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Girls' higher education in India on the road to inclusiveness: on track but heading where?

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Abstract The scope of this paper spans from macro-level national and inter-state comparisons to more micro-level intra-state scrutiny of systemic fault-lines shaping the contours of girls' education in India. Post independence, national level indicators have been suggestive of greater gender parity. Yet, there is more to inclusiveness of girls in Indian higher education than increasing absolute numbers or improving gender ratios. Rising female participation has coincided with a massive 'systemic expansion' of delivery systems and therefore, would have to be a function of this expanded availability. As a corollary, systemic skews and limitations, both qualitative and quantitative, are bound to influence how girls get incorporated into the system. This would matter not just in terms of how many access it, but also what courses do they access and where. In the course of this paper, we scan through several geographic layers of delivery systems to surface how critical systemic traits are shaping access to higher education in India, and how girls remain particularly vulnerable to them. It reveals how the progress achieved so far has spawned its own hierarchies, which do not get reflected adequately in the national level indicators. As we scale down to states, the first set of skews begins to surface in the form of inter-state disparities of access and uneven faculty-wise distributions. Moving to the next level of geographic dis-aggregation, further skews are revealed based on availability of medium of instruction; as also the guidelines of gender based affirmative action meant for improving girls' participation that ironically end up creating their own distortions. Through a study of these multi-layered hurdles, this paper brings forth the systemic side of impediments that have remained less explored in comparison with the cultural-attitudinal biases that have plagued girls' participation to higher education in India.

Keywords Girls' higher education · Gender · Equity · Inclusiveness · India · Maharashtra · Regional disparities · Systemic constraints

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This paper seeks to assess the extent of girls' inclusiveness in higher education in India, an issue of serious concern considering that South Asia—of which India constitutes a significant part—has traditionally been among the geographies with persistently high gender disparities (see Schultz 1994; Tembon 2008). In doing so, it serves to add to the significant body of literature that has emerged over time evaluating gender equity in education among the developing, low-income countries (notably King and Hill 1993; Morley et al. 2006). Yet, the relevance of this paper is more India specific, heightened further circumstantially by certain sweeping macro-economic developments that differentiate it from other developing countries. Aided by a series of reforms in the post-liberalization period (1991 onwards), the Indian economy has been delivering growth rates in the high single-digits (see Ahluwalia 2002; Panagariya 2004; Panagariya 2008). To put this in a global perspective, if some of the recent reports in The Economist (2010a, b) were to be believed, India is expected to grow faster than any large economy in the world for the next couple of decades. This economic acceleration is bound to demand a commensurate increase in human capital, necessitating a greater coherence between economic and educational policies.

Coinciding with India's economic growth, in fact one of the reasons stated in support of the foreseeable continuity of it, is the advantage of a favorable age structure of its billion-plus population—referred as demographic dividends (The Economist 2010c). The extent of benefits to be accrued on this account would depend greatly on the educational accomplishments of the population. Comparing the demographic specifics, Chandrashekar et al. (2006: 5055) state that "(i)n 2020, the average Indian will be only 29 years old, compared with the average age of 37 years in China and the US, 45 in west Europe and 48 in Japan"—but go on to conclude that this advantage cannot be reaped fully with the existing deficits in education. The demographic argument notwithstanding, there is substantial literature to prove that economic growth and educational attainments follow close trajectories and show a strong positive correlation (see Tilak 1989 for a literature review and discussion on the subject; also Sadeghi 1995). Supplementing the economic reforms, the 1990s in India has been a decade of notable improvements in primary education and literacy rates as revealed through the 2001 census (see Ramachandran and Saihjee 2002). This would need to be extended further to secondary and more importantly, to higher levels of education, where greater economic returns get accrued (see Patrinos 2008). How would India with its historical underperformance across the higher rungs of education manage its economic growth in the future? This is one of the crucial linkages to be addressed, posing its corresponding challenges on the structure and output of educational delivery systems in the coming years.

Probing deeper, even if the higher educational delivery systems were to be expanded, their effectiveness would remain muted without greater gender inclusiveness. Gender inequality in education impacts growth adversely, hindering economic growth in South Asia over the years (see Klasen 1999). Within the immediate global comparisons of economic performance, notably the BRIC cluster (Wilson and Purushothaman 2003)—comprising Brazil, Russia, India and China—India appears to be a laggard in gender gap rankings of educational attainment (see Lopez-Claros and Zahidi 2005). In which case, how would India manage to curtail the prevailing gender gaps in its education delivery systems going forward?

Voices of concern on the status of girls' education in India have periodically figured in both public policy statements (see Government of India 1959, 1975, 1988, 2008) as well as academic discourses (Mazumdar 1975; Kamat 1976; Krishnaraj 1977; Ahmad 1979; Chanana 1993, 2000, 2007). By providing the analytical frameworks of investigation, these

studies form important chronological junctures for placing current limitations to girls' education in the context of their past. In their appraisal of gender bias prevalent in Indian education, they identify its roots in deeply entrenched socio-economic-cultural conditioners (poverty, lack of economic resources, traditional roles of girls as helping hands at home) that have impeded greater, more meaningful participation of girls in education. Khan (1993: 187) mentions of studies to the effect that "domestic work, marriage, betrothal and parental indifference account for 55% of the total wastage—caused by repeating grades and dropping out—in girls' education at the upper primary level". Overcoming this attitudinal stereotyping has been an arduous task in the Indian context. But even as we acknowledge that these strands of analyses cannot be undermined in any way, we argue in the course of this paper that there are equally important systemic or structural traits responsible for shaping girls' education in India, particularly at the tertiary level. These constraints are not gender specific but there is a tendency for girls to be particularly susceptible to them.

