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Participation of Women in Higher Education in North Eastern States – A Comparative Study

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Abstract

The advancement of society, both social and economically, hinges immensely on identical participation of men and women in all the possible forms of social and economic activities. In this association the present study is an effort to analyse the comparative participation of women in higher education in North Eastern states. The study is completely based on secondary data which is collected from official website of MoHRD and also from subsequent yearly reports of UGC. Simple statistical tools have been applied to investigate if there is any alarming discrepancy as far as the participation male and female in higher education. The study comes up with some interesting findings and also with some scope of future studies.

JEL Code: A2, A20
Key Words: Women, Higher Education, Gender Disparity, Gender Parity Index.

Section-I

1.1. Introduction:

Higher education means the education beyond the level of secondary education. It is often assumed that education imparted by the colleges or universities are higher education. But in fact higher educational institutions include Professional Schools in the field of Law, Theology, Medicine, Business, Music and Art. It also includes other institutions like Teachers‟ Training School and Technological Institutions. Moreover, institutions for training of highly skilled specialists in the field of economics, science, technology and culture of various types of higher schools are treated as Higher Educational Institutions because these institutions allow those candidates in their campus who have completed their study at the secondary level. Thus, in general, the term Higher Education refers the education at the degree level and above.

Almost half of the population in India is occupied by women. They are the half of the human resources. But it is very unfortunate to say that for long years there have been a strong bias against women and thereby there is a tendency to deny equal socio-economic

opportunity for them. This neglecting attitude towards women is prominent in many respects particularly in the field of education. None can deny the fact that education is the fundamental agents for the socio-economic development of a country. But women access in the domain of education has not been fairly treated.

There are two different views on the question of women participation in higher education - traditional and modern. The traditional view supports women's education to equip them to become better wives and mother. This view believes that women's present education is entirely irrelevant in their lives. It is only waste of time and this does not help them to solve the problems of their daily life. This view believes that modern educated women are neither happy nor contended nor socially useful. She is misfit in life and needs opportunities for self-expression. But modern attitude visualizes education as an instrument for women's equality and development. Theoretically the need of higher education for both males and females is the same. But practically it could be said that female education is more important than that of male. Women education has two aspects- individual aspect and social aspect. It is education which increases women's abilities to deal with the problems of her life, her family, her society and nation. Education increases confidence in a woman. An educated woman can easily understand the demerits of early marriage and high birth rate. They have the attitude of gender parity among their children right from health care, nutrition, education and even career. The fruits of education are enjoyed not only by the woman concerned but it passes to her family in later life. In a word, over all development of a society depends on the development of its total members. But if half of its members are legged behind, obviously it will create hindrance to the development. This paper seeks to demonstrate the latest trends in the Gander Disparity Index (GDI) of all the north-eastern states. It also attempts to investigate whether there is any significant time impact or state impact on GDI in northeastern states. Simultaneously, it also attempts to see if there is any difference in disparity of women's higher educational attainment in northeastern states as compared to other states of India.

I. 2. Statement of the problem: This paper tries to study the relative participation of women in higher education in comparison to men in the North Eastern states. The main aim of the study was to see the situation of women in higher education. That is to see whether there is any disparity in higher education against women.

I. 3. Objective: To analyse the participation of women in higher education.

I. 4. Hypothesis:

1. There is no disparity in women's participation in higher education as compared to men.
2. There is no variation on Gender Disparity of North Eastern states across time.
3. There is no significant variation of Gender Parity across North Eastern states.

I. 5. Importance of the study: Education is the basic right of all human beings. Educated woman not only contributes in the economic development of the country and prosperity of

the nation but also greatly serve her families in all aspects of life, like saving of her household budget, medical assistance to her parents in law and children. It is the common observation that even educated employed woman provides shelter, house and other benefits to her husband and his family with great honour and dignity. So it is very important to see whether women are being given equal opportunities in the field of education.

Section II

Review of Literature: Salik and Zhiyong (2014) examined the status of gender in higher education and the rationales behind the gender inequalities and discrimination in higher education in rural areas of Pakistan. Their study exposed that number of female students starts lessening gradually in rural areas from higher secondary to undergraduate and graduate level. They suggested that there is need for significant paradigm shift in the way that government, parents and scholars should plan how to increase the number of female in higher education trend in public sector universities. There is need to provide equal access for higher level of education without any discrimination in order to develop female in the rural areas of Pakistan. There is need to create awareness among parent about the importance of higher education of female.

