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Research Article

Relative Educational Status Of Assam: A District Level Study

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ABSTRACT

Education is considered as a key instrument for creating human capital equipped with skill and knowledge that proceed the path of development. Overall, the education scenario of a nation or state depends on the performance of various education indicators. The study aims to analyze the performance of the education sector of Assam, one of the major states of the North-Eastern Region of India, in general, and its districts in particular. Based on secondary data available in the Statistical Handbook of Assam, a Composite Education Index consists of a Teacher Index, an Outcome Index and an Infrastructure Index calculated for all the districts of Assam for the starting period (2003-04) and end period (2016-17). The study finds that the relative educational status of districts of Assam has changed over the years. Out of the three top-performing districts in 2003-04 viz Nalbari, Sivasagar and Jorhat, only Jorhat district could maintain its previous position during 2016-17. Moreover, inter-district variation in individual indices has been found highest in the case of the Infrastructure Index, followed by the Teacher Index. However, for the Outcome Index, the variation has been reduced over the years.

Keywords: Educational status; Composite education index; Infrastructure index; Outcome index; Teacher Index

Introduction:

One of the greatest inventions of human civilization is education which creates the evolution of thoughts by transforming people's superstitious beliefs into modern rational beliefs, traditional agrarian ideas into modern technology-based ideas and helps people to realize the value of their lives. Generally, the level of educational development and economic growth of a country goes hand in hand. Thus, for the country's economic development, the respective government should focus on the growth of outcome indicators of education as educational indicators are expected to influence the dynamics of other socio-economic indicators like infant mortality, maternal health, life expectancy, per capita income etc.

The influential role of education as an engine of economic growth was focused in the academic literature of classical economists like Adam Smith, Marshall and Mill etc. Later, 'Human Capital Theory' and 'New Endogenous Growth Theory provided formal attention to the issue of the rationale of investing in human resources including R&D to enhance economic growth (Becker, 1975, Schulz, 1961, Lucas, 1988, Romer, 1990a, 1990b). The development experiences of many of the advanced economies during the 1980s taught a lesson that a mere increase in income per capita can't help much to narrow down the income disparities if the increase in income is not associated with the enhancement of human development. That is why the importance of investment in the social sector came into the picture.

The performance of education indicators is important for paving the path of other socio-economic variables. Here comes the question of the quality aspect of education. India and its states have been making incredible improvements in terms of increase in the number of educational institutions and enrollment over the years. However, high level of dropout rates is visible in successively higher levels of education (MoSPI, 2006). Moreover, the learning levels of students are not up to the mark as per ASER reports.

Assam is one of the major states of the North Eastern Region of India and it's the gateway of other NE states of the country. However, the state is lagging behind in comparison to other states of India in terms of socio-

economic indicators. The literacy rate of the state is the lowest among North Eastern states and it lagged behind the national average. In terms of Goal No. 4 of Sustainable Development Goals (SDGs) i.e. Quality Education, Assam's score has been reduced from 12 to 4 in 2020-21. The state is in the aspirational range in quality education indicators (NITI Aayog, 2021). Again, the learning achievement especially the arithmetic ability of students of Assam is below the national average. (PRATHAM, 2022). Thus, to scrutinise the quantitative and qualitative aspects of education, the performance of education indicators is more or less helpful in predicting a country's economic journey.

Thus, realizing the importance of education, this study tries to analyze the overall education scenario of Assam in general.

Literature Review:

Various studies have been conducted to analyze the importance of education in socio-economic aspects of life as well as for the macroeconomic development of a country. Advocating investment in education, especially on-the-job training, (Becker 1962) viewed that spending on human capital is important as there are wide earnings differential between educated and illiterate persons. Again, differences in the level of development can be better explained by differences in human capital growth. (Schultz, 1961).

Barro (2001) conducted a study to analyze the growth effect of education by taking data from a panel of almost 100 countries from the period 1965 to 1995. Important findings were average years of schooling of males at secondary and higher levels positively impacted on economic growth, the average years of schooling of male members at the primary level were insignificant to growth and female education indirectly influenced growth by lowering the fertility rate.

From the historical time till today, there has been rapid change in education scenarios all over the world. Tilak (1993) remarked that the education scenario of ASEAN countries is relatively much better in terms of literacy, universal primary education, private investment in education, returns to education etc. However, there is wide variation among ASEAN countries in terms of educational attainment in higher education. Prakash (2007) conducted a study to analyse the trend in the growth and financing of higher education in India. He said that Indian higher education had been facing several challenges in terms of accessibility, equity, quality, finance etc. The development of elementary education at the cost of higher education deteriorated its institutional base and prevented it from being globally competitive. Tilak (1998) conducted a study about the performance of educational indicators in the state of Andhra Pradesh. He found that despite in enhancement of many educational institutions, Andhra Pradesh performed very poorly in terms of education indicators such as enrolment rate, literacy rate etc. as compared to other states. Low promotion rate and high drop-out rate are the characteristics of low-quality education. The author recommended that to fulfil the goal of universal elementary education, Andhra Pradesh needed to allocate a huge amount of resources, the department of Education alone should aim at allocating 30 per cent of total revenue expenditure to education.

