

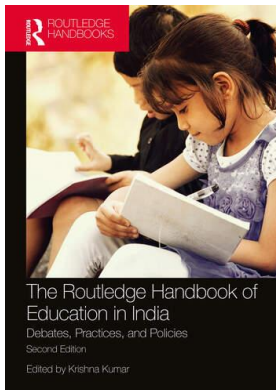
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## **The Routledge Handbook of Education in India Debates, Practices, and Policies**

Krishna Kumar

### **Gendered access and participation**

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# Gendered access and participation

## Unequal subject choices in Indian higher education

*Karuna Chanana*<sup>1</sup>

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### Globalisation, privatisation, and higher education

What is central to globalisation is that the world has become increasingly interdependent and ever closer. Further, the direct nexus between the industry, corporate world, and higher education has brought a transformation in the skills needed for jobs. The most salient development is the rise of the for-profit private sector in higher education, which offers academic programmes and subjects in response to market demand. This explains the rise of private universities and colleges providing self-funded/self-financing education around the world and in India.

Simultaneously, the government or public universities are also increasingly expected to be financially self-sufficient, thereby forcing them to cut their costs and to think of ways and means to raise funds. The 'social compact' (Brennan and Naidoo 2006: 223) between the state and society to provide for education for all (Slaughter and Leslie 1997) has broken down. Slaughter and Leslie term this development as 'academic capitalism' (1997: 8), in which one of the easiest options is to ask students to finance their own education, giving rise to the phenomenon of self-funded education. Additionally, banks provide loans to students. And institutions introduce academic subjects with high market demand. This is a critical development in the nexus between the market demand for higher education and the proliferation of specific masculine subjects, namely, science, technology, engineering, and mathematics (STEM), management, etc., which have gendered outcomes.

While globalisation has increased opportunities and benefits, it also raises serious concerns about cultural identity, social justice, and equity. The higher education system has suffered a precipitous decline in state support, and the self-funded academic programmes have given rise to debt-ridden graduates and contingent faculty. How can women cope with these developments in a society where parents, by and large, are reluctant to invest in the education, especially higher education, of their daughters?

This point is discussed here by looking at the participation of women vis-à-vis their subject choices. This is done within a broader framework flowing from the questions: why do women in comparison to men choose different subjects and specialisations? Does higher education reinforce the difference or gender inequality in subject choices?

## Gender and subject choice

This section looks at the reasons for the predominance of women students in arts and humanities and of men in physical sciences, engineering, and technology. In order to understand this phenomena, one has to understand the ideas of masculinity and femininity vis-à-vis their social construction. It is argued that students make the selection of subjects on the basis of qualities that these subjects are perceived to hold which, in turn, are related to the perceptions about masculinity and femininity (Thomas 1990).

Feminist educational researchers have written about the segregation of girls into arts and humanities and boys into science in schools. They argue that gendered socialisation,<sup>2</sup> which is related to traditional role ideology, impacts the subject choices of girls and their future roles. In fact, the binary opposition of masculinity and femininity is communicated at an early age to girls and boys through socialisation in the family and later on in educational institutions. In other words, similar ideologies underlie the socialisation processes at home and at school and its classroom processes, structure, and organisation (Chanana 2006: 269). The patriarchal imprint on the subject divide and choices, therefore, has received much attention (Acker 1994; Gautam 2015; Thomas 1990).

So far as the subject choices and resultant gendered segregation are concerned, it begins in school, especially at the secondary level. As well as gendered subject choices in school, this phenomenon in higher education has also received the attention of scholars (Acker 1994; Becher 1981; Harding 1986; Hudson 1972; Keller 1983; Thomas 1990). They went further and argued that the clustering of women in specific subjects narrows their occupational choices and leads to their occupational segregation (Deem 1978; Sharpe 1976; Wolpe 1978). Therefore, the subjects, when they are perceived as feminine and masculine, are social constructions in as much as masculinity and femininity are. According to Becher (1981), 'academic subjects are not neutral, they are cultures, each with its own way of perceiving and interpreting the world' (quoted in Thomas 1990: 7).

Harding (1986) says that the subject choices have to be understood in relation to women's place in society. Thomas (1990) goes further and argues that it is a reflection of the balance of power in society. Millett (1983) extends the argument further by saying that this assumption perpetuates male dominance in science. 'To both scientists and their public, scientific thought is male thought, in ways that painting and writing – also performed largely by men – never have been' (Keller 1983: 188).