Post independence, increased female participation in Indian higher education has coincided with massive 'systemic expansion' of delivery systems (Government of India 2007). The participation of girls is therefore a function of this expanded availability. On the flipside, systemic skews and limitations, both qualitative and quantitative, are bound to influence how girls get incorporated into the system. This would hold true not just in terms of how many of them access it but also determine their choices across disciplines/institutions. In this paper, we follow logic similar to Charles and Bradley (2002) of using vertical and horizontal segregations viz. years of education and fields of study. We engage with female participation in the eligibility thresholds of Class X (end of school) and XII (end of junior college), before proceeding to the higher rungs viz. bachelors degrees in various faculties where choices begin to manifest. If girls' inclusiveness is to be accounted for, it would have to manifest in (1) greater 'geographic spread' of female numbers, indicative of cross-regional dispersion of equity and (2) more even 'faculty wise distribution', suggestive of girls availing broadening institutional choices within education. Using these closely inter-twined tools of enquiry, this paper scans across the geographic layers of delivery systems to assess girls' participation in higher education in post-independence India.

Across different states of India, enormous differences have prevailed in human development indicators (see Indrayan et al. 1999). Their initial conditions have differed and so have the subsequent trajectories they have traversed, mirroring in their respective performances of girls' education. We argue that these early differences have been further accentuated by distorted systemic skews in institutional and faculty-wise availability of education in the country. The skews are not merely inter-state characteristics. Even within states, the spread of higher education is not even, giving rise to urban/semi-urban versus rural divides in access (see Sahni and Kale 2004). Samal (2003) provides a stark case of the state of Orissa, where there are more than 50 government colleges in urban centers and not a single one in rural areas. But intra-state, there are additional systemic characteristics that qualify (or limit) the nature of access to education viz. (3) medium of instruction and (4) caste and gender-based reservations. This order of factors is important since medium is already decided at the primary and secondary levels of schooling, while reservations come into play only after Class X.

Post linguistic division of states in India (as per the States Reorganization Act, 1956), the binary of English versus the regional/vernacular language in the delivery systems of education has come to stay (Articles 345–347 of the Constitution of India provides for the choice of language/s to be adopted in a state). A link with the socio-cultural backgrounds

or conditioners can be traced to the choice of medium of instruction as well (see Faust and Nagar 2001; Dewey 2006 offers a specific case study in this respect); with English being considered an elitist language that spawns a systemic divide with the majority who get educated in the vernacular. The choice of medium, as Rao (2008) argues, is formed largely by the cultural capital of the children, with English medium education being the exclusive privilege of one's caste and class situation. How this cultural capital translates in gender terms needs further investigation. Similarly, there are state-specific schedules of castes/communities classified as socially disadvantaged, making them eligible for affirmative action in the form of seat reservations for entry in academic institutions (see Weisskopf 2004 for an elaboration of affirmative action in Indian education, also Basant and Sen 2010). In India, policy interventions towards inclusiveness have been prioritized in terms of improving participation of the socially disadvantaged. Gender reservations have been accommodated only as a sub-layer of the caste-based reservations. For example, a seat reserved for a girl from a backward caste would get transferred to a boy from a backward caste rather than to another girl from the open-merit category (the implications of this are illustrated later).

How do girls maneuver through this complex systemic maze comprising of factors a, b, c and d put together? To what extent are their struggles similar or different to what boys face? In our endeavor to seek answers to these hurdles, we have structured the paper as follows. Section "Scanning for inclusiveness at the national level" focuses on factors (1) and (2)—providing national and state-level comparisons of the absolute and comparative numbers of female participation in Indian higher education. In section "Scanning for inclusiveness at the state level (Maharashtra)", we narrow the focus to Maharashtra, a leading state in girls' education in India. Here, in addition to the above factors, we also discuss the more state-specific issues of (3) and (4).

In this paper, we make use of secondary data at three different geographic layers viz. national, state and district (or divisional) levels. At the very outset, there is a need to clarify some of their limitations that hinder more effective comparisons, particularly related to dis-aggregation and commensurability. The national level data provided by the University Grants Commission (UGC) is more recent compared with the data made available by the Directorate of Education, State of Maharashtra. However, the former enables only inter-state comparisons. For looking any further into gender-wise dis-aggregation within a state on several parameters including district-wise, faculty-wise distribution and medium of instruction, one has to rely on state databases. In other words, as one moves towards the lower geographic scales, there emerges a problem of whether to opt for more recent but not disaggregated data—or opt for disaggregation using an older dataset. We have opted for the latter at the state level, resulting from which section "Scanning for inclusiveness at the national level" offer more recent data (up to 2005) than section "Scanning for inclusiveness at the state level (Maharashtra)" (up to 2001) with up-gradations incorporated wherever possible.

Scanning for inclusiveness at the national level

For a starter, imagine classrooms filled with boys. Metaphorically, that was the status of girl's education in India in colonial times, even at the turn of independence. For girls, the tryst with education began from this starting point of non-inclusiveness. Naturally, the nascent understanding of their progress revolved largely around increasing participation, in facilitating their entry in the system in the first place. In this phase, their evaluation

couldn't have been in terms of how they were faring vis-à-vis boys. A large (almost entire) pool in the relevant age-group remained uneducated and the objectives were to draw and retain them within the folds of education. Increase in absolute numbers was sufficient indicator of girls' inclusiveness.

As participation increased, absolute numbers were superseded by relative numbers as the criteria of evaluation. The calibration of inclusiveness then progressed to assessing equity within the system, as measured in gender ratios. Thus, 'from participation meaning inclusiveness', the objectives got re-oriented along the way to evaluating 'how inclusive was their participation'. The entry of boys preceded girls in the delivery systems. Therefore, they became the natural benchmarks for measuring girls' progress at all levels of education—orienting girls' education into a 'catching up' exercise of sorts.