Methodology:

This study is based on secondary data published by various government and non-government organizations. The state-level data on various educational variables have been collected from the Statistical Handbook of Assam, Directorate of Economics and Statistics, Government of Assam.

In order to analyse inter-district variation in the education scenario of Assam over the years, a Composite Education Index ranging between 0 and 1 has been calculated for the starting period and end period for all the districts to rank them. Due to the lack of district-level data, the starting period is taken as 2003-04 and the end period is taken as 2016-17.

A max-min normalisation procedure has been used to normalise the absolute values of indicators so that all the absolute values of the indicators can be transformed into index values which are unit-free. The formula for the normalisation of the index has been given as follows-

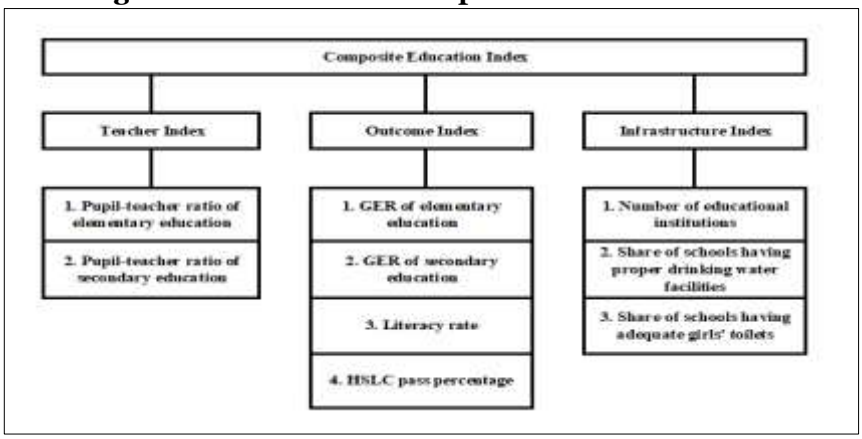
$X_{normalised} = (X-X_{min})/ (X_{max}-X_{min})$

The above formula has been used by the United Nations Development Programme (UNDP) to construct the Human Development Index (UNDP, 1990). Here, X is the actual value of the variable. Again, the observed maximum and minimum value of the variable has been taken as maximum value (X_{max}) or goal post (for positive indicator) and minimum value (X_{min}) or goal post (for negative indicator) respectively. Accordingly, the district whose performance is best will get the highest value of 1 and the worst performing district will get 0 by the same logic. The Composite Education Index incorporates three individual indices, namely, Teacher Index, Outcome Index and Infrastructure Index. Again, each index has its own set of variables. Quantitative improvement in education in terms of the number of education institutions and enrolment does not ensure quality. The demand-supply mismatch is quite visible everywhere. Qualitative educational improvement is not possible without reforms in school infrastructure, teachers' quality, style of teaching etc. (Hanushek & Wosmann, 2007). Therefore, to analyse the overall education system of Assam, these three indices are taken for analysis.

After calculating the Composite Education Index, districts are ranked accordingly and a comparison has been made between the starting period (2003-04) and end period (2016-17) regarding the relative educational status

of districts. After the formation of the Composite Education Index, districts are categorised on the basis of quartile values, in order to rank them. All the districts are divided into four categories in the following manner-
Very Poor Category- *"0" to "Q1" (Q1=First Quartile)*
Below Average Category- *"Q1" to "Q2" (Q2=Second Quartile)*
Good or Above Average Category- *"Q2" to "Q3" (Q3=Third Quartile)*
Excellent- *"Q3" to "1"*
The structure of the Composite Education Index has been given in the following flow chart-

Figure- 1: Structure of Composite Education Index



Source: Authors' conceptual framework

Educational Status of India in Terms of Various Educational Indicators:

At the time of independence, India's education scenario was not in a very good condition. It was characterized by a huge disparity in terms of gender, castes, geographical region and so on. The overall literacy rate was approximately 14 per cent. However, India made significant progress in terms of literacy rate after independence, which had grown from 18.3 per cent in 1951-52 to 73 per cent in 2011-12. Moreover, there have been changes in the definition of literacy rate. The definition of 'Effective Literacy Rate' as per the census, 2011 is the total percentage of the population aged seven years and above in a particular area at a particular time who can read and write with understanding. The growth of female literacy was even more impressive than its male counterparts. It has grown from less than 10 per cent in 1951 to 64.6 per cent in 2011. During this 60-year period, female literacy has grown nearly by 6.5 times (Office of the Registrar General & Census Commissioner, 2011). Decadal growth of female literacy is also higher than its male counterparts as we can see from Table 1.

