

Chapter 16

Understanding Accessibility, Inclusion and Performance of Students with Disabilities in Higher Education: A Case Study of University of Delhi



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Introduction

Education, in particular higher education, plays an important role in developing students' capacity to think and use the knowledge acquired in gainful employment. Higher education opens up opportunities for career development in meaningful occupations, thereby improving an individual's quality of life and social status. This role is even more important for persons with disabilities, whose freedom of opportunities in education and employment is limited because of their impairment. Despite extensive government policies, programmes and legislative initiatives for inclusive education of children with disabilities in India, both the rates of educational participation and outcomes of education remain poor for children and young adults with disabilities. Dropout and illiteracy rates for this group remain much higher than the general population and school attendance continues to lag behind that of non-disabled peers. While 5% seats are mandated to be reserved for students with disabilities as per the Rights of Persons with Disabilities Act of 2016, low enrolment rates result in several seats remaining vacant in institutes of higher education. Low rates of enrolment coupled with high dropout rates can be attributed to the several barriers posed by inaccessible structures, curricula, lack of appropriate support services and the adverse social attitudes towards students with disabilities often resulting in their social isolation.

Creating an accessible and inclusive university education system is imperative to draw students with disabilities into full participation with the concomitant increase in social capital and social cohesion. An *accessible* educational system ensures that

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persons with disabilities can access their environment without impediment and face the same set of duties and responsibilities as their non-disabled peers. *Inclusive* education is the practice of educating *all* children irrespective of their ability level in an appropriate environment most suited to their needs. It involves adoption of inclusive practices which call for change in mindsets, attitudes, approaches and strategies to ensure that no learners are excluded from the education on offer. In pursuance of the goal of inclusive education for students with disabilities (SWDs), it becomes imperative to identify academic, social, cultural and attitudinal barriers they face in the field of higher education and undertake timely intervention in eliminating these barriers to help these students realize their full potential.

Apart from struggling with architectural, institutional and academic barriers, SWDs routinely encounter the more deleterious attitudinal barriers posed by insensitive behaviour of peers and teachers, which are an outcome of their negative perceptions and stereotypes about persons with disabilities. The significance of attitudinal barriers in determining the success or failure of SWDs, and hence their inclusion in higher education is widely recognized in disability literature (Rao 2004; Johnson 2006). However, 'attitude towards disabilities' is the least researched variable when it comes to studies concerned with disability issues in higher education. This paper attempts to examine the impact of both physical (architectural) and attitudinal barriers on academic achievements of SWDs in higher education through a case study of University of Delhi.

The paper is organized as follows: section "[The process of marginalization and freedom of opportunities](#)" presents a discussion on the process of marginalization of persons with disabilities and the notion of inclusive education based on the normative framework of Amartya Sen's capability approach of development (Sen 1992). Section "[Barriers to academic engagement in higher education](#)" explores the different kinds of barriers faced by SWDs enrolled in institutions of higher education which impact the level of their academic engagement. Section "[Current educational status of children with disabilities in India](#)" presents data on educational status of SWDs in India. Section "[Accessibility and inclusiveness: Determinants of academic performance of SWDs in University of Delhi](#)" presents the case study of SWDs enrolled in undergraduate colleges of University of Delhi. The econometric study based on primary data was conducted to assess (i) the extent of accessibility and inclusion in to mainstream education as perceived by the SWDs, and (ii) the factors which impact academic performance of such students in higher education. Section "[Conclusion: Implications for practice and policy](#)" is the concluding section which briefly spells out implications for practice and policy.

The Process of Marginalization and Freedom of Opportunities

Marginalization in education is a form of acute and persistent disadvantage rooted in underlying social inequalities. It represents a stark example of "clearly remediable injustice". (UNESCO, Education for All, Global Monitoring Report 2010)

National Education Plans across countries endorse the principle of *equality of opportunity* in education. They seek to address equity issues through policy interventions that accord special attention and resources to social groups that experience marginalization in education. These groups include children belonging to ethnic groups, tribes or specific castes, children with special needs, girls and the disadvantaged groups of urban and rural population including the neo-literates, semi-literates, children of slum dwellers, war victims, migrant workers, etc. The objective is to ensure that children can achieve what they want to, irrespective of their gender, ethnicity, language, income and other disparities in their social circumstances. However, the one group that remains widely excluded from quality education is that of children with special needs. 'Disability' has been recognized as one of the most potent albeit the least visible factor resulting in educational marginalization (UNESCO 2010).

Even if *equality of opportunity* in education is assured for all, for most children with disabilities, it does not translate into *freedom of opportunity* in education (i.e. the ability to exploit the practical opportunities afforded by reality). This can be explained in terms of Sen's capability approach of development which provides a broad normative framework for evaluating and assessing issues concerning social arrangements and equity. Capability approach claims that the freedom to achieve well-being is determined by an individual's '*capabilities* and *functionings*'. The set of real/practical opportunities to achieve valuable states of being and doing constitute an individual's '*capabilities*' set. '*Functionings*' of an individual are the actual outcomes or achievements through being or doing what is valuable, such as being educated, being gainfully employed and spending leisure time with family. In this context, 'disability' can be understood as an individual's physical or mental impairment which results in deprivation of *capabilities* or *functionings* (Mitra 2006). Impairment inevitably shrinks an individual's *capability* set by diminishing the range of the practical opportunities available. When this further restricts an individual's *functionings* (where an individual is unable to do or be what he/she values doing or being), the impairment manifests into a disability.