Even as the criteria of evaluation have been evolving, the hierarchies inherent to girls' education have been altering qualitatively. The delivery systems inherited by independent India had their own skews of access but the systemic versus extra-systemic contrast i.e. those within the system versus those left out was the more glaring of divides. Over time, with the prolific growth in institutions and capacities, intra-systemic skews have become more pronounced. In 1949–1950, there were 40,866 girls entering the hallowed precincts of higher education in India (Government of India 1962). As part of an equation of only "14 girls per 100 boys" (see Kamat 1976: 5) at that time, they were a privileged lot indeed. Their very entry into education was sufficient to differentiate them from the rest—a vastly enormous pool of girls left out. We can already spot the germination of a straightforward, systemic hierarchy based on participation. Over the past 60 years, Indian higher education has grown to become one of the largest in the world. In 2003, there were 46,41,576 girl enrolments in higher education (Government of India 2007: 12), a quantum leap from the earlier figures. The equity ratios too have come to a more respectable 65 girls per 100 boys (Government of India 2007)—not quite parity yet but slowly inching towards it. But alongside these achievements, more complex hierarchies of access have replaced the previous ones. While the earlier systemic divide of access continues to remain poignant, certainly more severe in some regions as against others—the rising participation of girls has brought in its wake newer, intra-systemic hierarchies. When there were 14 girls per 100 boys, the question was—why were girls not accessing the system. Now, when there are 65 girls, the questions are more about the topography of their access, how and where are they fitting into the system.

There are a couple of issues to be contended with here, the answers to which would qualify the extent of progress achieved in girls' education and what the future portends. Firstly, is the drive towards equity sustainable over time? This issue would take a more serious turn in the years to come. A tendency towards gender equity is clearly discernible presently but it needs to be emphasized that it is still happening at fairly low scales. In the face of high drop out rates (Government of India 2007: XXI), the proportions of students tapping any higher education is still quite miniscule—8.17% for girls and 11.58% for boys from the relevant age group of 18–24 years as per the gross enrolment ratios (ibid: 61). One key challenge would be to continue this equity at higher scales of access. There is a structural problem to be overcome for that to happen. Across the scales of urbanities, the distribution of boys accessing education tends to be more homogenous than in case of girls. For the current status of equity to improve or sustain in the future, girls' participation would have to penetrate in pockets where there has traditionally been greater resistance to it. They could comprise of certain states (like Bihar, Rajasthan) where female enrolment ratios are lower and moving down the geographic ladder, non-urban areas where female participation has far lesser saturations. If national gross enrolment ratios (GER) are any indicator, "(T)he rural urban divide continues as urban GER is about three times higher (22.56) than the rural

(7.51). For women it is four times higher (22.56 for urban as compared to 5.67 for rural) whereas for urban men it is about twice and half higher than the rural men" (Raju 2008: 86). In the non-urban zones, the possibility of boys' participation increasing faster than girls cannot be ignored, thereby affecting macro-level equity ratio formations.

Secondly, even as the equity ratios are being nudged upwards, in which streams of education are girls participating? This is a question of more immediate concern. While national aggregates do show a tendency towards improved participation and equity of girls, this does not translate into evenly spread numbers across regions/states. But more importantly, even in places where female participation is on the higher side, the distribution of boys across different faculties of education tends to be more homogenous than in case of girls. In other words, boys remain better represented across various disciplines. Therefore, equity at an aggregate level doesn't adequately reveal how girls are confined/concentrated in selective disciplines or at-least that they remain poorly represented in some of them. This is in line with UNESCO (1995) findings of how stream-concentrations of girls and boys starts getting formed at the secondary level and gets more conspicuous at the tertiary stages.

The state of the states in absolute numbers

Beyond the national numbers, the progress reports of the states draw an impressive picture in some basic macro-indicators. All states now possess a larger pool of girls clearing Class XII, thereby eligible to enter higher education. There is also a greater conversion of this eligibility into actual participation leading to (1) increasing absolute numbers and (2) more rationalized percentage contributions of different states in the national pool of female enrolments. Earlier, a lumpy distribution of girls plagued the system, with states like Kerala, Maharashtra, West Bengal and Punjab showing greater concentration (see Table 1, figures for 1958–1959). Other states, largely non-inclusive earlier, have increased their shares leading to a rationalization of national numbers.

At the turn of independence, girls' education at the state-level was a function of two factors. As a primary condition, greater acceptability had to prevail in a region/geography. This edifice was the culmination of grass-root efforts of social reformers in the states (see Ahmed 1989), without which the entry of girls would have been arduous. But mere reforms wouldn't have sufficed. It had to be supplemented with greater institutional presence to accommodate the girls being drawn into primary education. These initial background conditions varied enormously across states, forming a definite hierarchy of its own—depending on the sequencing of social reforms striking root and the waves of institutional expansion. Over time, greater acceptability has prevailed across states and no longer remains the critical pre-requisite. It is institutional presence that has come to determine the nature and extent of girls' participation.

The contrast between two states, Maharashtra and West Bengal explains this better. In 1958–1959, they cornered a lion's share of girls entering higher education (15 and 20 percent respectively in national female enrolments). Over time, Maharashtra has witnessed manifold expansion in institutional capacities; its contribution in the national pool of female enrolments has come down but only marginally. In contrast, West Bengal hasn't complemented its 'early momentum' by augmenting institutional numbers. Its share has declined sharply, now substituted by other states that have expanded their delivery systems.