According to Snow (1961), practitioners of science and of arts inhabit two distinct cultures. Arts and science are more than subject groupings, there are meanings attached to them (quoted in Thomas 1990: 24). More recently it is being argued that the concept of science and arts is a social construction. Further, subject specialisation reflects 'differences from' rather than 'communality with' (Thomas 1990: 24). Becher (1981) also looks at 'cultures' of various disciplines and talks of cultures across disciplines and also within disciplines, e.g. applied and theoretical physics, academic and practitioner lawyers (quoted in Thomas 1990: 24).

The *UNESCO World Atlas of Gender Equality in Education* 2012 underscores the point that 'it is essential to contextualise and ensure a nuanced understanding' of the phenomenon (2012: 77 quoted in David 2014: 31). It goes on to look at the significant differences in the fields of subjects selected by women and men.

### *Masculine/male and feminine/female subjects?*

One of the major concerns in the context of subject choice and gender has been the low representation of girls and women in STEM. Research has been conducted abroad to answer the question: why are there fewer women in STEM?

To answer this question, Kim Thomas looks at the relationship between subject and gender, between academic constructions of arts and science, and students' own sense of and perceptions about masculinity and femininity. According to her, masculinity/femininity and arts/science are both socially constructed oppositions. They make sense in relation to each other. Additionally, evaluation is inherent in this dual construction so that one is rated higher than the other. Further, gender has a cultural meaning because it is based on the differences between women and men. Moreover,

the question of subject choice is not a neutral one and that individual school subjects can be seen to embody certain kinds of values. Further, the very notion that scholarship can be divided into two completely distinct areas, known as arts and science, in itself implies a value judgment. To choose to study arts rather than science is to make a statement about the values one considers important.

*(Thomas 1990: 24)*

She observes that although education is expected to be the site for promoting equality, it also perpetuates inequality of opportunity (Thomas 1990: 2).

In her book she takes physics as an example of science and English as representing arts, and looks at the two cultures of these subjects. Throughout, her emphasis is on the social construction of the differences imputed to the subjects and perceived by the students who make the choices. She refers to the

contrast, both implicit and explicit, that is made between the activity of studying science and the activity of studying the humanities. We discover that the contrast is based upon a particular set of values which science is believed to embody, and which is apparently lacking in humanities ... in describing physics, for example, as a particular kind of subject, students are also saying something about themselves, as people: the qualities ... which are central to their self-image.

*(Thomas 1990: 38)*

She adds that the ideas about subjects and about gender, to a great extent, mutually reinforce each other (1990: 172). Further, students also perceive physics and physical science as objective and value-free, while English is subjective and uncertain (1990: 172–173). She argues further that 'these perceptions far from being simple or accidental, are intimately related to issues of authority and control, and the need to concentrate power in the hands of certain groups of people' (1990: 36).

Thomas goes on to argue that higher education does not actively discriminate against women, but by accepting certain beliefs and values about subjects and their appropriateness for women and men, 'it makes it difficult for women to succeed ... as a liberal social institution, women may be allowed to enter in good numbers in higher education yet by allowing gender divisions to be maintained it promotes "illusory liberalism"' (Thomas 1990: 179).

According to a recent study by Leslie *et al.* (2015), certain qualities perceived to be innate in men, such as intellectual brilliance, and in women, such as hard work, are also ensuring that women do not pursue the professions of scientists and engineers. The practitioners believe that these professions require brilliance, which men have, rather than sheer hard work, which women are good at. Thus, the teachers reinforce this perception that these subjects require raw, innate talent and women are stereotyped as not having that quality, and so remain underrepresented in STEM subjects. In order to understand the gender imbalance in STEM subjects, a nationwide

survey of 1,800 graduate students and university teachers from across 30 academic subjects was undertaken in the USA. It was found that a misconceived idea of brilliance is preventing women from taking subjects like physics, engineering, and mathematics. Instead, they take softer subjects such as humanities, languages, and social sciences. According to the authors, there is no evidence that women and men are intellectually different. The underrepresentation of women is due not to actual differences in intellectual ability but mainly to the perceived differences between women and men, termed by the authors as the ‘field-specific ability beliefs hypothesis’ (Leslie *et al.* 2015: 262).