Balatchandirane (2007) looked at the attempts of some of the Asian countries to eliminate gender discrimination in education and how these impacted upon their course of modernisation. He also looked at the impact of education on female labour force participation. He also attempted an inter-regional comparison. His basic idea was to study the gender discrimination in education in each country and correlate its trend with economic development. He concluded that no country in this world has been able to show substantial progress in modernisation, economic and otherwise, without substantially reducing the gender discrimination in education or eliminating it.

Singha and Singha (2013) makes an attempt to study discrimination against Indian women in attainment of higher education in general and technical and professional education in particular in the era of economic liberalization and globalization. For studying gender based disparity, they analysed data from different sources mainly from Census of India, University Grants Commission and Ministry of H.R.D. Their analysis relates to educational infrastructure including women colleges, and female enrolment, in both the technical and non-technical categories in both the pre and post liberalization period to facilitate comparison. The findings of their study suggest bias against women in matters related to higher education. The discrimination was found more in professional and technical category in comparison to non-technical category. Bias against females increased in the era of globalization. They suggested that immediate attention and corrective measures in the higher education policy should be taken so as to make it more responsive for female education with special consideration for the rural sector females in the era of globalization.

Ara and Malik (2012) examined the status of female education from primary to onwards higher secondary level of education. They took the data from district Swat (Pakistan). Their results exposed that number of female students starts lessening gradually with the increase

of their age from primary to higher secondary education. They suggested that there is need for significant paradigm shift in the way that government, parents and scholars should plan how to increase the number of female education trend in public sector educational organizations. They also suggested that there is need to provide equal access to for various level of education without any discrimination in order to develop female in the district Swat Pakistan. There is need to create awareness among parent about the importance of various level of female education.

Ismail (2015) aimed to identify why academic performance differs between male and female students at a school level that leads them to qualify for entrance into universities. Entrance qualification to university is based on the meritocracy system of their academic achievement. She found that more female students have always outperformed the male students in their educational attainment. The inequality of gender in the enrolment of students into universities has become a serious phenomenon for the past decades. This qualitative and quantitative method of research utilizes data analysis from University Malaya samples. Her findings revealed that female students have different characteristics and inspiration that influence their educational achievement. She also found that more male students are represented in subject choices like Engineering. The author is of the view that the outcome from gender imbalance will hinder the country's development if more females dominated in the job market. In light of these results, she gave several suggestions that have been proposed for the solution and implication to increase the number of male students in tertiary institutions.

Pickering (1997) and Bleach (1998) claimed that one of the reasons boys in the United Kingdom did less well than girls is that boys considered schooling and the selection of stereotypically female subjects as unfair and biased. As a result, British boys tend to be less motivated to do well in schools.

According to Dweck, and Licht (1980), gender characteristics determine how well boys and girls adapt to their academic tasks. They suggested that certain academic tasks and areas in general may possess characteristics that are compatibility with girls' cognitive orientation and that is likely to facilitate their performance. Similarly, boys' achievement orientations may make them better suited for certain academic pursuits. For instance, they found that mathematics is an area that, in general, possesses the characteristics that best fit the male cognition, whilst language-based subjects seem to possess those qualities that best fit the female cognition.

Section III

Methodology: This section presents details about nature of data applied in the study and the methodology used here. The purpose of this section is to construct a framework to meet the objectives of the present study.

Sources of Data: Data has been collected from the official website of MoHRD (Ministry of Human Resource Development) and annual reports of AISHE (All India School Education

Survey) for the period 2010-11 to 2014-15. All the data used in the study are secondary data.

- **Gender Parity Index:** The Gender Parity Index (GPI) is a socioeconomic index usually designed to measure the relative access to education of males and females. This index is released by UNESCO. In its simplest form, it is calculated as the quotient of the number of females by the number of males enrolled in a given stage of education (primary, secondary, higher education, etc.). It is used by international organizations, particularly in measuring the progress of developing countries. The Institute for Statistics of UNESCO also uses a more general definition of GPI: for any development indicator one can define the GPI relative to this indicator by dividing its value for females by its value for males. For example, some UNESCO documents consider gender parity in literacy.

$$\textbf{GPI} = \frac{\textit{Value of enrolment for females}}{\textit{Values of enrolment for males}}$$

- **Sopher's Disparity Index:** This method of calculating disparities has been developed by David.V.Sopher (1974). According to this method, if X1 and X2 represents the respective percentage of values of variables of group 1 and group 2, then the disparity index (D) can be calculated by the formula

$$\textbf{D} = \textbf{Log}\left(\frac{X_2}{X_1}\right) + \textbf{Log}\left[(Q - X_1) / (Q - X_2)\right]$$

Where, X2 > or = X1 and Q = 100

In this method of measuring disparity group 2 is taken for variable having comparatively higher value and group 1 for that having relatively lower value. For example, in order to measure rural urban disparity in literacy, the rural literacy should be taken as X1 and urban literacy as X2. This is because urban literacy rate is generally higher than rural literacy rate. In case of perfect equality i.e. no disparity at all, the value of D will be zero. The measured value of D is interpreted as – higher the value of D, higher the extent of disparity and lower the value of D shows lower the disparity. Generally this method is used in measuring the relative disparity.