While the rationalization of girls' numbers across states has led to the dismantling of one phase of pre-existing hierarchies, new intra-systemic hierarchies of geography and faculties have come to replace them. In 1950s, Maharashtra and the four Southern states

Table 1 Growth in higher educational institutions and female numbers across states

State	Number of Institutions of higher education		Total number of girl students		Contribution to national female enrolments (%)	
	1958–1959	2004–2005	1958–1959	2004–2005	1958–1959	2004–2005
Andhra Pradesh	110	1,869	5,686	3,97,103	3.87	8.55
Arunachal Pradesh	–	16	–	2,519		0.054
Assam	40	395	3,146	88,732	2.14	1.91
Bihar	113	881	4,538	1,35,423	3.09	2.91
Chattisgarh	–	255	–	60,028	–	1.29
Goa	–	8	–	12,569	–	0.27
Gujarat	81	251	5,249	2,74,198	3.58	5.9
Haryana	–	323		1,13,939		2.45
Himachal Pradesh	5	155	141	48,813	0.096	1.05
Jammu and Kashmir	26	230	2,603	36,327	1.77	0.78
Jharkhand	–	156	–	76,559	–	1.64
Karnataka	124	1,532	7,236	3,13,202	4.93	6.74
Kerala	80	405	10,763	1,85,170	7.34	3.96
Madhya Pradesh	142	1,099	7,452	2,37,364	5.08	5.11
Maharashtra	221	1,882	22,364	5,77,892	15.25	12.4
Manipur	3	66	167	17,422	0.113	0.37
Meghalaya	–	57	–	14,284	–	0.30
Mizoram	–	30	–	4,325	–	0.09
Nagaland	–	57	–	6,139	–	0.13
Orissa	44	897	1,268	73,332	0.86	1.57
Punjab	117	373	12,013	1,43,422	8.19	3.08
Rajasthan	96	871	5,953	1,31,986	4.06	2.84
Sikkim	–	9	–	2,711	–	0.05
Tamil Nadu	117	1,033	9056	3,79,493	6.17	8.17
Tripura	5	23	276	9,491	–	0.20
Uttar Pradesh	166	1,985	12,237	5,81,460	8.34	12.52
Uttaranchal	–	139	–	62,447	–	1.34
West Bengal	178	583	30,468	2,76,298	20.78	5.95
Delhi	36	178	4,916	3,42,469	3.35	7.37
Pondicherry	–	34		10,326	——	0.22
India		16,552	1,46,575	46,41,576		

Constructed from Government of India 1962 and Government of India 2007

In certain states like Tamil Nadu, Karnataka, figures for 1958–1959 are for the preceding Madras and Mysore states. Also, the states of Uttaranchal, Chhatisgarh and Jharkhand have been newly carved out from Uttar Pradesh, Madhya Pradesh and Bihar respectively

had a substantial share of higher education institutions and this has only increased further. The structural north–south divide in institutional concentrations repeats itself in female participation as well. In the 'south',[1] the ascendancy in girls' participation has coincided with rising institution numbers. In the 'north' however, girl enrolments have increased

[1] By 'south', we infer Maharashtra and the four Southern states.

without the institutions increasing commensurately. This amounts to more numbers getting accommodated in a limited, prevailing framework. The geographical imbalances surface more flagrantly in stream-wise distribution of institutions across states (see Table 2). In the 'south', there is a marked increase in institutions of professional education (engineering, medicine) largely under private initiatives. Consequently, the 'south' which accounts for 32% of the population now has 46% of general education institutions and almost 60% in professional education (see Sahni and Sumita 2004). In the rest of the country, institutional expansion has continued with a conspicuous bias towards general education (arts, science and commerce). Symptomatic of this divide, the 'south' today accounts for a lesser share of girls in general education but corners an overwhelmingly large proportion in professional education in the contributions to national girl enrolments.

The larger query that emerges is of engendering of education in sync with increase in scales (through institutional expansions). The south, which has been witness to institutional expansion, has also seen a rise in girls' numbers in absolute terms—leading to a formidable skew in their shares of national enrolments (69%), particularly in engineering (see Table 2). However, it is not to be confused with gender parity, for the number of boys accessing the professional courses is substantially higher.

Such structural disparities in institutional presence impact female participation at several levels. The systemic lack of stream-diversity beyond 'south' ends up channeling female participation into general education in the rest of the country. As more girls clear Class-XII, they would continue to feed into institutions of general education en masse, particularly into the arts stream. This is bound to affect the range of opportunities for them, limiting their choices and inhibiting their capacities as human resources. If a girl aspires for the professional streams, she would have to (1) compete for limited, locally available seats or (2) migrate to institution abundant zones in 'south'. While the first option has competitive hurdles, the second option is equally hindered by the resistance to female migration. Only 1.3% female migrants cited education as the reason for migration, significantly lower than for boys (Census of India 2001). It can therefore be corroborated that skewed geographic distribution of educational institutions puts girls at a distinct disadvantage compared with boys.

The state of the states in gender ratios

Within the aegis of skewed institutional availability comes the issue of gender equity. Tables 3 and 4 show the evolving status of girl-boys ratios for different streams across states. In 1958–1959, girls were consistently a tiny fraction of boys' numbers across all states (see Table 3). [2] Most of them mustered only up to 20 girls per 100 boys at the level of matriculation. Even in progressive states, the ratio did not exceed beyond 40 (except Kerala). A good measure of improvement has been achieved ever since. All states now have improved equity ratios in Class-X and XII (see Table 4). Therefore, at-least the eligibility base has become more engendered. This is a critical achievement and translating this into better equity at subsequent rungs of education is the challenge going forward.

Once again, some states have progressed decisively more than others. While gender ratios were clustered in the lower ranges earlier, we now have a hierarchy that showcases divergence of progress. For Class X, at the lowest rung are Bihar, Rajasthan, Madhya

[2] Tables 3 and 4 segregate states on the basis of their girl boy ratios (number of girls per 100 boys) at different stages/courses of higher education. The intervals marked in bold for the different stages are the national level averages of girls per 100 boys.