The American Association of University Women (AAUW n.d.) has also been taking an interest in the problem of girls’ underrepresentation in STEM subjects. Girls grow up thinking and believing they do not belong in science, engineering, mathematics, and technology. According to the AAUW, girls lose interest in the so-called male subjects by the seventh grade and few plan to pursue STEM subjects in college. In the *Huffington Post*, Robbie Couch (2015) writes about a Microsoft video ad which shows teenage girls who are good at science but who also believe that it ‘is a boys’ thing’. As a result, although seven out of ten are interested in pursuing STEM subjects, only two end up pursuing it. Couch also mentions another video ad by Verizon which focused on societal expectations that girls need not pursue science but be pretty. The ad goes on to say that it is time to tell girls that they are ‘pretty brilliant’.

Penner (2015) addresses the question of underrepresentation of women in STEM fields or subjects and specialisations. He argues that one-size-fits-all does not work even though it is true that women are generally underrepresented in STEM subjects. For example, ‘gender representation varies considerably both within STEM and within non-STEM fields’. He gives statistics from the paper of Leslie *et al.* (2015) to substantiate his point. ‘As noted by Leslie *et al.*, in 2011 women received 54 per cent of US Ph.Ds in molecular biology, compared to 18 per cent in physics, 72 per cent in psychology, and 31 per cent in philosophy.’ He explains this difference through Leslie’s argument that there is a correlation between the perceived ability required of a field or subject and the representation of women and men in it. Therefore, while science is generally perceived as a ‘male subject’, some specialisations such as molecular biology are not. This is also true for some subfields within the arts, humanities, and social sciences. Therefore, physics and philosophy are perceived to require innate ability associated with boys and men, while effort, associated with girls and women, is considered important for success in molecular biology and psychology (Penner 2015).

Moreover, those girls and boys who do not choose stereotypical subjects have to face unequal treatment and discrimination because they are atypical (European Students’ Union 2008). Those who do will be in a minority and may also find the classroom environment hostile. They will also enter a workforce which will not be friendly. ‘Stereotypes, gender bias, and the climate of academic departments and workplaces continue to block women’s participation and progress’ (AAUW n.d.).

### *Do schools make a difference in the subject choices?*

The segregation of boys and girls by subject starts at the school level (Deem 1978; Sharpe 1976; Thomas 1990) and continues in colleges and universities. It is not related to the achievement or performance of girls because they are doing well in school board examinations.

The type of schools make a difference. For example, girls who are enrolled in single-sex schools ‘are more engaged and exude more competence and combativeness’ (IFUW 2014, personal communication). In these schools, girls do better even in leadership roles because there is no male presence. In single-sex schools, girls are not discouraged from taking up one or the other subject, provided all are taught. This is discussed below.

There is also a difference between government or state and private schools which demonstrates that girls in state coeducational schools are much less likely than boys to study physics. This disparity is less visible in private schools. Of course, the students in these schools come from better-off homes wherein they may receive support to take unconventional subjects. Nonetheless, some state schools also bucked the trend. For example, the Institute of Physics, UK, undertook a statistical study to explore the links between gender and subject choice in schools (2013). The study was based on the National Pupil Database to look at the progression of students to a number of gendered A-level subjects from coeducational schools. It found that nearly half of core educational schools (49 per cent) that are state-funded are not encouraging girls to go for A-level physics, thereby making the gender imbalance worse. Only a small number (19 per cent) send relatively more girls to A-level physics. Therefore, there is a smaller gender imbalance in progression to other subjects in these schools. It concludes that the whole school environment is critical to the progression of girls to A-level physics.

Commenting on the report of the Institute of Physics, Donald (2013) says that the state schools 'not only don't do enough to counter prevailing gender stereotypes' but also reinforce the existing and prevalent ones, thereby narrowing the children's choice of subjects. Donald says that sexism is prevalent in the matter of subject choice in schools because they fail to 'encourage these in a gender-neutral way'. While boys are less likely to take stereotypically 'girls' subjects such as psychology and English, at A-level girls avoid physics or economics, stereotypically identified as 'for boys'. This is not good news. This is expected when teachers believe that 'boys can't do English' and 'may be girls don't like Physics'. So long as these are the prevalent attitudes of teachers and headteachers, gender stereotyping in subject choices will continue and girls will remain a majority in the English and boys in the physics classes (Donald 2013).

The same report also demonstrates that there are schools that are different and buck the trend. The state schools were compared with the non-state-maintained independent schools. There were 343 schools and these were equally divided into three groups: those that reinforced gender stereotyping, those that were neutral, and those that went against the trend (Donald 2013).

