around 0.2, whereas in Daman & Diu it is -0.24, which indicates that more girls than boys are enrolled. In states like Gujarat, Madhya Pradesh, Odisha, Rajasthan, Tripura, and Uttar Pradesh, there is disparity against girls in enrolment at the higher secondary

level. Thus, by looking at the disparity index at different levels of education in schools, it can be concluded that there is no severe gender disparity in enrolment, as it hovers around -0.2 to $+0.2$, though it increases as we move to higher grades.

5. **Impact of Covid-19 on Gender Inequality in Literacy and Enrolments**

The COVID-19 pandemic has introduced an unprecedented disruption to the education system worldwide. The pandemic has worsened this pre-existing education inequality in our economy. Poor and rural students may not have uninterrupted access to internet facilities, making it difficult for them to access online instruction. India's Gross Domestic Product (GDP) has shrunk by 7.3 per cent in 2020-21, as per provisional national income estimates by the National Statistical Office (NSO) data. During the pandemic, people suffered job losses, and because of financial constraints, many families stopped sending their daughters to school. This pandemic had also put the burden of household chores and sibling care on girls. Therefore, the challenges that girls face in continuing their education during school closures in India are greater than those faced by boys.

In July 2020, the Centre for Budget and Policy Studies (CBPS) performed a survey including 3,176 families across five states: Delhi, Assam, Bihar, Uttar Pradesh, and Telangana. Despite having a phone at home, only 30 percent of all polled youngsters had access to one when needed. Among these children, just 26 percent were female, while 37 per cent were male. The National Family Health Survey-5 indicates that 42.6 percent of women have used the internet, compared to an average of 62.6 percent among men. In urban regions, 56.8 percent of women and 73.76 percent of men have used the internet, whereas the circumstances in rural areas are worse. In rural regions, 33.94 percent of women use the internet, whereas the usage rate among men is 55.6 percent. The five Indian states with the lowest percentages of women who have ever used the internet were Andhra Pradesh (33.9%), Telangana (43.9%), Tripura (36.6%), Bihar (38.4%), and Gujarat (48.9%). This percentage markedly decreases in remote areas. The five states with the lowest percentage of women who have ever used the internet in rural regions were West Bengal (14%), Andhra Pradesh (15.4%), Telangana (15.8%), Tripura (17.7%), and Bihar (17%). In three states—Goa (68.3%), Kerala (57.5%), and Sikkim (54%)—and one Union Territory, Ladakh (54%), the percentage of women who have ever used the internet exceeds 50. Thus, lower mobile and internet access for females may affect education access after the COVID-19 pandemic.

Furthermore, we calculated the value of Sopher's disparity index for the periods before and after COVID-19. Tables 4 and 5 show a gross enrolment disparity between boys and

girls in school and higher education. We analyzed Class I-VIII the impact of COVID-19 using pre- and post-COVID-19 data for the years 2018-2019, 2020-2021, and 2021-2022. For the Class I- VIII enrolment disparity between boys and girls, it increased in states like Gujarat, Haryana, Rajasthan, Karnataka, Maharashtra, Manipur, Nagaland, Tamil Nadu, Tripura, Odisha, Uttarakhand, Delhi, and Goa. On the other hand, states like Bihar, Chhattisgarh, Jammu & Kashmir, Kerala, Punjab, Telangana, Uttar Pradesh, West Bengal, A & N Islands, Lakshadweep, and Puducherry have declined. The states like Arunachal Pradesh, Assam, Himachal Pradesh, Madhya Pradesh, Meghalaya, and Chandigarh have no change in disparity ranking.

Likewise, the enrolment gap between boys and girls in classes IX-X widened in states such as Assam, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Maharashtra, Madhya Pradesh, Meghalaya, Mizoram, Nagaland, Odisha, and Goa. Conversely, states such as Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Manipur, Rajasthan, Sikkim, Tamil Nadu, Telangana, Uttar Pradesh, West Bengal, Chandigarh, Delhi, and Lakshadweep have experienced a fall. The states of Arunachal Pradesh, Kerala, Maharashtra, Punjab, Tripura, Uttarakhand, the Andaman and Nicobar Islands, and Puducherry exhibit no alteration in disparity ranking.

Table 5 presents the findings of Sopher's disparity index for Class XI-XII and tertiary education. The enrolment difference between boys and girls in classes XI and XII has widened in states such as Arunachal Pradesh, Assam, Jharkhand, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, West Bengal, Chandigarh, and Delhi. Conversely, states such as Andhra Pradesh, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Odisha, Punjab, Rajasthan, Telangana, Uttar Pradesh, Uttarakhand, Andaman & Nicobar Islands, Goa, and Puducherry have experienced a fall. The states of Bihar, Haryana, and Sikkim exhibit little alteration in their inequality rankings.