Table 2 Stream-wise concentrations of female enrolments among select states in graduate streams (2004–2005)

States	Arts, Science and Commerce		Engineering		Medicine	
	Institutions	No. of girls (boys)	Institutions	No. of girls (boys)	Institutions	No. of girls (boys)
Andhra Pradesh	1,340	2,03,039 (3,66,925)	261	59,677 (1,35,116)	53	7,563 (8,108)
Karnataka	930	1,39,231 (1,53,403)	120	7,755 (25,108)	172	19,472 (36,767)
Kerala	186	1,03,806 (54,938)	66	4,172 (16,690)	40	4,745 (3,516)
Maharashtra	1,208	3,40,963 (4,67,564)	177	28,059 (1,05,085)	116	20,422 (21,521)
Tamil Nadu	445	2,07,390 (1,80,998)	222	14,695 (34,771)	97	4,735 (42,950)
Total (above states)—a	4,109	9,94,429 (12,23,828)	846	1,14,358 (3,16,770)	478	56,837 (1,12,862)
All India total—b	10,377	27,71,771 (39,56,258)	1,302	1,65,402 (5,31,207)	817	89,052 (1,67,696)
Percentage (a/b)	39.53	35.87 (30.93)	64.97	69.13 (59.63)	58.5	63.93% (67.30%)

Calculated from Government of India 2007

Table 3 Categorization of states according to girls-boys ratios in different streams (1958–1959)

No. of girls per 100 boys	Number of states falling in a particular interval of gender ratios across courses				
	Matriculation	BA-BSc	BCom	Engineering	Medicine
0–10	4	3	19 (all states)	19 (all states)	5
10–20	5	10			7
20–30	4	2			4
30–40	1	4			2
40–50					
50–60					
60–70					
70–80	1				
80 and above					1

Except for matriculation, data for the other streams of education is for 19 states

Table 4 Categorization of states according to girls-boys ratios in different streams (2004–2005)

No. of girls per 100 boys	Number of states falling in a particular interval of gender ratios across courses						
	10th	12th	BA	BSc	BCom	Engineering	Medicine
0–10					1	5	3
10–20				1	1	9	2
20–30				2	3	10	2
30–40		2	1	1	3	**3**	2
40–50	2	1	1	2	3	2	2
50–60	2	2	3	5	**2**	1	**6**
60–70	3	**6**	4	**6**	6		
70–80	**6**	3	**2**	2	2		4
80–90	8	8	6	3	4		1
90–100	5	5	3	2	2		4
Above 100	4	4	10	6	3		4

Compiled from Government of India 1962 and Government of India 2007. The total number of states in 1958–1959 and 2004–2005 are 19 and 30 respectively

The numbers in bold indicate the ranges of number of girls per 100 boys for national aggregates

Pradesh (MP) and Uttar Pradesh (UP)—populous states lying below the national average of 60–70 girls per 100 boys. The middle rung comprises of Jharkhand, Chhatisgarh, Uttaranchal (newly formed states) along with Gujarat, Haryana, Orissa and West Bengal. Maharashtra along with the southern and northeastern states registers higher equity, closer to parity levels. These states consistently rank above the national averages of equity across further rungs of education as well. The 'north–south' divide is equally characteristic of comparative numbers too.

For contextualizing this divide, we need to understand the stages of progress traversed by modern education in India. Starting with mass illiteracy, the next stage comprised increasing and retaining numbers at every rung of education. Such a sequence commenced earlier for boys. As a result of the gender time-lag, various combinations of girl-boy

Table 5 Girl-boy ratios in different streams in the South (2004–2005)

States	10th	12th	BA	BSc	BCom	Engineering	Medicine
Andhra Pradesh	83	67	47	53	67	44	93
Goa	100	104	247	175	143	53	212
Karnataka	89	89	84	117	92	30	52
Kerala	104	113	198	217	117	24	135
Maharashtra	83	73	77	73	65	26	58
Tamil Nadu	92	99	121	119	100	42	11
Pondicherry	99	110	204	190	176	34	72

Compiled from Government of India 2007

participation emerged to coexist in the system; progressing through phases of literate boys and illiterate girls → higher educated boys and literate girls → boys diversified across streams of higher education and girls concentrated in some streams. These are generic combinations and every state could simultaneously exhibit more than one combination at any given point of time. There could be more progressive pockets with advanced girl-boy participation alongside backward regions languishing in preliminary stages. The level of equity achieved in a state has to be understood in the background of these multiple layers of hierarchies.

As can be noted from Table 3, most states fared quite poorly in gender terms in the late 1950s. From this regressive situation, all states have progressed but to varying extents. States like Bihar, Rajasthan, Madhya Pradesh (MP) and Uttar Pradesh (UP) began with fairly low female literacy. Of these, Bihar and Rajasthan have achieved better gender equity at standard X but no further. Comparatively, MP and UP have extended better female participation into higher education. MP has progressed further to achieve high girl-boy ratios across all streams of general education, while UP has managed this only in arts. Persistently, higher equity at class XII gets extended only to the arts faculty at graduation across several states. The southern states (Kerala, Maharashtra, Madras, Mysore) already had higher female literacy at independence. Hence, their improvement began from a better base. Progressing to parity at schools, they have extended equity in higher education as well (see Table 5). They not only have diversified female participation in general education, but also fare remarkably better in professional streams. Particularly in engineering, Andhra Pradesh alone accounts for roughly one-third of girls in engineering in the country (see Table 2). A relatively better equity in this state boosts the national average, concealing the non-inclusiveness of girls in other states in engineering.