Table 1: Gender wise literacy rate of India & decadal growth

Census year	Persons	Decadal Growth	Male	Decadal Growth	Female	Decadal Growth
1951	18.3		27.2		8.9	
1961	28.3	4.5%	40.4	4.0%	15.4	5.6%
1971	34.5	2.0%	46	1.3%	22	3.6%
1981	43.6	2.4%	56.4	2.1%	29.8	3.1%
1991	52.2	1.8%	64.1	1.3%	39.3	2.8%
2001	64.8	2.2%	75.3	1.6%	53.7	3.2%
2011	73	1.2%	80.9	0.7%	64.6	1.9%

Source: Author's own calculation based on census data, 2011

As per the report published by Ministry of Human Resource Development (2018) Gross Enrolment Ratio (GER) is defined as total enrolment of students in a level of education expressed as a percentage of corresponding eligible official age-group population in a given school year regardless of age. It had been increasing from 69.6 per cent in 1986-87 to 106.7 per cent in 2005-06 at elementary level. During this period, female enrolment had grown from 51.1 per cent to 101.3 per cent at elementary level. Again, gross enrolment at secondary and higher level had risen from 33.26 per cent and 8.07 per cent in 2001-02 to 40.42 per cent and 11.55 per cent in 2005-06 respectively. However, dropout rates were quite high at all the levels which offset the improvement in gross enrolment. But figures of drop-out rates have been declining over the years. During 2006-07, elementary dropout rate at all India level was 45.90 percent which further had dropped to 42.39 percent in 2009-10. At secondary level, drop-out rate had declined from 59.88 percent in 2006-07 to 52.76 percent in 2009-10 (MoSPI, 2006). In case of higher education, Gross Enrolment Ratio has been growing from 12.39 percent in 2006-07 to 25.8 in 2017-18 (MHRD, 2018).
One more indicator i.e. Gender Parity Index (GPI) indicates ratio of females to males enrolled in a given level of education and thereby showing gender-wise educational access. The value of GPI for India has been improving over the years for all the levels of education. For primary and upper primary education, GPI has

been growing from 0.41 to 1.03 and 0.22 to 1.10 respectively during 1951-2015. Trend of GPI for Elementary, Secondary and Higher levels of education is shown in Table 2.

Table 2: GPI for Elementary, Secondary and Higher Education

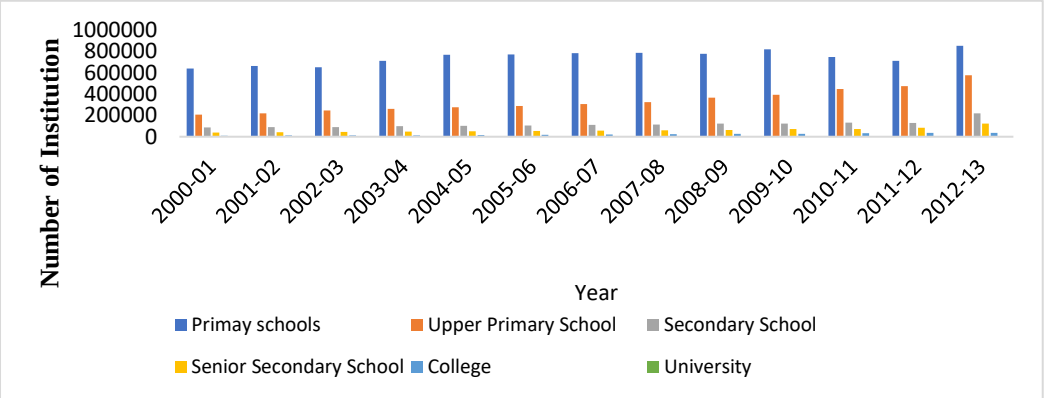
Year	GPI at Elementary level	Annual Growth Rate	GPI at Secondary level	Annual Growth Rate	GPI at Higher Education	Annual Growth Rate
2005-06	0.92		0.8		0.69	
2006-07	0.93	1.09%	0.81	1.25%	0.69	0.00%
2007-08	0.96	3.23%	0.85	4.94%	0.7	1.45%
2008-09	0.97	1.04%	0.86	1.18%	0.72	2.86%
2009-10	0.98	1.03%	0.88	2.33%	0.74	2.78%
2010-11	0.99	1.02%	0.88	0.00%	0.86	16.22%
2011-12	1	1.01%	0.93	5.68%	0.88	2.33%
2012-13	1.03	3.00%	0.96	3.23%	0.89	1.14%
2013-14	1.04	0.97%	1	4.17%	0.92	3.37%
2014-15	1.05	0.96%	1.01	1.00%	0.92	0.00%
2015-16	1.05	0.00%	1.02	0.99%	0.92	0.00%