The extent of deprivation of individual *capabilities* and *functionings* depends on the following factors and the possible interplay between them:

- (i) The nature of impairment and an individual's other personal characteristics such as age, gender and caste. In certain cases, the nature and severity of impairment results in deprivation, irrespective of the amount of resources available and an individual's environment, such that freedom of opportunity in certain areas do not exist for some. For instance, a child with muscular dystrophy in contrast to another child without such an impairment but with a similar basket of goods and same environment, may not have access to similar practical opportunities (e.g. attend college, engage in work or sports). Such disability can be attributed to the intrinsic nature of the impairment itself.
- (ii) The resources at an individual's disposal (assets, income, etc.): In cases where impairment induces relatively higher costs of achieving a given level of

well-being, lack of adequate resources result in deprivation of *capabilities* and *functionings*.

- (iii) An individual's environment (physical, cultural, social, economic and political): Individuals with impairments are confronted with obstacles and hindrances posed by lack of accessible environments, inadequate legislations, policies and services and various other economic and social barriers such as negative attitudes and social stigma that result in deprivation. For instance, an acid attack victim with a disfigurement often finds her opportunity set reduced, not by the condition or impairment itself, but by the stigmatization in the society or by discrimination faced in interpersonal relations.

Critics question the very use of terminologies or labels such as the 'disadvantaged' or 'marginalized' for persons with disabilities, as they have a negative connotation, implying that the group is a victim of its own characteristics. Such a practice does not attempt to recognize that being 'marginalized' is not just an outcome of certain characteristic; rather it is an outcome of a 'process' of pushing a particular group of people to the edge of society by denying it an active role, identity or place in it. Sen's capabilities approach allows one to understand marginalization of persons with disabilities as a *process*, where impairments along with other factors, such as individual's resources and the various kinds of barriers posed by an individual's environment, result in deprivation of an individual's *capabilities* and *functionings*. Hence, freedom of opportunities remains elusive for most persons with disabilities. The following section explores how SWDs face educational marginalization in institutes of higher education, as barriers manifest at various levels, limiting their *capabilities* and *functionings*, hence impacting their academic achievements.

Barriers to Academic Engagement in Higher Education

In order to provide equality of opportunities in education, it is imperative to create an *accessible* and *inclusive* education system. *Accessibility* goes beyond physical accessibility, to include accessible curricula, and delivery and evaluation methodology, as well as the provision of the necessary supports and accommodations to ensure that SWDs have equal opportunity in their education. Without appropriate support, SWDs face the risk of academic failure and associated loss of self-confidence and self-esteem. An *inclusive* educational system provides education for *all* in appropriate environments, keeping in mind students' diversity and needs. It aims at strengthening the capacity to reach out to all learners, minimizing exclusion of students within and from education (UNESCO 2005) and ensure their attendance, participation and achievements. From the perspective of the capabilities approach, inclusive education enhances and expands the *capabilities* of students in achieving their valued *functionings*.

Persons with disabilities routinely encounter various kinds of barriers within families, communities and institutions which results in their exclusion from

participation in social, civil and political processes. Lack of access to inclusive education results in low levels of skill formation and hence high unemployment rates. The level of academic participation and performance in higher education is determined by the various obstacles faced by SWDs. Some of these obstacles/barriers stem from personal and family-level socio-economic characteristics, such as the nature of disability, family size and income and parents' education status and occupation. Family resources and income are important in determining the ability to meet upfront and hidden costs of attaining higher education (Checchi 2000; Eamon 2005; Yinusa and Basil 2008). Studies have also highlighted the significance of education of parents and other family members in determining the likelihood of a student with disability pursuing higher studies. The findings have shown that students whose parents did not attend a university are less likely to pursue higher education (Sweet et al. 2012). Family's socio-economic status (SES) measured in terms of family size and income, parents' occupation and/or parents' occupation, is also a significant determinant of academic performance (Krashen 2005). It is generally observed that high and middle SES families are in a better position to provide a learning environment at home and extra learning facilities if needed. Students from low SES families, however, have limited access to such facilities which limits their opportunity to make it to the top of the educational ladder and excel. Apart from the restrictions posed by limited economic resources, SWDs often face the more formidable obstacles posed by social deprivation (Smith et al. 2005).

SWDs face barriers in institutions of higher education which can take a variety of forms. They can be physical, financial, technological, systemic or attitudinal. The more widely recognized and acknowledged disability-related barriers are the *physical* or architectural barriers to educational services which include lack of ramps, accessible paths and elevators in multi-storeyed buildings, inaccessible washrooms and inaccessible transportation to and from college. Many SWDs join an institute of higher education which is not located in their home town and are thus dependent on student housing facilities provided by the college or the ones available in the vicinity of the college. Lack of accessible students housing often results in dropping out of some SWDs or calls for costly, long and exhausting commutes. This is further aggravated by the lack of reliable and accessible public transportation. Lack of accessibility goes beyond those posed by physical barriers to also include those posed by lack of funding, inaccessible university admission procedures and curricula, inappropriate delivery and evaluation methods and ineffective dispute resolution mechanisms. All these jeopardize students' access to higher education.

The physical presence of SWDs in colleges does not automatically ensure their participation. A student's academic engagement in terms of academic performance and extent of a student's participation in college's corporate life depends on the general academic environment in a college which sets the parameters of a student's learning experience. The academic environment in a college is closely related to the interpersonal relations between students, teachers and other staff members. Within the college, lack of awareness, understanding and the presence of negative perceptions based on myths and stereotypes about SWDs result in insensitive behaviour towards them. Such perceptions of 'dis'-ability are the real barriers to true inclusion.

Challenges and barriers centring on negative attitudes result in social discrimination within classrooms and college campuses, and have a knock-on effect on accessibility in mainstream education.