Quoting an earlier report, 'It's Different for Girls' of the Institute of Physics', Donald (2013) says that it 'demonstrated that essentially half of state coeducational schools did not see a single girl progress to A-level physics. By contrast, the likelihood of girls progressing from single-sex schools were two-and-a-half times greater.' This difference in coeducational and single-sex schools shows that school ethos and teacher attitudes and expectations matter. It is not just a matter of girls or boys not liking a particular subject. Schools have a critical role to play in breaking down gender stereotypes and helping girls and boys achieve their full potential by making non-stereotypical choices. Donald concludes by saying that 'we should be able to construct school learning environments whereby teachers do not give out messages, subliminal or otherwise, that there are subjects that aren't for girls, or equally that aren't for boys.'

In India, science is a mandatory subject up to Class X since the 1986 New Education Policy made it compulsory for all students, including girls. Some schools, however, defy the national policy by not teaching science in Class XI and XII in single-sex schools for girls. This way the girls are denied access to science, presuming that it is not for them or that they would not want to study it. A recent study undertaken by the MacArthur Foundation in Rajasthan found very few government girls' schools or single-sex schools for girls, and they did not offer science and mathematics education at the senior secondary or +2 stage. Thus, the biggest problem here is access. First, because there are very few single-sex schools for girls. Second, because most coeducational schools teaching science are located in urban and peri-urban areas. Parents are reluctant to send their daughters to these. Similarly, Muslim girls were not sent to schools located beyond

the boundaries of their Muslim neighbourhood. Therefore, the location of the school limits not only social access of girls to schooling, but also constrains their subject choices. Additionally, senior secondary schools that teach maths and science, although coeducational, are perceived as 'boys' schools' by parents and hence undesirable for their daughters. Thus, the parental perceptions deriving from socio-cultural traditions such as having to get married so they need not study maths and science denies girls access to science. Further, maths and science education may require extra financial input because of private tuition and laboratory expenses (Mukul 2015: 16).

Thus, researchers underline the fact that schools are critical in determining subject choices and that one needs to look at what happens to girls' choices therein because it has a long-term impact on their subject choices in college and university, and the job opportunities thereafter.

### *Why gender differences in subject choices?*

Several factors can explain the gender differences in subject choices.

Most of the time the choice of subjects is determined by outdated gender stereotypes. Thus, traditional gender role ideology leads to gender inequalities in terms of subject preferences.

Socialisation at home and its link with stereotyped feminine social roles; peer group, the school, mass media, and consumerism; parental expectations from daughters' education; daughters' aspirations following from their socialisation – all these factors make for a complex situation.

Following from the above are the perceptions about subjects being masculine or feminine. Also there is the corresponding beliefs that there are gender differences in ability, and hence the inability of girls to pursue certain subjects such as mathematics and physics. These are social constructions.

The type of school also matters: whether it is state-maintained/government-run or private; and whether it is coeducational or single-sex.

Additionally, what matters is the school ethos consisting of classroom processes and teaching styles, the expectations of teachers and the headteacher, which encourage girls to take up arts and humanities while discouraging them from taking up mathematics and physics.

### **Equity and access: the contemporary situation**

Social transformation or change through education presumes some fundamental changes in the political, social, and economic institutions of the society, with a positive impact on the relationships between social groups, genders, classes, or strata, and the distribution of wealth, power, and status. However, doubts have been expressed by leading scholars in the field of education. Brown *et al.* (2011: 3) say that 'the changing economic world evokes at once a sense of admiration and foreboding'. 'Clearly, globalisation has not made, and will not make, the world homogeneous' (McDonnell 2008: 146). Bowles and Gintis express misgivings and scepticism about the impact of globalisation and the equation of knowledge as a commodity when they say: 'Today, no less than during the stormy days when *Schooling in Capitalist America* was written, schools express the conflicts and limitations, as well as the hopes of a heterogeneous and unequal society' (2002: 15).

According to MacKinnon and Brooks (2001), the social movements that represent civil society have been questioning the dominance of technology in higher education. They also question the formulation of research agendas around the new technologies and at the marginalisation of social issues and the social policy research areas in which the disadvantaged groups, the marginalised, the minorities, and women academic staff and students, are generally disproportionately located.