Source: Author's own calculation of Growth Rates based on data from Educational Statistics at a Glance, 2018, MHRD, GOI

From Table 2 it is visible that Gender Parity Index of India has been increasing at all the levels which is a positive sign. Annual growth of GPI of higher education is also impressive and it reflects women's increasing access and participation in all the levels of education.

Number of institutions has been growing tremendously. During 2000-01, number of primary and secondary schools were 638738 and 206269 respectively which had risen to 853870 and 577832 in 2012-13. During the same time, growth of number of secondary schools was 218857 in 2012-13 from 87675 in 2000-01. Total number of higher education institution including colleges, universities and standalone institutions was 10406 during 2000-01 which had increased to 47937 in 2012-13 (MHRD, 2015).

Figure 2: Number of education institutions in India at different levels

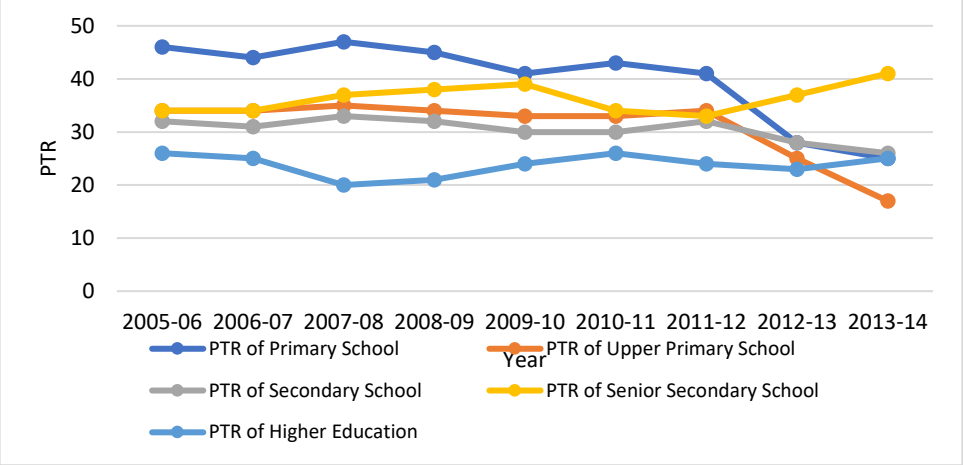


Source: Statistical Year Book India, various issues, GOI

Number of female teachers per hundred male teachers at primary level was 20 in 1950-51 which had increased to 105 in 2015-16. Between 2000-01 and 2015-16, number of secondary and senior secondary female teachers has increased from 54 to 72 and 42 to 73 respectively (MHRD, 2018).

Another indicator of effective education i.e. Pupil Teacher Ratio (PTR), which indicates average number of students per teacher at a particular level of education, has grown over the years from 24 in 1950-51 to 43 in 2010-11 at the elementary level; however, after 2012-13 it started declining and in 2015-16 the value of PTR for elementary level reached at 23. PTR is considered as a negative indicator which means higher the value lower is the learning outcome of students and vice versa, other things remaining same. At the upper primary level, PTR was 20 during 1950-51 which had come down to 17 in 2015-16 and thus showing some improvement. At the secondary and senior secondary level, PTR has been increasing over the years, only after 2013-14, it reduced for secondary level. For senior secondary level, it continued to increase. Year wise PTR of different levels of education from 2000 to 2013-14 is shown in Figure 3.

Figure 3: Trend of Pupil-Teacher Ratio of India from 2005-06 to 2013-14



Source: Educational Statistics at a Glance, 2018, MHRD, GOI

Figure-3 highlights that among different levels of education, PTR of senior secondary and higher education level has been increasing over the years which may be the reason for poor performance in respect to other levels of education. As PTR is a ratio of student to teacher, increasing value may either be due to high enrolment of students as compared to growth of number of teachers or probably because of lack of recruiting new teachers in higher education to fulfil increasing demand of students. However, PTR of primary, secondary and upper primary level have shown some improvement as the value of PTR has declined after 2012-13.