Current Educational Status of Children with Disabilities in India

According to Census 2011, there are 26.8 million persons with disabilities, constituting 2.01% of total Indian population. Only 55% of them are literate and 8.5% of them are graduates. Despite extensive government policies, programmes and legislative initiatives for inclusive education of children with disabilities in India, both the rates of educational participation and outcomes of education remain poor for children and young adults with disabilities.

At a time when India has nearly achieved universal primary school enrolment (with only 2.95 children out of school), 28% of children with special needs are out of school (2014 study), representing the most marginalized group in education (Table 16.1). Across the disability spectrum, the percentage of out-of-school children varies significantly. About 44% of children with multiple disabilities and 36% of children with mental disabilities are out of school while this percentage is nearly half in the case of children with hearing and visual impairment.

Most children with disability who attend school do not complete a full cycle of quality basic education, leading ultimately to lower employment chances and long-term income poverty. The distribution of persons with disabilities enrolled in school and institutes of higher education is as follows (see Fig. 16.1): 58% in primary (classes 1–5), 29% in upper-primary (classes 6–8), 8% in secondary (classes 9–10), 2% in

Table 16.1 Category-wise percentage of out-of-school children (age 6–13 years)

| Categories | Percent of children |
|-----------------------|---------------------|
| All | 2.97 |
| Scheduled caste | 3.24 |
| Scheduled tribe | 4.2 |
| Other backward class | 3.07 |
| All disabled | 28.07 |
| Multiple disabilities | 44.13 |
| Mental disability | 35.97 |
| Speech | 34.82 |
| Orthopaedic/locomotor | 23.72 |
| Hearing | 19.31 |
| Visual | 17.64 |

Source: SRI-IMRB (2014) study on out-of-school children in India, MHRD, GOI

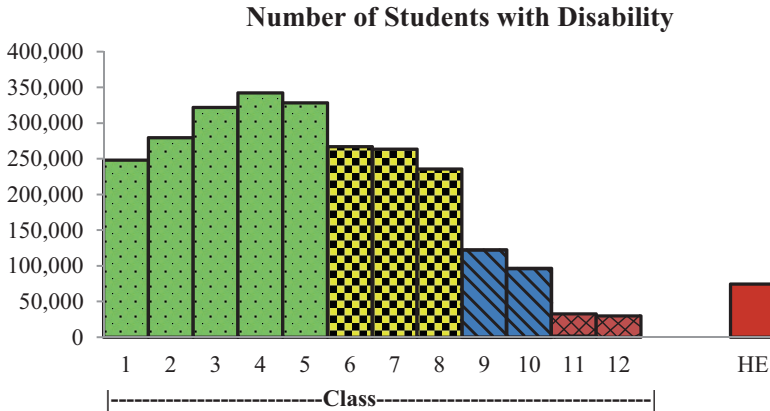


Fig. 16.1 Total enrolment of students with disabilities at various levels of education (2015-16)
 Source: Based on data from U-DISE (2015-16) to AISHE (2015-16)

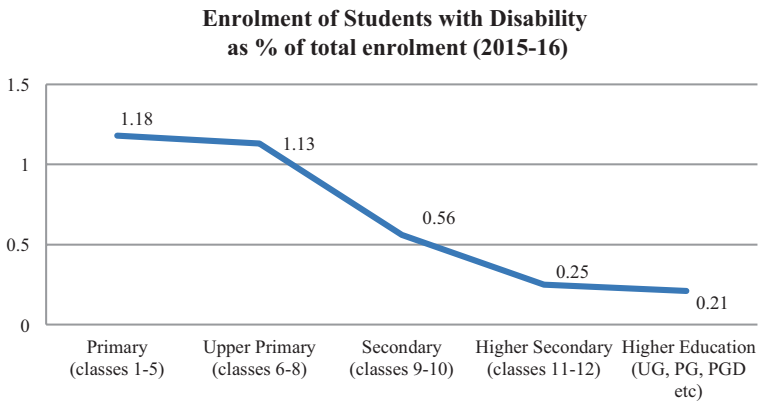


Fig. 16.2 Percentage enrolment of students with disability (2015-16)
 Source: Based on data from U-DISE (2015-16) to AISHE (2015-16)

higher secondary (classes 11-12) and 3% in institute of higher education (undergraduate, postgraduate, PG diploma, diploma, M.Phil., Ph.D., certificate and integrated/dual degree). Data suggest a significant drop in enrolment after upper-primary and secondary level of education, dropping at each level by nearly 50% (see Fig. 16.2).

Official figures on dropouts reveal that more dropouts occur during the transition from schooling to higher education, both for abled and disabled students, with the percentage being much higher for the disabled students. After schooling, a large number of SWDs prefer not to enrol in colleges, with the enrolment rate being particularly low for female SWDs. This trend can be attributed to several factors including lack of infrastructural facilities within colleges, lack of transport facilities and other support services, insensitive attitudes of teachers and peers in colleges, etc.