In South, the more baffling of developments in gender equity is the reverse phenomenon of 'classrooms filled with girls'. Across states here, girls' enrolments exceed boys substantially in general education (see Table 5). Can such 'excess of equity' ratios be considered genuine choices exercised by girls? Kerala for instance has more girls than boys across general education. In arts and science, their numbers are double that of boys but their ratios turn paltry in engineering. Though equity is a methodologically important tool of assessment, it has been gradually outgrown here. Having come to view girls' education from the comparative lens of boys; we are at a loss to assess such excesses for want of appropriate benchmarks. This would provide another dimension to the argument in Subrahmanian (2005: 397) of how 'gender parity' oriented indicators are static in nature,

and "limited indicators of change in education, as they do not by themselves tell us very much about processes of education".

Hidden in the 'excess of equity' ratios is the more serious issue of non-inclusiveness for girls in newer courses introduced in the system. Female enrolments have always exhibited an inclination towards more established courses. In 1950s, female numbers were concentrated in arts, education and medicine. Commerce, a relatively new branch of graduation at that time had much lower female enrolments (Government of India 1962). While commerce has progressively matured as an option, the more recent institutional expansions into engineering courses still do not form part of their 'normal' choices. There appears to be higher inclination in letting boys avail newer streams and courses and reluctance in exposing girls to the possible risks associated with them (as seen in section "Scanning for inclusiveness at the state level (Maharashtra)" for female applications to engineering courses in Maharashtra). The cost differentials across general and professional courses remain an important factor in creating this chasm. The increasing normalization of commerce as a choice could be explained from its low fee structures, as part of general education offerings. While official yearly fees for general education (BA, BCom, BSc) could typically fall below Rs. 3,000 (even after accounting for institutional variations and aided/unaided institutions), fees for professional courses (engineering and medicine) could be several multiples higher.[3] This high-cost factor acts as a deterrent in allowing girls to pursue professional courses (see Chanana 2000).

Therefore, while the bias against educating girls may have been tackled to an extent, the bias against investing in them tacitly continues. The impact of this trend extends further into employment markets. The new courses offered have their own forward linkages in terms of employment avenues they open up, as has been the case with different branches of engineering, pharmacy, architecture etc. Low female entry into these courses isolates them from the job market while the predominantly general education they acquire makes them eligible only for a limited set of job opportunities. This phenomenon of gendered segregation of faculties is not restricted to India. Saith and Harriss-White (1998: 27) observe that it is common to developing and industrialized countries, going on to cite from sources that "girls are actually directed towards subjects like domestic science, handicrafts and biology, while boys study vocational subjects or chemistry and mathematics". For girls, such segregations are a prelude to scanty post-education employment possibilities. To cite Gerber and Schaefer (2004: 32), "(I)f all college degrees are not equal in terms of the advantages they provide, group differences in the type of college degree received can produce group-based inequalities in the labor market even without group-based differences in overall access to a college education". Although female participation shows a rising trend overall in India, it is not quite in sync with either the faculty expansions or their subsequent employment markets {substantiating the arguments in (Bebbington 2002) for women in science and technical streams}. In other words, the gender bias against girls, which earlier prevented the entry of girls in education, has now shifted to the exit levels. Even the progressive south doesn't fully counter this lag (see Kodoth and Eapen 2005 for the case of Kerala); the state of other states being more appalling.

[3] As a select case, refer to (http://www.unipune.ernet.in/stud_info/fee-structure/fee-structure.html) for general education fees in University of Pune (in the state of Maharashtra) which can be contrasted with the fee schedules for engineering colleges in the state (see Directorate of Technical Education 2007b).

Table 6 Post independence stream-wise increase of female education in Maharashtra

Years		Arts	Science	Commerce	Engineering	Medicine
1960	No. of institutions	64	–	10	5	16
	Girls	17,424	–	430	11	1,143
	Girls per 100 boys	31	–	4	<1	29
2004–2005	No. of institutions	1208			177	116
	Girls	1,92,899	44,861	1,03,203	28,059	20,422
	Girls per 100 boys	77	73	65	26	94

Compiled from Government of India 1962 and Directorate of Education 2000

For 1960, there is no segregation of arts and science institutions and enrolments since there were no separate science colleges in the state at that time. For 2004–2005, the data compiled by UGC provides only an aggregated number of arts, science and commerce institutions, which could be offering either a single faculty or a combination of them. The engineering institutional and student numbers are inclusive of architecture. It needs to be noted that as per Directorate of Technical Education (2006b), there were 37 architecture colleges in Maharashtra compared with 163 engineering colleges. However, the intake capacity of architecture was only 1,777 students, a small fraction of engineering where the capacity was of 51,282 students

Scanning for inclusiveness at the state level (Maharashtra)

In this section, the geographic lens shifts from national and inter-state contexts to Maharashtra, among the leading states for girls' education in absolute numbers. The emphasis is on scrutinizing intra-state spread of female numbers and faculty-wise segregations. Additionally, we address certain characteristics viz. medium of instruction and directives of caste and gender reservations that manifest more fully at the state level. These parameters, when assessed for Maharashtra, can give a fair indication of the challenges faced by other states as well; what the more progressive states are grappling with currently, and what could be in store for the less progressive ones in the future.

In 1960, Maharashtra was already home to substantial numbers of institutions and girl students. Four decades later, the states' progress could be termed more meaningful across several fronts; institutional numbers, girls within the system, girls across courses, girls compared with boys across courses (see Table 6).

Qualifying the progress further, girls' participation is now more dispersed across the divisions/districts of the state. It was not always the case. Instead of a homogeneous spread, the numbers were clustered in select urban pockets that could be deemed the 'established centers' for girls' education in the state. In 1960, Bombay alone accounted for a phenomenal 1,03,112 girls—52% of the total girls in secondary school (Government of India 1962). Naturally, higher education numbers too were highly concentrated. These centers have continued to grow but their year-on-year addition of girls has been gradually tapering. In contrast, participation has been expanding more rapidly in the hinterland areas- the 'emerging centers' (see Table 7). Over the past three decades, while participation in Mumbai (Bombay earlier) has doubled, 'emerging centers' like Nanded have grown 12-fold. Putting it succinctly, the expanded girls' numbers in the state are rooted in this hinterland spread of education.