Overall Education Scenario of Assam and its Districts:

The state of Assam in the North Eastern Region of India plays an important role in the economic development of the country due to its geographical location and richness of natural resources. Its fertile soil, dense forest cover, water body and cultural heritage have attracted people from different parts of the country. As per the census 2011, the total population of the state was 3.12 crore, which was around 2.58 per cent of the total population of India. However, education status, in terms of literacy rate is lower in the state as compared to other states of the North-Eastern Region as well as the national average. The literacy rate of Assam was 72.19 per cent in 2011 as compared to 73 per cent at all India levels.

Assam has made significant improvement in terms of quantity indicators of education although it is comparatively less as compared to other states. The Gross Enrolment Ratio of Assam at primary and upper primary level was 94.3 per cent and 67.9 per cent respectively, which was lower than the national average of 116.0 per cent and 85.5 per cent during 2010-11 (GOI, 2015). In contrast to this, the Pupil-Teacher Ratio of the state is much more favourable as compared to other states of India (Government of Assam, 2003).

Inter-district variation has been seen in terms of the availability of teachers and schools. Although the number of educational institutions has grown very rapidly, most of the schools have lacked facilities like drinking water, separate boys' and girls' toilets, adequate classrooms etc. Moreover, the drop-out rate of the state continues to be high for high school and higher secondary levels which contrasts with the all-India figure. Thus, the focus has been shifting from quantitative achievement to qualitative performance like quality education, retention rate, transition rate etc. (Government of Assam, 2003).

The relative status of different districts of Assam in terms of education in the starting period, 2003-04 is highlighted in Table 3 below:

Table 3: Relative status of Assam's different districts in terms of education in 2003-04

District	Teacher Index	Rank	Outcome Index	Rank	Infrastructure Index	Rank	Composite Education Index	Rank
Barpeta	0.36	14	0.58	6	0.37	11	0.44	10
Bongaigaon	0.22	21	0.53	9	0.38	9	0.37	16
Cachar	0.36	16	0.53	8	0.15	21	0.35	19
Darrang	0.38	12	0.39	17	0.35	15	0.37	17
Dhemaji	0.67	3	0.51	12	0.21	20	0.47	9
Dhubri	0.08	23	0.26	22	0.35	14	0.23	23
Dibrugarh	0.32	18	0.43	15	0.4	7	0.38	14
Dima Hasao	1	1	0.38	18	0.03	23	0.47	7

Goalpara	0.38	11	0.42	16	0.38	10	0.4	13
Golaghat	0.43	7	0.52	10	0.6	2	0.52	6
Hailakandi	0.68	2	0.48	13	0.25	19	0.47	8
Jorhat	0.37	13	0.88	1	0.43	6	0.56	3
Kamup	0.09	22	0.62	5	0.56	3	0.43	12
Karbi Anglong	0.59	4	0.31	20	0.09	22	0.33	21
Karimganj	0.25	20	0.51	11	0.27	18	0.34	20
Kokrajhar	0.36	15	0.25	23	0.35	12	0.32	22
Lakhimpur	0.45	6	0.82	4	0.29	17	0.52	5
Morigaon	0.41	9	0.56	7	0.63	1	0.53	4
Nagaon	0.36	17	0.44	14	0.35	13	0.38	15
Nalbari	0.29	19	0.88	2	0.55	4	0.57	1
Sivasagar	0.49	5	0.87	3	0.33	16	0.56	2
Sonitpur	0.4	10	0.26	21	0.39	8	0.35	18
Tinsukia	0.42	8	0.34	19	0.53	5	0.43	11
C.V	0.47		0.37		0.42		0.21	

Source: Author's calculation based on data from Statistical Handbook of Assam, 2004-05

The values of quartiles are respectively-Q1=0.36, Q2=0.43, Q3=0.49. Districts that come under the very poor category, as the index value lies between 0 and 0.36 are- Cachar, Dhubri, Karbi Anglong, Karimganj, Kokrajhar and Sonitpur. Out of the six, Dhubri performs the worst, followed by Kokrajhar and Karbi Anglong. In respect of individual indices also these districts perform very poorly, except Karbi Anglong in the Teacher Index, in which it secures fourth position. The pupil-teacher Ratio of secondary education is favourable in the case of Karbi Anglong. The poor performance of Dhubri in the Education Index may be due to the high elementary and secondary Pupil-Teacher Ratio and low GER at the secondary level. For Kokrajhar, the low value of the Composite Education Index may be due to the low enrolment rate at the elementary and secondary levels.

Districts that performed under below average category, ranging between 0.36 and 0.43, are- Bongaigaon, Darrang, Dibrugarh, Goalpara, Kamrup, Nagaon, and Tinsukia. Kamrup and Tinsukia districts lie in the median position and thus performs on average. By analysing the values of individual indicators, it can be said that there are variations among the districts regarding their performance in Teacher Index, Outcome Index and Infrastructure Index. Some districts like Bongaigaon and Kamrup performs very badly in the Teacher Index but are comparatively in a better position in the other two indices.