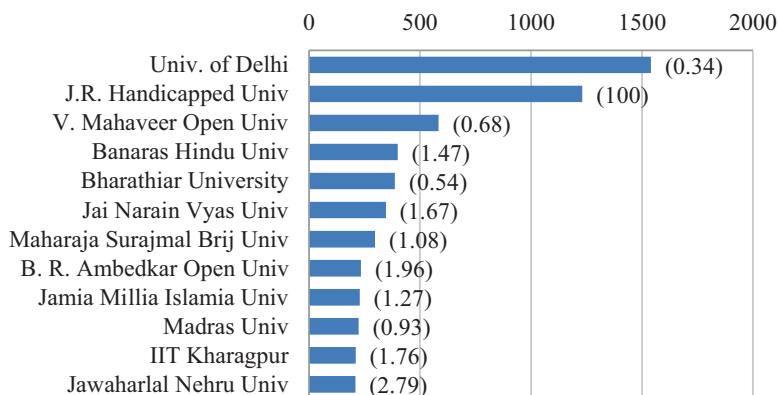


Fig. 16.3 Number of SWDs enrolled in top 12 Indian universities (ranked in terms of number of SWDs enrolled)

Note: The figures in brackets represent the percentage enrolment of SWDs to total enrolment

Source: Based on data from AISHE 2017–18

Reports of All India Survey on Higher Education (AISHE) present institution-wise and category-wise enrolment figures. AISHE 2017–18 presents such data for over 44,000 institutions of higher education spread across the country. About 828 of them are universities which enrol a total of 12,605 SWDs. Nearly 55% of the universities have zero enrolment of SWDs. SWDs enrolled in universities across the country represent 0.19% of total intake of students. This is despite the fact that 3–5% seats are kept reserved for SWDs in all institutions of higher education. Only five universities enrol SWDs who account for more than 3% of total enrolment.

University of Delhi, also called Delhi University (DU), has the maximum number of SWDs enrolled across all universities in India (AISHE 2017–18). It enrolls 1541 SWDs (1037 are male and 504 are female). SWDs, however, account for only 0.34% of total enrolment in University of Delhi. The next highest enrolment is of 1231 SWDs in a university which is specifically for SWDs.¹ See Fig. 16.3 which depicts the number of SWDs enrolled and their percentage enrolment in 12 Indian universities which enrol more than 200 SWDs, ranked in terms of actual enrolment of SWDs.

Empirical studies examining the performance of SWDs in higher education and assessing the impact of physical and attitudinal barriers on the level of their academic engagement are sparse. The following section presents the results of an econometric exercise carried out using primary data collected from SWDs in University of Delhi, in order to assess the factors that impact their academic participation and performance.

¹ *Jagadguru Rambhadracharya Handicapped University* in Uttar Pradesh is only for students with the following impairments: visual, hearing, mobility and mental (defined as per the Disability Act of 1995).

Accessibility and Inclusiveness: Determinants of Academic Performance of SWDs in University of Delhi

This section presents the results of a case study based on a survey of SWDs enrolled in undergraduate colleges of University of Delhi (DU). The survey was supported by the DU, under Innovation Projects for Colleges 2013–2015, Project code DCAC 201. Findings from preliminary analysis of survey data are reported in Saksena and Sharma (2015). Results of further data analysis are presented in this section.

DU enrolls the largest number of SWDs across all Universities in India (AISHE 2017–18). Survey data reveal the fact that the dropout rate of SWDs enrolled in University of Delhi is negligible. However, the enrolment of SWDs expressed as a percentage of total enrolment in the university is lower than that of many other Universities in the country. This percentage has remained below 0.5% for many years, which is well below the percentage of seats reserved for SWDs in the university. Empirical studies to determine the various barriers faced and their impact on the academic performance of SWDs, particularly for those in institutions of higher education are few, and nearly missing in the Indian context. The case study presented in this section is an attempt to find answers to the following questions: (i) How accessible and inclusive are colleges in DU from the viewpoint of SWDs? (ii) What are the main determinants of the level of academic engagement of these SWDs?

Both family-level and college-level characteristics, which either aide or pose as barriers to access and inclusivity in higher education, and hence impact the academic performance of SWDs, were assessed. Data were obtained from the *Equal Opportunity Cell* (EOC) of the university which is located in the main campus, called the North Campus of DU. It is mandatory for each college to have an *Enabling unit* (EU). EOC at the university level and EUs at college level act as the nodal offices, established to promote inclusion and diversity at the institutional level. A total of 168 undergraduate students across 35 colleges randomly selected from the list of enrolled students for the academic years 2012–13 and 2013–14 were surveyed using a semi-structured questionnaire. Nine questionnaires were discarded during data cleaning and coding stage (primarily due to several missing observations).

Sample Characteristics

Personal Characteristics of SWDs 65% of the surveyed students were male students (in line with the actual male to female ratio of two-thirds to one-thirds for SWDs enrolled in University of Delhi). Students with an orthopaedic handicap and those with a visual handicap dominated the sample, accounting for 56% and 38% of the sample respectively. For more than half of them (57%), Delhi – National Capital

Region was their home town. About 73% of them resided in the city with their family or relatives.

Household-Level Characteristics Annual family income of SWDs ranged between a minimum of Rs. 21,000 to a maximum of Rs. 19.20 lakhs, with mean annual income of Rs. 3.2 lakhs. Half the students interviewed had annual family income which was less than or equal to Rs. 1.8 lakhs, which was below the per capita income of Delhi in the year 2012–13. Father's occupation of students surveyed was diverse ranging from Income tax commissioner and Professors to auto drivers and contractual labourers. More than 60% of the respondents had at least one family member who had studied till the post-graduation or graduation level. However, 2% of the respondents had family members who never had any formal education.

University- and College-Level Characteristics University of Delhi (DU) has 77 affiliated colleges spread across the city. It has two main campuses: the North campus (also called the main campus) situated in North Delhi and the South campus which has colleges spread across the city (called the off-campus colleges). DU has more than 1 lakh regular undergraduate students. For the survey, 50 students from North campus colleges (also called the Campus colleges) and 110 students from off-campus colleges were interviewed. For 95% of them, DU was their first choice of university after finishing school. There is an evident bias against Science subjects, a trend that continues from school level itself. 65% of the students were enrolled for Bachelors in Arts and 23% of them were enrolled for Bachelors in Commerce.