Similarly, for higher education, enrolment disparities between boys and girls increased in states like Andhra Pradesh, Assam, Chhattisgarh, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Uttarakhand, and West Bengal. On the other hand, the states like Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Rajasthan, Uttar Pradesh, Delhi, Goa, and Puducherry have declined. The states like Bihar, Tripura, and Lakshadweep have no change in disparity ranking.

Table 3. Gender inequality before and after covid-19

Indicators	**NFHS-4 (2015-2016)**			**NFHS-5 (2019-2021)**		
	Male	Female	Difference	Male	Female	Difference
literate rate	Na	Na	Na	84.4	71.5	12.9
10>= years of schooling	47.1	35.7	11.4	50.2	41.0	9.2

Source: NFHS-4 (2015-2016) & NFHS-5 Report (2019-2021)

Table 4. Sopher's disparity index for school education before and after COVID-19

States/UTs	**Class I-VIII**				**Class IX-X**			
	(2018-19)		**(2021-22)**		**(2018-19)**		**(2021-22)**	
	SDI	Rank	SDI	Rank	SDI	Rank	SDI	Rank
Andhra Pradesh	0.0341	2	0.0174	3	0.005	10	0.016	8
Arunachal Pradesh	-0.024	22	-0.028	22	-0.023	20	-0.030	20
Assam	-0.046	32	-0.067	32	-0.109	31	-0.125	33
Bihar	-0.041	30	-0.020	19	-0.063	25	-0.037	21
Chhattisgarh	0.003	11	-0.003	10	-0.089	29	-0.056	27
Gujarat	-0.010	17	-0.031	25	0.114	1	0.041	3
Haryana	0.007	8	-0.003	11	0.034	5	0.024	6
Himachal Pradesh	-0.014	18	-0.016	18	-0.004	14	-0.011	15
Jammu & Kashmir	-0.031	27	-0.031	24	0.001	12	-0.014	16
Jharkhand	-0.004	16	-0.011	14	-0.039	23	-0.040	22
Karnataka	0.017	4	0.002	7	0.015	8	-0.003	11
Kerala	0.003	13	0.005	4	0.009	9	0.008	9
Madhya Pradesh	0.016	5	0.004	5	0.049	3	0.029	4
Maharashtra	0.005	9	-0.020	20	0.025	7	0.019	7
Manipur	-0.023	21	-0.040	29	-0.027	21	-0.025	19
Meghalaya	-0.076	34	-0.137	34	-0.133	33	-0.163	34
Mizoram	0.007	7	-0.013	17	-0.019	18	-0.077	29
Nagaland	-0.030	26	-0.054	30	-0.068	27	-0.094	32
Odisha	0.016	6	0.002	8	0.005	11	-0.005	12
Punjab	-0.003	15	-0.004	12	-0.003	13	-0.005	13
Rajasthan	0.021	3	-0.002	9	0.087	2	0.060	1
Sikkim	0.039	1	0.029	2	-0.090	30	-0.050	24
Tamil Nadu	0.004	10	-0.007	13	-0.009	16	0.002	10
Telangana	0.003	12	0.002	6	-0.020	19	-0.008	14
Tripura	-0.023	20	-0.035	27	-0.064	26	-0.053	26
Uttar Pradesh	-0.035	29	-0.030	23	0.041	4	0.056	2
Uttarakhand	-0.014	19	-0.036	28	-0.018	17	-0.015	17
West Bengal	-0.026	25	-0.011	15	-0.169	34	-0.086	30
A & N Islands	-0.044	31	-0.023	21	-0.072	28	-0.073	28
Chandigarh	-0.071	33	-0.088	33	-0.132	32	-0.088	31
Delhi	-0.034	28	-0.056	31	-0.053	24	-0.015	18
Goa	-0.024	23	-0.032	26	-0.006	15	-0.046	23
Lakshadweep	0.001	14	0.040	1	0.031	6	0.028	5
Puducherry	-0.025	24	-0.012	16	-0.033	22	-0.052	25

Source: Department of School Education & Literacy and AISHE 2018-2019 and AISHE 2021-2022