- **Two-Way Analysis of Variance:** In statistics, the two-way analysis of variance (ANOVA) is an extension of the one-way ANOVA that examines the influence of two different categorical independent variables on one continuous dependent variable. The two-way ANOVA not only aims at assessing the main effect of each independent variable but also if there is any interaction between them.
- **Mann-Whitney U test:** In statistics, the Mann–Whitney U test (also called the Mann–Whitney–Wilcoxon (MWW), Wilcoxon rank-sum test, or Wilcoxon–Mann–Whitney test) is a nonparametric test of the null hypothesis that it is equally likely that a randomly selected value from one sample will be less than or greater than a randomly selected value from a second sample. Unlike the t-test it does not require the assumption of normal distributions. It is nearly as efficient as the t-test on normal distributions. The test involves the calculation of a statistic, usually called U, whose

distribution under the null hypothesis is known. In the case of small samples, the distribution is tabulated, but for sample sizes above 20 (approximation) using the normal distribution is fairly good. Some books tabulate statistics equivalent to U, such as the sum of ranks in one of the samples, rather than U itself.

U is then given by:

$$\boldsymbol{U_1 = R_1 - \frac{n_1(n_1 + 1)}{2}}$$

Where n_1 is the sample size for sample 1, and R_1 is the sum of the ranks in sample 1.

It doesn't matter which of the two samples is considered sample 1. An equally valid formula for U is

$$\boldsymbol{U_2 = R_2 - \frac{n_2(n_2 + 1)}{2}}$$

The smaller value of U1 and U2 is the one used when consulting significance tables. The sum of the two values is given by

$$\boldsymbol{U_1 + U_2 = R_1 - \frac{n_1(n_1 + 1)}{2} + R_2 - \frac{n_2(n_2 + 1)}{2}}$$

Knowing that $R_1 + R_2 = N(N + 1)/2$ and $N = n_1 + n_2$, and doing some algebra, we find that the sum is $U_1 + U_2 = n_1 n_2$.

Section IV

Data Analysis: In this section we are going to discuss the results related to our earlier mentioned objectives. The methodologies for finding these results have already been discussed in Section-III. We will precede our discussion in this section by considering our objectives and research questions.

Table-1

Gender Parity Index for different years of Northeast states along with respective coefficient of variation

States/UTs	GPI 2010-11	GPI 2011-12	GPI 2012-13	GPI 2013-14	GPI 2014-15
Arunachal Pradesh	0.58	0.89	1.08	1.04	0.97
Assam	1.01	1.01	0.97	0.92	0.93
Manipur	0.86	0.98	0.94	0.99	0.94
Meghalaya	1.29	1.13	1.06	0.96	1.07
Mizoram	0.96	0.93	0.98	0.96	0.98
Nagaland	0.65	0.74	0.77	0.82	1.06
Sikkim	0.85	0.95	1.23	1.11	1.14
Tripura	0.69	0.7	0.71	0.72	0.67
Coefficient of variation	123.1884	135.7143	173.2394	154.1667	170.1493

Source: Calculated by author from secondary data

Table-1 shows Gender Parity Index for different years. Gender Parity Index is the ratio of the number of females by the number of males enrolled in a given stage of education. From table-1 it can be seen that the variations in Gender Parity Index (GPI) in 2010-11 is 1.231884. In the next period, that is, in 2011-12, the variation in GPI comes down significantly to 1.357143. In 2012-13 there is a slight increase in the variation in GPI from 0.138 to 1.732394. In 2013-14 the variations in GPI reduces to 0.12 and in the next period that is, in 2014-15 the variation again slightly increases to 0.136.