The survey data reveal that only 67% of students interviewed were aware of the EOC, out of which only 40% had availed of EOC's services and facilities. Most of the SWDs knew of the EOC because they had approached EOC for assistance during admission and/or they had attended the common orientation programme organized by EOC for all of them. The off-campus students who were aware of the central EOC did not avail of any of the support services provided by the EOC because of the long and difficult commute to EOC. While all of them are eligible for a fee waiver by the university, there are also additional scholarships for them, which most of them were unaware of. Only 12 out of 159 SWDs availed of scholarships that are available for them at higher education level. Creating greater awareness among SWDs through information available to them in readily available formats will ensure efficient utilization of facilities and provisions earmarked for them.

Most colleges do not provide hostel facilities. Less than 7% of students surveyed resided in college hostels. For most of the others who resided far away from their colleges with their families, other hostels or rented accommodations, commuting to college posed a formidable challenge. On an average, students spent 49 min on their commute to college, with the maximum commute time of 200 min. Only 5 students used the bus/van service provided by the university/EOC. Descriptive statistics related to quantitative data collected from the respondents are given in Table 16.2.

Table 16.2 Descriptive statistics

| | Time spent on commute to college (minutes) | Distance from residence to college (kms) | Class size (number) | Average time spent in college (hours) | Average marks in college examination (%) | Average marks in last school exam (%) |
|--------------|--|--|---------------------|---------------------------------------|--|---------------------------------------|
| Mean | 48.94 | 11.29 | 56.94 | 4.91 | 61.97 | 70.56 |
| Median | 45.00 | 10.00 | 50.00 | 4.75 | 62.00 | 70.00 |
| Maximum | 200.00 | 60.00 | 300.00 | 8.00 | 83.00 | 96.00 |
| Minimum | 2.00 | 0.000 | 10.00 | 1.00 | 35.00 | 48.00 |
| Std. Dev. | 34.63 | 9.37 | 30.52 | 1.23 | 9.41 | 11.94 |
| Skewness | 1.29 | 1.98 | 4.15 | 0.31 | 0.02 | 0.30 |
| Observations | 158 | 89 | 158 | 156 | 138 | 140 |

Source: Based on primary survey data

Table 16.3 Rating physical accessibility in college campus (% distribution of responses)

| | Classrooms | Labs | Library | Washrooms | Canteen | Admin. office |
|---------------|------------|------|---------|-----------|---------|---------------|
| Excellent | 14.6 | 13.9 | 22.9 | 12.3 | 9.7 | 10.9 |
| Good | 60.1 | 64.4 | 51.6 | 50.9 | 50.0 | 61.9 |
| Average | 24.1 | 20.8 | 21.0 | 30.9 | 32.5 | 26.5 |
| Below average | 1.3 | 0.9 | 4.5 | 5.8 | 7.8 | 0.6 |

Source: Based on primary survey data

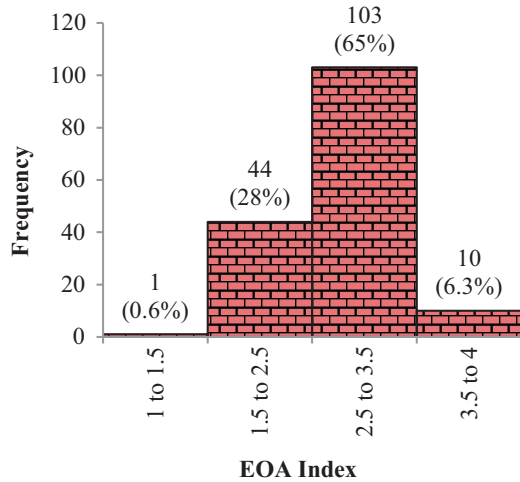
While 90% of colleges in DU have an enabling unit (EU) in their campus, 42% of the surveyed students were not aware of the existence of an EU in their college. 18% of the students stated that their college did not have an EU. There may be an overlap in these numbers as (i) when a student was not aware of an EU in the college, it may be the case that the college actually had an EU, or maybe the college just did not have an EU; (ii) it may be the case that a college had an EU, but the student reported that the college did not have one. In this study, however, students' responses are taken at face value.

Assessing Accessibility

Ease of physical access within various sections of a college building and college campus such as classrooms, library and washrooms was assessed based on respondents' rating of accessibility on a four-point Likert scale: excellent, good, average or below average. The responses are compiled in Table 16.3.

On an average, more than 70% SWDs rated accessibility to classrooms, libraries, laboratories and administrative offices as good or excellent. However, more than one-third of the students rated accessibility to washrooms as 'average' or 'below

Fig. 16.4 Frequency distribution of ease of access index
 Source: Authors' own calculations based on primary survey data



average'. Ease of access to washrooms is a basic necessity for all students. The responses thus highlight the need to focus on improving access to washrooms in colleges.

In order to capture the overall ease of accessibility within the college campus, an ease of access (EOA) index was estimated as a weighted average composite index, by assigning scores to each response category as follows: 4 points for an 'excellent' rating, 3 points for a 'good' rating, 2 points for an 'average' rating, and 1 point for a 'below average' rating. The points given to classrooms, laboratories, library and washroom were assigned a weightage of 2, while points given to canteen and administrative office (which a student need not necessarily visit every day) were assigned a weight of 1. The range of the computed EOA index was [1, 4] and for the surveyed sample, this index value ranged from 1.38 to 4.