The following districts have performed above average, with scores ranging between 0.43 and 0.49 - Hailakandi, Dima Hasao, Dhemaji and Barpeta. Out of these, except for Barpeta, all three have performed exceptionally well in the Teacher Index and have secured the top three ranks. The high achievement in PTR (low PTR) may be due to the low enrolment of students, particularly at the secondary level.

Lastly, districts that secure the highest relative position in the Education Index, which ranges between 0.49 and 1, are- Sivasagar, Nalbari, Morigaon, Jorhat and Golaghat. Nalbari secures the highest rank, followed by Sivasagar and Jorhat. One of the common features of these districts is that all of them perform extremely well in the Outcome Index and thus have high enrolment and literacy except Golaghat which performed better in the Infrastructure Index as compared to the Outcome Index.

Inter-district variation as measured by the Coefficient of Variation is 0.21 for the Composite Education Index. For individual indices, however, high variation is found in the Teacher Index, followed by the Infrastructure Index and Outcome Index. In fact, district-wise variation has been increasing over the years, especially in the case of the Infrastructure Index and Teacher Index. For the Outcome Index, however, inter-district variation is reduced.

In order to compare the inter-district relative status of education for the starting period and end period, the Composite Education Index has been also calculated for the end period (2016-17), which is highlighted in Table 4 below:

Table 4: Relative status of Assam's different districts in terms of education in 2016-17

District	Teacher Index	Rank	Outcome Index	Rank	Infrastructure Index	Rank	Composite Education	Rank
Barpeta	0.45	12	0.49	12	0.4	9	0.45	11
Bongaigaon	0.19	20	0.63	5	0.21	19	0.34	20
Cachar	0.08	23	0.5	10	0.35	11	0.31	22
Darrang	0.44	14	0.63	6	0.32	12	0.46	9

Dhemaji	0.57	9	0.64	4	0.35	10	0.52	6
Dhubri	0.28	18	0.37	18	0.64	2	0.43	12
Dibrugarh	0.43	15	0.42	17	0.2	20	0.35	19
Dima Hasao	0.77	3	0.51	8	0	23	0.43	13
Goalpara	0.26	19	0.31	20	0.55	6	0.37	15
Golaghat	0.47	11	0.51	9	0.26	15	0.42	14
Hailakandi	0.45	13	0.42	16	0.21	18	0.36	17
Jorhat	0.84	2	0.53	7	0.45	8	0.61	3
Kamup	0.53	10	0.74	2	0.59	4	0.62	2
Karbi Anglong	0.63	7	0.19	22	0.28	14	0.37	16
Karimganj	0.11	22	0.46	14	0.8	1	0.46	10
Kokrajhar	0.4	16	0.43	15	0.25	16	0.36	18
Lakhimpur	0.73	4	0.7	3	0.47	7	0.63	1
Morigaon	0.28	17	0.49	11	0.22	17	0.33	21
Nagaon	0.58	8	0.28	21	0.61	3	0.49	7
Nalbari	0.64	6	0.89	1	0.19	21	0.58	5
Sibsagar	1	1	0.48	13	0.29	13	0.59	4
Sonitpur	0.72	5	0.15	23	0.57	5	0.48	8
Tinsukia	0.14	21	0.31	19	0.14	22	0.2	23
C.V	0.5		0.35		0.52		0.25	

Source: Author's calculation based on data from Statistical Handbook of Assam, 2017-18

The inter-district variation in the Composite Education Index has increased in the end period as compared to the starting period as we can view from C.V value which is 0.25 in the end period. For individual indices, C.V values are 0.50, 0.35 and 0.52 for the Teacher Index, Outcome Index and Infrastructure Index respectively. Except for the Outcome Index, variation has risen in the other two individual indices.

For the Composite Education Index, the values of quartiles respectively are- Q1=0.36, Q2=0.43 and Q3=0.50. Accordingly, districts that come under the very poor category, ranging from 0 to 0.36 are- Bongaigaon, Cachar, Hailakandi, Dibrugarh, Kokrajhar, Morigaon and Tinsukia. Tinsukia performs the worst, followed by Cachar and Morigaon. Bongaigaon and Cacher have performed worse in the Teacher Index, but slightly better in the Outcome Index.

Districts that fall under the category of below average, ranging from 0.36 to 0.43 are- Dhubri, Dima Hasao, Goalpara, Golaghat, and Karbi Anglong. However, Dhubri and Goalpara rank second and sixth position in the Infrastructure Index. Also, Dima Hasao and Karbi Anglong performed much better in the Teacher Index but poorly performed in the Outcome Index and Infrastructure Index.