Globalisation is also accompanied by an increased focus on techno sciences that have social and equity implications because the disadvantaged groups, the marginalised, the minorities, and women are less likely to be involved in those areas which are frontrunners in the new economy and the market; they are also likely to be at the lower levels; they may also be unable to adjust to the time-space compression that IT demands or fosters (Harvey 1993).

Moreover, the issue of compatibility between managerialism and equity (Sawer 1989; Yeatman 1990) has also been debated. It is argued that contemporary changes have an impact on pursuing equity issues within the universities because ‘a commitment to equity and a commitment to cost-cutting’ (Bacchi 2001: 120) may not go hand-in-hand. This situation is again a reminder that universities have always contained many contradictions that impact women (Brennan and Naidoo 2006: 226).

These contradictions can also be viewed as multiple roles which resist as well as draw on global and national forces that simultaneously push for change and also play a reproductive role. An important point is that at the systemic level, differentiation among higher education institutions has become common and is reflected in their academic programmes. For example, there are academic and vocational programmes, applied and market-driven professional subjects, and those in humanities, social sciences, and pure sciences. Therefore, institutional and subject differentiation is happening along with the diversification of the students in terms of their social composition. These two processes of institutional differentiation and diversification of students, ‘allows higher education in the context of change to perform contradictory social functions, namely, helping maintain the status and position of social elites while providing some opportunities for social mobility’ (Brennan and Naidoo 2006: 229). This is reminiscent of what was said long ago by Bourdieu (1977) when he expostulated the main contribution of education to the systemic reproduction with very limited contribution to change. In this context, let us look at the subject choices of Indian women to see whether they reflect the contradictory social functions of education.

## Indian higher education system

In the Indian higher education system, most of the expansion since the early 1990s in the number of institutions and in professional subjects or the male-dominated subjects such as engineering, technology, ICT, management, etc., has been in the private sector. This development is also linked to the self-financing/self-funded subjects which are primarily market-driven professional ones and are offered mainly in private and public institutions. All subjects in private institutions are much more expensive than those in public HEIs. But both can deny access to students, especially those from lower and middle strata due to high costs.

Additionally, market demand has impacted the stratification of disciplines or subjects, leading to the devaluation of arts, humanities, and social sciences. Traditionally, underprivileged students and women have entered arts, humanities, and social sciences, which is a continuing trend. How are the new developments in the market, its direct impact on the curriculum and higher tuition fees impacting the subject choices of women students?

Another development is the privatisation of public universities that have introduced market-oriented subjects on a self-funded basis in addition to those regulated by the government which are not expensive. It raises the question: which parents are able and willing to spend more on the education of their daughters in order to access the much-in-demand self-funded subjects? In the absence of a database, it is not possible to answer this but it deserves to be pursued through research.

In 2011–12 there were 624 universities of all kinds, out of which 195 were private while eight were exclusively for women. Out of 35,852 colleges, more than 71 per cent were private,



mostly unaided (13,515) colleges, as per the report of the All India Survey of Higher Education (AISHE) (Government of India 2014: T9, table 5). However, private colleges enrol only 62 per cent of students. Simultaneously, the tuition fees are also increasing in the private as well as the state sector in the name of self-funded academic programmes and subjects. The women students have to compete for a few relatively inexpensive seats in a state-run system. Or their parents should be ready to shell out the high cost of private higher education. AISHE mentions that the enrolment of women students is low in private universities, which is anticipated to be due to high tuition fees (Government of India 2014: 36). There is no need to emphasise that high direct cost is a barrier to access, especially for women.

### *Women in higher education in India*

Let us look at the access and participation of women in higher education in India. While access here means enrolment, participation refers to what happens after the students enter higher educational institutions. Do they transit to higher levels, i.e. from undergraduate to postgraduate level and to research? Which subjects and specialisations do they choose? There is a positive development so far as access is concerned since the numbers have increased generally. In this expansion, women have also gained. But then how do they fare when looked at separately and at the disaggregated level?

It is pertinent to mention that the private unaided colleges are self-funded and are not directly subsidised by the state government, while the private aided colleges receive substantial support and subsidy from the state government. Therefore, the individual cost of education in the latter colleges is as much as in the government colleges, while the private unaided colleges, referred to here as private colleges, are very expensive. This has gendered implications.