The EOA index was further divided into the following sub-ranges: EOA index value lying between 1 and 1.5 (including the upper limit) implies that overall physical accessibility in college as assessed by SWDs is *below average*. Likewise, $1.5 < \text{EOA index} \leq 2.5$ implies *average* accessibility; $2.5 < \text{EOA index} \leq 3.5$ implies *good* accessibility; $3.5 < \text{EOA index} \leq 4$ implies *excellent* physical accessibility. The frequency distribution of EOA index based on these sub-divisions presented in Fig. 16.4 depicts that nearly 29% students assess ease of physical accessibility within college premises to be just average or below average. Majority of them however assess ease of physical accessibility to be good (65%). This broad conclusion did not change even if the cut-offs used in defining the sub-divisions of the EOA index were tweaked around. 6% of SWDs rated physical accessibility in their college to be excellent. A closer examination revealed that ease of accessibility had been rated differently by different students enrolled in the same college. This is a consequence of the fact that a college which may be well equipped to provide ease of access to students with visual impairment, may not have specific facilities needed for free access by students on wheelchairs.

Assessing Inclusiveness

While promoting accessible barrier-free environment is an essential step towards creating an enabling environment for SWDs, ensuring a congenial and supportive atmosphere free from negative attitudes and stereotypes regarding SWDs, where peers, teachers and other non-teaching staff members of the college are sensitive and supportive of the needs of SWDs, is equally, if not more, important in determining the extent of social inclusion of SWDs into the mainstream. In order to assess the extent of inclusion of SWDs, this study attempted to construct an index of sensitivity based on the respondents' rating of attitudes and behaviour the students, teachers and non-teaching staff members in their college on 3-point Likert scale:

- (i) Sensitive: includes cases of very helpful and sensitive behaviour.
- (ii) Moderately Sensitive: includes cases of usual normal considerate behaviour towards all, where help is offered when asked, without any specific special concern for a student with disability (SWD), and.
- (iii) Insensitive: includes cases where no specific help is offered and sometimes even harmful behaviour is meted out to SWDs such as bullying and harassment.

The responses are compiled in Table 16.4. Most SWDs find behaviour of the students in colleges towards them to be sensitive (47%) or moderately sensitive (44%). Only 10% of them stated that behaviour of their peers was insensitive towards them. Two respondents reported instances of bullying and harassment in college. As far as behaviour and attitudes of teachers and non-teaching staff members is concerned, majority of the respondents were of the opinion that they were only moderately sensitive where they were considerate towards all but did not specifically help out the SWDs. The overall perception of these students was that most peers and teachers generally had positive attitudes towards disability in general, but did not specifically want to be friend or support any one of the SWD.

A *sensitivity Index* was computed to denote overall sensitivity of members of a particular college as perceived by a SWD, thus providing a measure of the extent of inclusivity in colleges. Points were assigned to each rating are as follows: 3 points for a 'sensitive' rating, 2 points for a 'moderately sensitive' rating and 1 point for an 'insensitive' rating. The points given to student's and teacher's sensitivity were assigned a weight of 2, while points given to non-teaching staff's sensitivity were

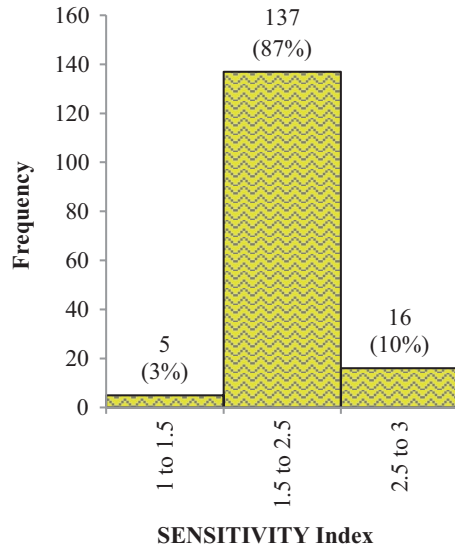
Table 16.4 Rating behaviour of students, teachers and non-teaching staff members in college (% distribution of responses)

| | Students | Teachers | Non-teaching staff |
|----------------------|----------|----------|--------------------|
| Sensitive | 46.8 | 17.2 | 4.9 |
| Moderately sensitive | 43.7 | 80.9 | 80.2 |
| Insensitive | 9.5 | 1.9 | 14.9 |

Source: Based on primary survey data

Fig. 16.5 Frequency distribution of sensitivity index

Source: Authors' own calculations based on primary survey data



given a weight of 1 (since interaction with non-teaching staff is usually limited). The range of computed index was [1, 3].

The sensitivity index was further divided into the following sub-ranges: sensitivity index value lying between 1 and 1.5 (including the upper limit) implies that overall behaviour of members in a college as assessed by SWDs is *insensitive*. Likewise, $1.5 < \text{Sensitivity index} \leq 2.5$ implies *moderate sensitivity*; $2.5 < \text{Sensitivity index} \leq 3$ implies *sensitive* behaviour. The frequency distribution of sensitivity index based on these sub-divisions presented in Fig. 16.5 depicts that majority of the respondents assessed the overall attitude and behaviour of college members to be only moderately sensitive (87%). Nearly 3% respondents rated the behaviour to be insensitive.

This broad conclusion did not change even if the cut-offs used in defining the sub-divisions of the sensitivity index were tweaked around. This is a direct fallout of the fact that teachers as well as non-teaching staff members are not trained and equipped to cater to specific needs of SWDs. Some cases of downright insensitive behaviour of non-teaching staff members were also reported. Raising awareness about disability issues among students and staff member, and training staff members on delivery of specialized assistance to SWDs will go a long way in eliminating attitudinal barriers and creating a more inclusive environment for SWDs in college campus.