Between the established and emerging centers, a trend towards rationalization of girls' numbers can be observed at the class X level (see Table 7). This convergence notwithstanding, their demarcation continues on more subtle levels. Earlier, the 'established centers' exhibited higher concentration of schools. Today, they have progressed to a higher

Table 7 Spread of institutions and female numbers across divisions for Class X

Districts	1971		2001	
	Number of high schools	Girl enrolments	Number of high schools	Girl enrolments
Established centers				
Mumbai	725	2,13,771	1,263	4,57,590
Pune	336	53,508	1,059	3,52,360
Nagpur	303	54,279	699	2,00,440
Emerging centers				
Nasik	234	23,737	721	2,12,240
Aurangabad	204	18,742	437	1,10,900
Nanded	157	8,353	423	1,07,660
Amravati	208	25,199	530	1,26,100
Yavatmal	155	11,124	454	84,450

Compiled from Directorate of Education, 2001 and Government of Maharashtra 2001–2002

Table 8 Medium-wise numbers of secondary schools (including higher secondary) in 1998–1999

Divisions	No. of schools	Medium-wise institutions and enrolment			
		Marathi	No. of girls (boys)	English	No. of girls (boys)
Greater Mumbai	1,210	177	1,68,999 (2,41,009)	570	1,61,882 (1,92,366)
Nashik	2,422	1,941	5,57,571 (7,11,708)	236	67,110 (82,740)
Pune	2,386	2,048	5,49,265 (7,14,809)	221	59,041 (77,082)
Kolhapur	2,031	1,918	4,05,645 (5,20,240)	44	7,423 (9,517)
Aurangabad	2,458	2,229	4,45,889 (6,90,578)	53	5,706 (9,888)
Amravati	1,647	1,485	3,29,439 (4,29,051)	20	3,501 (4,436)
Nagpur	1,856	1,617	4,16,956 (4,54,617)	83	14,145 (20,173)
Total	14,010	11,415	28,73,764 (37,61,972)	1,227	3,18,808 (3,96,202)

Compiled from Directorate of Education 2000: 86–93

concentration of 'English medium' schools. In 1998–1999, the divisions of Greater Mumbai and Pune had 570 and 221 English schools respectively—64% of the total in Maharashtra (see Table 8). While institutions have expanded in the hinterland, they are largely based in the vernacular. This intrinsic differentiation of schooling medium has far-reaching ramifications in further educational journeys of boys and girls alike.

Impact of medium of instruction on access

Post Class X, students arrive at their first tryst with systemic choices, where they are expected to choose between the streams of arts, science and commerce. In Maharashtra, higher education in science is offered only in the English medium whereas arts and commerce have English/vernacular options. This poses a linguistic barrier for accessing science. In divisions (like Kolhapur, Aurangabad and Amravati) where female enrolments in the English medium are paltry, this mirrors in their participation in the science stream as well. The choices then remain between arts and commerce. But arts stream is uniformly spread across the state, while commerce is scarcely available beyond the 'established

Table 9 Stream-wise enrolment percentages across divisions in Class XI–XII (1998–1999)

	Arts		Science		Commerce	
	Boys	Girls	Boys	Girls	Boys	Girls
Greater Mumbai	7.5	25.0	29.3	16.7	61.9	56.5
Nashik	53.3	57.6	26.1	19.6	20.3	22.6
Pune	44.7	50.7	30.5	24.2	22.9	23.6
Kolhapur	50.5	60.4	29.2	22.2	18.8	16.7
Aurangabad	66.2	71.8	23.0	19.6	9.7	7.5
Amravati	63.3	72.4	24.5	19.5	11.2	7.8
Nagpur	60.4	69.5	24.4	19.6	13.4	9.8
All Maharashtra	49.3	55.8	26.8	20.1	22.7	23.8

Calculated from Directorate of Education 2000

centers'. Greater Mumbai and Pune together account for 52% of commerce divisions in the state (see Table 9). Therefore, incompatible medium of instruction and institutional (un) availability of streams combine to make 'arts' the default choice. It's not a preference but a systemic compulsion into which students get nudged—girls in particular.

Once the stream-segregation has been formed in Class XI–XII, the demand for different graduate disciplines is already pre-determined; the question of who will study what having already been decided. Girls who have opted for arts/commerce at Class XII would necessarily have to pursue BA or BCom respectively at graduation. In science, where professional choices come into offer post Class XII {after Higher Secondary Certificate (HSC)}, girls' enrolments are much lower compared to boys. So the basic eligibility to pursue professional options like engineering, architecture, medicine and pharmacy is already lost to them. In other words, when we consider the contracted participation of girls in streams like engineering or medicine (compared with boys), it is only a later manifestation of a skew that has already got formed at the earlier stages viz. poor enrolment in the science stream post Class X.