According to AISHE, in 2011–12, the total enrolment excluding the open universities was 29.2 million (Government of India 2014: 4), of which women formed 45 per cent (13 million). In addition, distance enrolment was 11.7 per cent of the total enrolment, of which 43.7 per cent were women (Government of India 2014: 7). The gross enrolment ratio (GER) for the 18–23 age group was very low at 20.8 per cent for all students: 22.1 per cent for men and 19.4 per cent for women (Government of India 2014: 4). Indications are that it is higher for women and men in states with private professional colleges.

The GER of Scheduled Caste (SC) women was 13.9 per cent and men 15.8 per cent; Scheduled Tribe (ST) women 9.7 per cent and men 12.4 per cent (Government of India 2014: 27). These figures substantiate the well-known fact that in spite of a very well formulated policy of positive discrimination, the representation of disadvantaged groups of SC and ST students is not adequate and the proportion of women from among them is negligible. Access is very limited for them as a whole, but more so for the women from these groups. For instance, SC and ST women comprised 11.0 and 4.3 per cent respectively of all women enrolled in 2010–11 (Government of India 2013: 4).

At the undergraduate level, there are 45.4 per cent women and 54.6 per cent men; at the postgraduate level, the proportion of women is 47.5 per cent as compared to 52.5 per cent of men; at the PhD level, their proportion falls to 39.6 per cent while men are 60.4 per cent. Women seem to drop out substantially between postgraduation and doctoral level research, where the leaky pipeline seems to be working effectively (Government of India 2014: 19). This is discussed below.

Let us look at the gender distribution by subjects at the undergraduate level (Table 15.1) to see if women's choices reflect a change away from the traditional feminine subjects while reflecting a gender divide. The maximum proportion of women (51.1 per cent) vis-à-vis men are still

Table 15.1 Subject enrolment of women and men at undergraduate level

<i>Subject/discipline</i>	<i>Women</i>	<i>Men</i>
Arts, humanities, social science	51.1	48.9
Science	48.8	51.2
Commerce	44.1	55.9
Education	60.5	39.5
Medical science	60.8	39.2
Computer science and computer application	40.2	59.8
Management	34.6	64.4
Law	32.0	68.0
Veterinary and animal science	30.8	69.2
Agriculture and allied sciences	24.6	75.4
Engineering and technology	28.5	71.5

Source: collated from Government of India 2014: T50–51.

enrolled in arts, humanities, and the social sciences, followed closely by sciences (48.8 per cent), in which their enrolment has been increasing due to the devaluation of pure sciences because it is no longer the first choice of men students (Chanana 2006). Again, there has been a gradual increase in women's enrolment in the traditionally male-dominated professional subjects such as commerce (44.1 per cent) and engineering and technology (28.5 per cent), yet they do not outnumber men in any of these fields except teacher education (60.5 per cent) and medical science (60.8 per cent). In management, which is a relatively new subject, their proportion has reached 34.6 per cent. It is still low in agriculture (24.6 per cent), veterinary science (30.8 per cent), and law (32.0 per cent) (Government of India 2014: T50–51). The last four subjects remain predominantly male domains, with women occupying less than or around 30 per cent of seats. Medical education in India has been preferred for women so that secluded women patients can be treated by women doctors, so this subject stands between the boundaries of feminine and masculine subjects. Therefore, the enrolment of women in medicine, though a professional subject, has passed the halfway mark. It is an increase from 48.9 per cent in 2011–12 (Government of India 2013).

The transition from postgraduation to doctoral research shows that in the four subjects in which the proportion of women was either more than 50 per cent or close to the 50 per cent mark, their proportions reduce substantially. For example, in social sciences the proportion of women reduces from 51.1 to 40.8 per cent; in science it goes up from 48.8 at the undergraduate level to 52.4 per cent at the postgraduate level, and then decreases to 39.9 per cent; in medical science it goes down from 60.8 per cent at the undergraduate level to 51.8 per cent and further reduces to 42.8 per cent; and in education from 60.5 per cent at the undergraduate level it reduces to 53.7 per cent at the postgraduate level and further decreases to 52.3 per cent at the doctoral level (Government of India 2014: T52–54).