Preliminary Data Analysis: Testing for Difference in Means

Further, analysis of variance (ANOVA) tests were conducted to detect if the observed differences in (i) average college performance of SWDs, (ii) average ease of access (EOA) index and (iii) average sensitivity index were statistically significant across different categories such as location of the college (main vs. off-campus colleges),

type of disability, presence or absence of an enabling unit in college and women's-only versus co-educational college. Figure 16.6 presents the box plots of the variable of interest against the various categorization variables listed above. The variables with significantly different mean values have been indicated in the box plots.

One-way ANOVA tests reveal the following: academic performance measured in terms of average percentage of marks received by the student in university exams varies significantly (i) between main North campus and off-campus colleges, with the average marks of SWDs in main campus colleges being much higher (significant at 1% level) and (ii) between colleges with and without an enabling unit, with the average marks of SWDs in colleges with an enabling unit being relatively higher (significant at 10% level).

The average ease of access (EOA) index is found to vary significantly (i) between main campus and off-campus colleges, with EOA index being much higher for main campus colleges (statistically significant at 5% level); (ii) between colleges with and without an enabling unit, with a much higher average EOA index in colleges that have an enabling unit (significant at 1% level) and (iii) between women's-only colleges and co-educational colleges with women's colleges having a higher EOA index (significant at 5% level).

The average sensitivity index was found to be higher for (i) North campus colleges (ii) for colleges with an enabling unit and (iii) for women's-only colleges. However, the difference in sensitivity index was not significant across any of the categories.

Econometric Model of Academic Performance and Its Determinants

The purpose of this empirical exercise is to investigate the effects of family background and college resources on the academic performance of SWDs. Positive family support and a congenial, supportive and accommodating college environment encourage greater academic participation of SWD. The underlying theoretical framework posits education of SWDs as a production process where students' personal characteristics and innate abilities, family background, school and college resources and peer attitudes are educational inputs while their academic performance, measured in terms of average marks in exams, represents educational output.

The educational production function estimated is as follows:

$$\text{COLLEGE_PERFORMANCE} = f(\phi_p, \phi_f, \phi_s, \phi_c)$$

where, the output of educational production function is the level of academic performance of a SWD, measured in terms of the average percentage of marks obtained by the SWD in the university exam (COLLEGE_PERFORMANCE). Educational inputs include four set of variables:

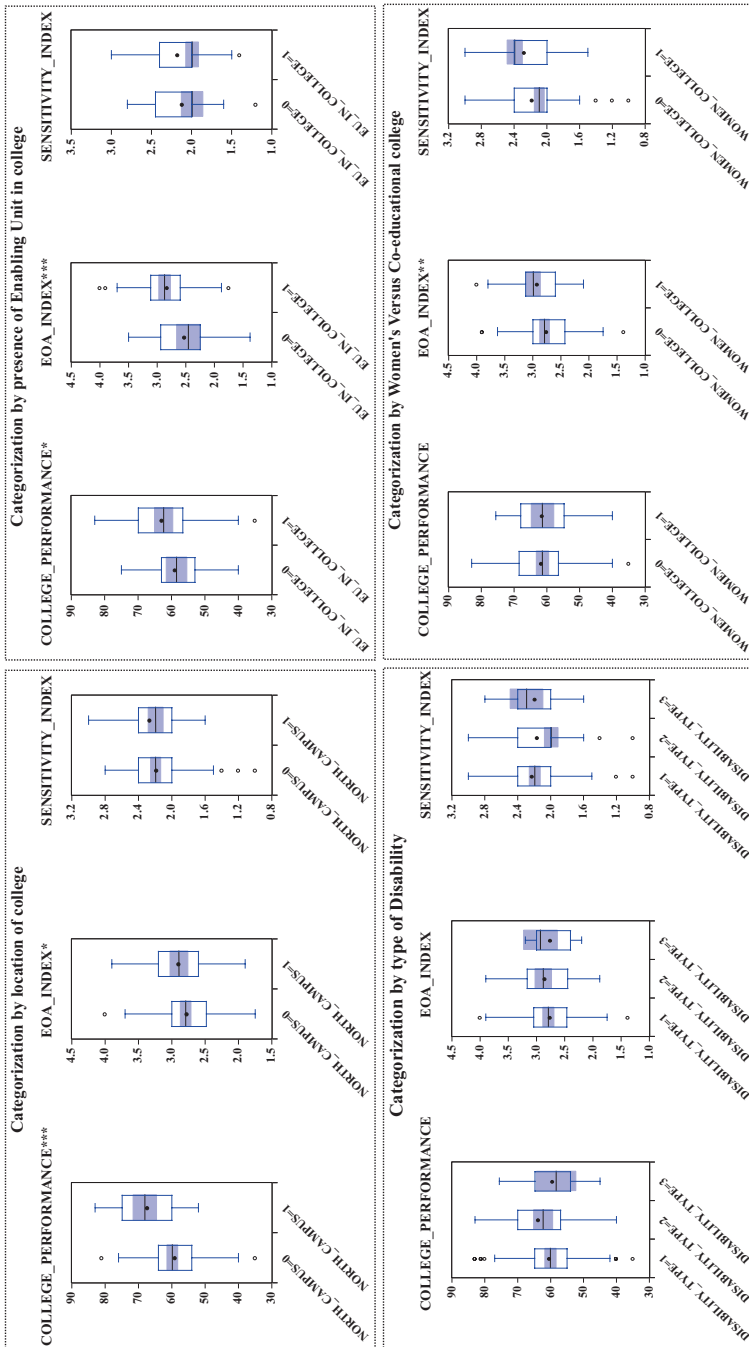


Fig. 16.6 Box plots of academic performance of SWDs, ease of access index and sensitivity index across different categories