Impact of location, caste and gender based reservations on access

For girls (and boys) opting for science at Class XII, entry to professional courses is contingent to maneuvering across a complex three-tier system of reservations viz. location, caste and gender-based quotas. The first tier of intra-state reservations is location-driven, differentiated into "home university" versus "other university" candidates (Directorate of Technical Education 2007a). Depending upon the place/division of completion of Class XII, the 'home university' of a candidate gets determined e.g. an HSC candidate of Pune division would fall under Pune University. A 'home university' candidate is eligible for 70% of the seats available in that university while the 'other university' candidates have to compete among the remaining 30%. Within this framework, caste based reservations come into play segregating the seats into 'open' versus 'reserved'. While 'open' category seats get filled by general merit across all applicants, the 'reserved' seats consider merit only among the 'reserved' candidates belonging to castes notified as socially/economically disadvantaged (Directorate of Technical Education 2007a; Directorate of Medical Education and Research 2008). In Maharashtra, caste based reservations of 50% function in tandem with gender based reservations of 30% that are applicable to all categories

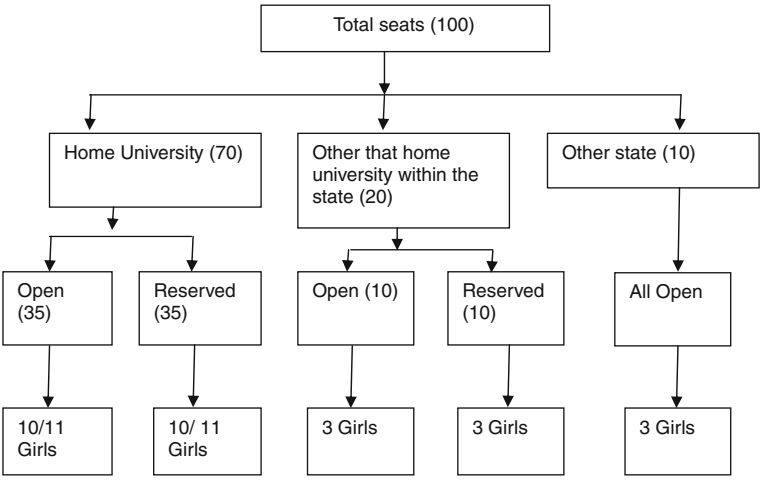

Chart 1 Schematic representation of seat distribution (for 100 seats)

(Directorate of Technical Education 2007a). In other words, in every sub-category (open and reserved), 30% of admitted candidates have to be girls (see Chart 1 for seat distribution).

Some of the effects of this distribution can be traced along the following trajectories:

a. *Skews of gender as seen through application numbers.* The lack of inclusiveness for girls in engineering can be traced at the level of application and admission numbers. As per the summary of allotments to engineering/technology courses for the year 2006, female applications were far lower compared with boys—14,117 girls versus 33,717 boys. Even in terms of conversion of applications into actual admissions, 80% of the boys secured admissions compared with 72% for girls (see Directorate of Technical Education 2006b).
b. *Skews in girls' participation across location-based reservations*. Engineering, architecture and pharmacy institutions are overwhelmingly concentrated in *established centers* like Pune and Mumbai (Directorate of Technical Education 2006b). For example, in 2006–2007, there were 35 engineering colleges under the jurisdiction of Pune University, while there were only 2 colleges under Swami Ramanand Teerth University, Nanded. There is a wide chasm in the quantum of 'seats' available, extending into 'seats available under reservations for girls'. Home university seats are much higher in number in Pune than in Nanded; naturally, *a larger number of girls can enter engineering here by availing the girls' reservation quotas*. Pertinently, while girls' participation is higher in Pune across both open and reserved categories, it is still hovering around the 30% mark—the officially earmarked threshold for girls' reservations. It could be speculated that in the absence of gender reservations, the entry of girls would be more restricted in the established centers too.
c. *Skews in girls' participation across caste-based reservations*: In established centers (Pune, Mumbai), there is greater utilization of ladies quotas resulting in more engendered participation in professional courses. As seen in Table 10, *open category* shows better inclusion of girls compared with the reserved-category. In the latter, a large chunk of the seats meant for girls get transferred and filled by reserved-category boys due to inadequate girl applicants.

Table 10 Distribution of candidates under the centralized-admission-process for engineering admissions, 2006–2007

University	Location based reservations	Total seats occupied			
		Open category		Reserved category	
		Boys	Girls	Boys	Girls
Pune	Home University	1,764	831 (32%)	1,893	743 (28%)
	Other than Home University	774	358 (31%)	859	354 (29%)
Swami Ramanand Teerth, Nanded	Home University	66	30 (31%)	72	20 (21%)
	Other than Home University	46	10 (17%)	43	5 (10%)

Calculated from Directorate of Technical Education 2006a

From the perspective of the government, it has already institutionalized its mechanism for equity by implementing gender reservations in education. But as illustrated above, it may fall short of providing the desired results. Quotas do form a definite channel for female entry into professional courses (where their enrolments have been low so far). But the way girls actually tap this system, as quantified in terms of utilization of quotas, would determine their entry into professional courses rather than the mechanism by itself.

Conclusion

If education is a signifier of development, it should incorporate a gender perspective to it. For just as there may be growth not translating into development; there can be educational growth not amounting to much female inclusiveness. Reviewing the journey of girls' education in India, it is undeniable that a long distance has been covered from the state of non-inclusiveness that prevailed at the time of independence. But the extent of inclusiveness remains a matter of debate.

The progress achieved so far has also spawned its own hierarchies, which do not get reflected adequately in the national level indicators. As we scale down to states, the first set of skews begins to surface in the form of inter-state disparities of access and uneven faculty-wise distributions. Moving to the next level of geographic dis-aggregation, further skews are revealed based on availability of medium of instruction; as also the guidelines of gender based affirmative action meant for improving girls' participation that ironically end up creating their own distortions. Through a study of these multi-layered hurdles, this paper brings forth the equally important systemic impediments that have remained less explored compared with attitudinal biases that have plagued girls' participation to higher education in India.

It is in these referential frameworks that issues of retention and completion of girls' education would have to be placed. As argued in Das and Desai (2003), an increase in education hasn't translated into increased work participation for women in India. Another set of limitations, both systemic and attitudinal, begin to surface post education and which need further investigation.

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