Districts that performed well and came under above average category, ranging from 0.43 to 0.50, are- Barpeta, Darrang, Karimganj, Nagaon and Sonitpur. Nagaon and Sonitpur performed very poorly in the Outcome Index, in fact securing first and third position from the last. Karimganj ranks second from the last in the Teacher Index.

Districts that come under excellent performers, ranging from 0.50 to 1 are- Dhemaji, Jorhat, Kamrup, Lakhimpur, Nalbari, and Sivasagar. Out of them, Lakhimpur performs best, followed by Kamrup and Jorhat. The best performance of Lakhimpur in the Composite Education Index is because of its good achievement in the Outcome Index and Infrastructure Index. Kamrup and Jorhat also do well in the Infrastructure Index.

Results and Discussion:

The purpose of the comparison is to identify the changing position of districts of Assam between two time periods in terms of relative educational status. From Table 3 and Table 4, it is found that the relative status of districts in terms of the Composite Education Index as well as individual indices have changed over the years. Some districts which have performed extremely well during the starting period lost their earlier ranks in the end period. The opposite also happened to some of them. For the Composite Education Index, the top and bottom-ranked districts for the starting and end periods are shown in Table 5.

Table 5: Rankings of districts in terms of Composite Education Index for Starting and End period

Composite Education Index, 2003-04		**Composite Education Index, 2016-17**	
Top 3 rankers	Bottom 3 rankers	Top 3 rankers	Bottom 3 rankers
Nalbari	Dhubri	Lakhimpur	Tinsukia
Sivasagar	Kokrajhar	Kamrup	Cacher
Jorhat	Karbi Anglong	Jorhat	Morigaon

Source: Tables: 3 & 4

From Table 5, it is observed that out of the three best-performing districts in 2003-04 in terms of overall education, only Jorhat is able to hold its previous position in 2016-17. The main achievement of Jorhat in the Education Index may be due to better performance in the Teacher Index which may be again because of an increase in the number of teachers as compared to the growth of the enrolment rate. Nalbari and Sivasagar could not maintain their relative education status during 2016-17. In fact, Nalbari performed so badly in the Infrastructure Index that its position shifted toward the bottom at the end period. Moreover, the relative educational status of Dhubri, Kokrajhar and Karbi Anglong has relatively improved during 2016-17 as compared to 2003-04. The district-level performances of individual indices are highlighted in Table 6.

Table 6: Top and bottom rankings of Individual Indices for districts of Assam for Starting and End period

Teacher Index, 2003-04		**Teacher Index, 2016-17**	
Top 3 rankers	Bottom 3 rankers	Top 3 rankers	Bottom 3 rankers
Dima Hasao	Dhubri	Sivasagar	Cachar
Hailakandi	Kamrup	Jorhat	Karimganj
Dhemaji	Bongaigaon	Dima Hasao	Tinsukia
Outcome Index, 2003-04		**Outcome Index, 2016-17**	
Top 3 rankers	Bottom 3 rankers	Top 3 rankers	Bottom 3 rankers
Jorhat	Kokrajhar	Nalbari	Sonitpur
Nalbari	Dhubri	Kamrup	Karbi Anglong
Sivasagar	Sonitpur	Lakhimpur	Nagaon
Infrastructure Index, 2003-04		**Infrastructure Index, 2016-17**	
Top 3 rankers	Bottom 3 rankers	Top 3 rankers	Bottom 3 rankers
Morigaon	Dima Hasao	Karimganj	Dima Hasao
Golaghat	Karbi Anglong	Dhubri	Tinsukia
Kamrup	Cacher	Nagaon	Nalbari

Source: Author's Compilation

Table 6 compares the ranking position of districts in two time periods in terms of three individual indices namely the Teacher Index, the Outcome Index and the Infrastructure Index.

Between 2003 and 2004, Kamrup district struggled with the Teacher Index, which takes into account the Pupil-Teacher Ratio. Despite this, the district boasts a strong school infrastructure and managed to secure the second spot in the Outcome Index during the 2016-2017 period. Kamrup has a high gross enrolment rate, though its poor performance in the Teacher Index could be attributed to the fact that enrolment growth has outpaced the increase in the number of teachers, especially at the secondary level. The district's impressive literacy rate and HSLC pass percentage, however, have played a role in its favourable performance in the Outcome Index.

In contrast, Dima Hasao has consistently excelled in the Teacher Index during both periods. This could be attributed to the low Pupil-Teacher Ratio at both the elementary and secondary levels, which is likely due to either low student enrolment or a high availability of teachers, or both. The Nalbari district has consistently maintained a high level of educational achievement, ranking at the top of the Outcome Index for both periods. Conversely, the Sonitpur district has consistently performed poorly, consistently ranking at the bottom of the educational achievement scale.