Table 5. Sopher's disparity index for Higher education before and after COVID-19

States/UTs	Class XI-XII				Higher Education			
	(2018-19)		(2021-22)		(2018-19)		(2021-22)	
	SDI	Rank	SDI	Rank	SDI	Rank	SDI	Rank
Andhra Pradesh	-0.037	16	-0.033	14	0.109	1	0.033	5
Arunachal Pradesh	-0.014	15	-0.052	20	0.007	13	0.029	6
Assam	0.002	11	-0.057	21	0.020	9	-0.043	18
Bihar	0.002	10	-0.009	10	0.107	2	0.045	2
Chhattisgarh	-0.080	24	-0.104	30	-0.028	20	-0.081	23
Gujarat	0.023	7	0.009	6	0.079	5	0.066	1
Haryana	0.002	9	-0.008	9	-0.102	26	-0.079	22
Himachal Pradesh	-0.044	17	-0.020	12	-0.140	29	-0.156	31
Jammu & Kashmir	0.005	8	0.006	7	-0.043	21	-0.083	24
Jharkhand	-0.012	13	-0.038	16	0.020	10	-0.028	14
Karnataka	-0.106	28	-0.045	17	-0.021	19	-0.035	15
Kerala	-0.081	25	-0.059	22	-0.180	32	-0.230	33
Madhya Pradesh	0.025	5	0.014	4	0.014	12	0.009	8
Maharashtra	0.034	4	0.010	5	0.052	6	0.041	3
Manipur	0.039	3	0.003	8	-0.003	17	-0.024	12
Meghalaya	-0.108	31	-0.164	33	-0.076	24	-0.124	30
Mizoram	-0.071	21	-0.088	29	0.033	7	-0.024	13
Nagaland	-0.046	18	-0.086	28	-0.049	22	-0.107	28
Odisha	-0.073	22	-0.046	18	0.093	3	0.028	7
Punjab	-0.012	12	-0.017	11	-0.151	31	-0.099	25
Rajasthan	0.109	2	0.073	1	0.002	14	0.002	9
Sikkim	-0.136	32	-0.154	32	0.001	16	-0.104	27
Tamil Nadu	-0.142	33	-0.077	24	0.018	11	-0.039	16
Telangana	-0.087	26	-0.036	15	-0.010	18	-0.048	20
Tripura	-0.013	14	-0.085	27	0.093	4	0.040	4
Uttar Pradesh	0.023	6	0.052	2	-0.064	23	-0.042	17
Uttarakhand	-0.059	19	-0.031	13	0.001	15	-0.075	21
West Bengal	-0.106	29	-0.172	34	0.032	8	-0.046	19
A & N Islands	-0.107	30	-0.081	25	-0.123	28	-0.112	29
Chandigarh	-0.078	23	-0.119	31	-0.252	33	-0.188	32
Delhi	-0.067	20	-0.072	23	-0.083	25	-0.022	11
Goa	-0.097	27	-0.048	19	-0.145	30	-0.100	26
Lakshadweep	0.487	1	0.050	3	-0.551	34	-0.557	34
Puducherry	-0.156	34	-0.082	26	-0.121	27	-0.008	10

Source: Department of School Education & Literacy, AISHE 2018-2019 and AISHE 2021-2022

6. **Concluding Remarks**

The study reveals significant variation in the gender gap in literacy rates across Indian states and Union Territories, ranging from 3 to 27 percent. The highest gender gap is observed in Rajasthan at 27.1 percent, while the lowest is in Meghalaya at 3.1 percent. The analysis of COVID-19's impact, utilizing pre- and post-COVID-19 data from 2018–2019 and 2021–2022, indicates an increase in enrolment disparity between boys and girls in classes I–VIII across states such as Gujarat, Haryana, Rajasthan, Karnataka, Maharashtra,

Manipur, Nagaland, Tamil Nadu, Tripura, Odisha, Uttarakhand, Delhi, and Goa. The enrolment disparity between boys and girls in classes IX-X has increased in states including Assam, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Maharashtra, Madhya Pradesh, Meghalaya, Mizoram, Nagaland, Odisha, and Goa. The findings confirmed that enrolment disparities between boys and girls have increased in states such as Andhra Pradesh, Assam, Chhattisgarh, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Uttarakhand, and West Bengal in higher education.

The census data for national as well as state levels has clearly indicated the existence of education inequality among genders. The analysis of the data shows that gender disparities are significant and the enrolment gap has widened in many states across all levels of education during COVID-19. This increased enrolment gap may be due to employment losses during COVID-19 and a fall in family income. We must find girls, especially those over 14 who are at risk of not returning to school, as they won't be protected by the Right to Education.

The policymakers should give incentives to girls so that those who belong to the poorer strata of income can continue with their education. The social support programmes need to start, which will shift the focus back to education for girls; the government can extend free education to them up until graduation. Financial assistance and motivation schemes may be helpful in increasing the enrolment of girls in higher education. For classes VI-XII, establishing more residential government schools, such as Kasturba Gandhi Balika Vidyalaya, can help reduce gender education disparity. The pandemic has negatively influenced all levels of education, and online teaching during this time has worsened learning outcomes. Thus, the only way to eliminate this inequality is by providing consistent and regular support to girls at all levels of education.

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