Table-2
Summary of Sopher's Disparity Index

States	2010-11	2011-12	2012-13	2013-14	2014-15
Arunachal Pradesh	0.943972	0.049987	-0.15305	-0.44048	-0.33941
Assam	1.087206	-0.18738	0.003645	-0.18651	-0.15389
Manipur	0.653465	0.015745	0.070829	0.099303	0.174158
Meghalaya	-0.53653	-0.23923	-0.13808	-0.62974	-0.4033
Mizoram	0.322886	0.064522	-0.00046	0.023599	0.037063
Nagaland	4.032043	3.592265	0.38451	1.151296	0.330293
Sikkim	2.519605	1.107396	-0.23702	-0.48505	-0.42804
Tripura	0.754913	0.378364	0.655325	0.59923	0.659479
All India	0.448435015	0.214052	0.114273	-0.02767	-0.08914

Source: Calculated by author from secondary data

In table-2 Sopher's Disparity Index has been calculated for all the North Eastern states for the time period ranging from 2010-11 to 2014-15. Sopher's Disparity Index was calculated to examine the extent of disparity in percentage enrolment in higher education between males and females. In table-2, in the period 2010-11, it can be seen that in the state of Nagaland, highest disparity in percentage enrolment between male and female students in higher education is found at 4.032043, which indicates that there is positive and high disparity among male and female students in higher education. In the same period, the state of Meghalaya has the lowest disparity between male and female students at -0.53653.In the same period, all India disparity level was 0.448435015. In the next period that is 2011-12, highest disparity is seen in the state of Nagaland at 3.592265 followed by the state of Sikkim at 1.107396. In the same period (2011-12) lowest disparity is seen in the state of Manipur at 0.015745 followed by Assam at -0.18738. In that period all India disparity levels was 0.214052. In the following period, that is, in 2012-13 all the North Eastern states improved in terms of reducing disparity in higher education. Highest disparity in this period was found in Tripura at 0.655325 and lowest in Mizoram at -0.00046. In 2013-14, the highest disparity was found in Nagaland 1.151296. In 2014-15, highest disparity was seen in the state of Tripura (0.659479) and lowest in Arunachal Pradesh (-0.33941).

Table-3

ANOVA: Two-Factor Without Replication

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F critical*
States	0.58548	7	0.08364	6.4489	0.000142	2.3592
Year	0.064135	4	0.016034	1.2362	0.318203	2.7140
Error	0.363145	28	0.012969			

Source: calculated from secondary data.

The following table shows the two factor Analysis of Variance. The two-way analysis of variance (ANOVA) examines the influence of two different categorical independent variables on one continuous dependent variable. From the above table it can be interpreted that states have significant influence on the Gender Parity Index as the *P-value* is lower than the *F-critical* value. Years are also significant since *P-value* is lower than the *F-critical* value.

Table-4
Summary of Mann-Whitney U Test for state-wise values of GPI different years

Years	R_1	R_2	n_1	n_2	**Calculated U**	**Critical - U**
2010-11	458	159	26	8	123	47 (0.05%) 34 (0.01%)
2011-12	497	164	27	8	128	47 (0.05%) 34 (0.01%)
2012-13	500	162	27	8	126	47 (0.05%) 34 (0.01%)
2013-14	501	158	27	8	122	47 (0.05%) 34 (0.01%)
2014-15	512	145	27	8	109	47 (0.05%) 34 (0.01%)

Source: calculated from secondary data.

In table-4, the Wilcoxson Mann-Whitney U test has been presented for different year. It is to be noted that the Wilcoxson Mann-Whitney U test is performed with the null hypothesis that there is no difference in ranks (from GPI values) among Northeast states and rest of the states. And as it is anticipated, the alternative hypothesis is that the average rank values of Northeast states are poorer than rest of the states. Thus, one-tailed test has been formed. The result of the Wilcoxson Mann-Whitney U value shows that any average rank values of Northeast states is poorer than rest of the states as calculated U value is greater than U critical value. It gives clear indication that the situation for the North-eastern states is poor compared to the rest of the states.

Section V

Conclusion: The main aim of the study was to see the situation of women in higher education. For this purpose several statistical tools were used. Coefficient of variation was used to see the extent of variation in Gender Parity Index for different years in Northeast states. Sopher's Disparity Index was calculated to examine the extent of disparity in

percentage enrolment in higher education between males and females. The two-way analysis of variance (ANOVA) was done to examine the influence of two different categorical independent variables, that is years and states, on one continuous dependent variable that is GPI. The Wilcoxson Mann-Whitney U test was performed to investigate whether there was any difference in ranks (from GPI values) among Northeast states and rest of the states. From all the above analysis, it can be seen that the variations in the Gender Parity Index has been rising over the years in the north eastern states. Also disparity in percentage enrolment is also very high in the north east as compared to all India levels. It was also found that both years and states have significant influence in the Gender Parity Index. Moreover it was also found that the situation for the North-eastern states is poor compared to the rest of the states. It is suggested that there is need for significant paradigm shift in the way that government, parents and scholars should plan how to increase the number of female in higher education in North Eastern states. There is also need to provide equal access for higher level of education without any discrimination. There is need to create awareness among parent about the importance of higher education of female.

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