Looking at the specialisations or substreams of these subjects at the undergraduate level and comparing the enrolment to the postgraduate and PhD levels, women do not retain their position of advantage. For example, out of 16 substreams in engineering at the undergraduate level, women outnumbered men (51 per cent) in only one of them, namely architecture. However, their proportion reduces at the postgraduate (42.3 per cent) and PhD levels (34.6 per cent). Women outnumber men in seven of the nine allopathic substreams or specialisations<sup>3</sup> in medical science. In three of them they comprise more than 60 per cent – dentistry (60.5), microbiology (66.1), and physiotherapy (69.7). In biotechnology, too, their proportion is close to 60 per cent

(58.3). There are more men in pharmacy (56.4 per cent) and general medicine (51.8 per cent). They outnumber women in these two specialisations at both the postgraduate and PhD levels – in pharmacy they comprise 57.3 and 72.6 per cent respectively, and in general medicine they account for 63.8 per cent and 56.9 per cent respectively. On the other hand, the proportion of women in dentistry at the postgraduate level reduces to 49.1 per cent and at the PhD level to 44.8 per cent. Even if they are able to retain their position at the postgraduate level, as for example in biotechnology (62.2 per cent), they lose it at the PhD level (49.1 per cent). This situation is the same in physiotherapy, where they are 59 per cent at the postgraduate level and only 42.9 per cent at the PhD level (Government of India 2014:T52–54).

Thus, gender inequality in participation has not declined – e.g. in enrolment men are over-represented in engineering, agriculture, and computer sciences, and women in biology-related sciences, both in the educational and occupational spheres (Chanana 2006). This is also reflected in the choice of subfields or specialisations. This is confirmed by a report on completed PhDs in India (Kurup and Arora 2010).

## Conclusion

There is no doubt that access has increased for women and is reflected in the higher enrolment, GER, number of higher education institutions, and proportions of women in new professional subjects that are applied and market-driven. However, layers of disadvantage are uncovered when data are disaggregated by level and specialisation. For instance, the gaps by gender and subject choice continue. Again, the proportions of women decrease as one moves from one level to the other, especially from the undergraduate to postgraduate to doctoral level. This indicates lower transition rates and participation. Moreover, specialisations are replacing subjects in terms of clustering of women students. Therefore, and as mentioned above, while the *vertical dimension of unequal participation* may be declining, the *horizontal dimension* relating to specialisations, especially at the doctoral level, remains resistant to change.

As already mentioned, a very important function of the higher education system in social change is to assess the extent of educational opportunities for women. This is a very critical question but is hampered by very limited data. For example, although enrolments in Indian higher education have increased substantially and the student community is diversified, we do not know about the distribution of women students in the public and private HEIs and in the increasingly diversified institutional contexts. Additionally, their clustering in subjects leading to low-end jobs with low salaries indicates that they are unlikely to move to higher positions. What is needed is gender-desegregated data about the rapidly expanding private sector.

Moreover, while the private higher education institutions have remapped the educational arena and increased the institutional and subject options for students, they limit access due to high costs and so are likely to be beyond the reach of women students, especially those from the Scheduled Castes and Scheduled Tribes and from lower middle and lower strata. Thus, higher education fails to promote equality and be more inclusive.

In this scenario, education has once again been projected as a critical instrument of social change as well as for cultural reproduction. Classic sociological questions about the relationship between education, on the one hand, and economy and society, on the other, are being raised again. In the context of marginal groups and women, questions about simultaneous inclusion and exclusion are also being asked.

Inclusion and exclusion both appear to pose dangers and opportunities. Women are simultaneously constructed as winners and losers. Winners, because they are gaining access, as

students, in significant numbers, but losers because of their lack of entitlement to leadership and prestigious disciplines.

(Morley 2009: 384)

Therefore, the role of the state in pushing higher education for promoting change and equality through subject choices in the age of globalisation and privatisation is critical. This is more so when gender, marginality, race, caste, class, and ethnicity are pushed to the background. It is time to frame a policy that will evolve strategies and procedures to encourage women to shift subject choices and specialisations at school and in higher education and to initiate steps to plug the leaky pipeline from undergraduate/postgraduate to doctoral level so that higher education becomes inclusive and equitable.

## Notes

- 1 This is a substantially revised and updated version of the paper published as 'Higher Education in and for a Changing World', *Journal of Educational Planning and Administration*, 2: 141–155, 2013.
- 2 From a very early age the toys and the clothing for the children encourage and reinforce gender stereotyping at home and later on in school through games, participation in extracurricular activities and subject choices. Boys are encouraged to play with cars and mechanical toys while girls play with dolls. This has been typical of the Western world, but is happening in India with the opening of the market economy and rise of consumerism.
- 3 I have excluded homoeopathy, Ayurvedic and Unani, and nursing. The last one because it is well known that a majority of nursing students are women.

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