When it comes to infrastructure, Dima Hasao has remained at the bottom of the rankings in both years. However, Dhubri has made significant progress and achieved the second position in the Infrastructure Index during 2016-17.

To gain a more comprehensive understanding of the changes between districts in terms of the Composite Education Index and the other three individual indices, a Spearman's Rank Correlation was conducted for both the starting and ending periods. The result of rank correlation has been presented in Table 7.

Table 7: Results of Spearman's Rank Correlation

	Education Index, 2016-17	Teacher Index, 2016-17	Outcome Index, 2016-17	Infrastructure Index, 2016-17
Education Index, 2003-04	0.3557* (0.095)			
Teacher Index, 2003-04		0.4368** (0.0372)		
Outcome Index, 2003-04			0.6640* ** (0.0005)	
Infrastructure Index, 2003-04				-0.105 (0.6311)

*Note: Value in parentheses indicates ρ-value & *, ** & *** denotes 10%, 5% & 1% levels of significance respectively.*

Source: Author's calculation.

Based on the data presented in Table 7, it appears that there have been shifts in the inter-district rankings for the Education Index between the Starting Period and End Period. While the rank correlation coefficient for the Education Index is not particularly high, it is still significant at a 10% level. The Teacher Index has a correlation coefficient of 0.43 and is significant at a 5% level, indicating changes in relative ranking position between the

two periods. Conversely, the Outcome Index demonstrates a high correlation between the Starting and End periods, suggesting minimal changes in inter-district relative position. Unfortunately, the Infrastructure Index lacks significant correlation, rendering interpretation impossible. Overall, these highlights that access, quality, and achievements in education vary significantly across districts, ultimately impacting the educational landscape as a whole.

Findings:

From the above discussion, some of the key findings from this study are mentioned below-

- The relative educational status of districts of Assam has changed over the years. Some of the districts that were performing at the top during the starting period, 2003-04 were not able to hold their previous positions during the end period, 2016-17. The districts that were at the top rank during 2003-04 as per the composite education index were Nalbari, Sivasagar and Jorhat. Out of the three, only Jorhat district could secure its previous position during 2016-17. Besides Jorhat, Lakhimpur and Kamrup are the two districts that secured the top two ranks in the composite education index during the end period, 2016-17.
- Inter-district variations have been found in the performance of individual indices. For example, Kamrup district has performed very poorly in the Teacher Index, but extremely well in the Infrastructure and Outcome Index. In fact, it has secured second position in the Outcome Index during 2016-17. Similarly, Dima Hasao, which performs at the top rank in the Teacher Index, secures the bottom position in the Infrastructure Index.
- On one hand, Nalbari district has maintained one of the top positions in the Outcome Index in both the periods thereby achieving high educational status. On the other hand, Sonitpur performed at the bottom in both periods and thus continuously at lower educational achievement. In the case of the infrastructure index, Dima Hasao has maintained its bottom position in both the years.
- Inter-district variation has been higher in individual indices as compared to the Composite Education Index. The variation has been highest in the Infrastructure Index, followed by the Teacher Index as measured by the Coefficient of Variation. In fact, district-wise variation has been increasing over the years, especially in the case of the Infrastructure Index and Teacher Index. For the Outcome Index, however, inter-district variation is reduced.
- The basic education facilities and infrastructure are more or less available in all the districts. However, wide variation is found for districts that perform above average in terms of relative educational status.

Conclusion:

The promotion of education as a merit good is an essential aspect of societal development. It is an area that every government should prioritize. Assam is one of the most significant Northeastern states and has a crucial role in the overall growth and development of the region and the country. However, despite the state's strategic importance, the educational status of Assam is not up to the desired level. There are significant inter-district variations in educational access and opportunities, as indicated by the Teacher index and Infrastructure index. The government must address these variations to ensure that every student has an equal opportunity to access quality education.

To achieve this goal, the government needs to emphasize equity in the distribution of educational resources. The government should allocate more resources to the districts that lack adequate educational infrastructure and resources. This step will help to bridge the gap between the regions and ensure that every student has access to quality education. Moreover, the government should also hire more teachers in districts with high enrolment to promote quality education. This step will help to reduce the student-teacher ratio and ensure that every student receives adequate attention. A better teacher-student ratio will also enhance the quality of education and improve the overall learning experience.

In conclusion, the development of the educational status of Assam is of utmost importance, not just for the state but the entire region and the country. By promoting equity in the distribution of educational resources and hiring more teachers in high-enrolment districts, the government can ensure that every student in Assam has an equal opportunity to access quality education.

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