Notes:

(i) The variables in the box plots above are defined as follows: NORTH_CAMPUS is 0 for off-campus colleges and 1 for colleges in the main campus; EU_IN_COLLEGE is 0 if a college does not have an EU and 1 if college has an EU; DISABILITY_TYPE is 1 for orthopaedic, 2 for visual and 3 for all other forms of disability; WOMEN_COLLEGE is 0 for a co-educational college and 1 for only women's college

(ii) *** implies significant ANOVA test at 1% level; ** implies significant at 5% level; * implies significant at 10% level
Source: Authors' calculations based on Survey data

- (i) ϕ_P is the vector of variables defining the personal profile of a SWD, such as age, gender and nature of disability.
- (ii) ϕ_F is the vector of variables that define family background of a SWD, such as income, educational qualification of parents and siblings and family size.
- (iii) ϕ_S is a vector of variables pertaining to the last school attended by the SWD, such as marks obtained in the last examination in school and school specifically for children with special needs and,
- (iv) ϕ_C is a vector of variables that capture college-level characteristics, such as location of college, presence of EU and class size.

Different variants of the regression model were estimated using the method of ordinary least squares (OLS) after carrying out the entire range of diagnostic checks for the breakdown of classical assumptions. Since the data were cross-sectional, the estimates were corrected for heteroscedasticity using White's correction. The following sub-section presents the final results of estimation.

Findings of Econometric Analysis

Several variables defining personal, family-level, school-level and college-level characteristics were included in the regression model. The final two variants which best fit the data are presented in Table 16.5. Both models fit the data well and are significant at 0.01 level. Preliminary regressions showed significant impact of family-level variables such as family income (family_income) and the highest educational qualification of any member in the family (family_educ). Thus, an index of socio-economic status (SES) was constructed as a weighted average of family_income and family_educ and included as an independent variable.

SES was found to be a highly significant determinant of student's academic performance. Thus, for the study sample, it was observed that families with higher socio-economic status, which could provide more and better facilities for academic engagement of SWD, had their child performing well in academics in college.

School-level variables such as SCHOOL_PERFORMANCE (marks obtained in the last school examination) and SPECIAL_SCHOOL (a dummy variable = 1 if the child attended special school, 0 otherwise) both had significant coefficients. A child who attended a special school was found to score, on an average, 3.55% more marks in college exams. Thus, for the sample of students studied, it can be said that SWDs who performed well in school and those who attended a special school performed better in academics at college level as well.

College-level characteristics such as CLASS_SIZE (student-strength in class) or TRAVEL_TIME (commute time) was found to have the expected sign, but statistically insignificant coefficients. The variable NORTH_CAMPUS (a dummy variable = 1 for colleges located in the North campus, 0 for others) had the expected positive and a significant coefficient. Colleges in the main campus have access to more and better facilities provided both by the concerned college and by the university through the EOC. On an average, a student enrolled in the main North campus

Table 16.5 Estimation of the educational production function of SWDs

| Dependent variable: COLLEGE_PERFORMANCE (% marks) | | |
|---|------------------------------|------------------------------|
| Estimation method: Least squares (white heteroscedasticity-consistent standard errors and covariance) | | |
| | Model A | Model B |
| Independent variables | Coefficient (standard error) | Coefficient (standard error) |
| GENDER | 0.50 (2.16) | 1.42 (1.91) |
| SOCIO_ECO_STATUS | 0.64*** (0.24) | 0.62*** (0.23) |
| SCHOOL_PERFORMANCE | 0.21** (0.08) | 0.20** (0.09) |
| SPECIAL_SCHOOL | 3.55* (1.94) | 3.70* (2.00) |
| NORTH_CAMPUS | 3.86* (1.96) | 4.20** (2.01) |
| SENSITIVITY_INDEX | 3.67* (2.13) | 4.55** (2.28) |
| EOA_INDEX | 1.86 (1.93) | 1.68 (1.93) |
| CLASS_SIZE | 0.02 (0.02) | |
| TRAVEL_TIME | -0.04 (0.03) | |
| Number of observations | 97 | 97 |
| R ² | 0.41365 | 0.400 |
| Std. Dev. Dependent var | 9.792 | 9.792 |
| Akaike info criterion | 7.063 | 7.045 |
| Schwarz criterion | 7.329 | 7.257 |
| Log likelihood | -332.559 | -333.668 |
| F-statistic | 6.819 | 8.479 |
| Prob(F-statistic) | 0.000 | 0.000 |

Source: Authors' calculations based on Survey data

Notes: *** implies significance at 1% level; ** implies significance at 5% level; * implies significance at 10% level

scored 3.86% points more in college examination than a student enrolled in an off-campus college.

The variables capturing accessibility and degree of inclusion are of special interest given the objective of this study: SENSITIVITY_INDEX and EOA_INDEX. Their coefficients capture the essence of the impact of attitudinal/behavioural barriers and physical barriers on the academic performance of a SWD. SENSITIVITY_INDEX is found to have a significant coefficient. Higher sensitivity index (as ranked by the students) positively impacts a student's academic performance. An increase in the value of the sensitivity index by one unit increased the marks in college examination by 3.67% points.

However, the variable capturing physical accessibility, EOA_INDEX, had a coefficient with the correct sign, but it was an insignificant determinant of academic performance. Ease of access may not be an important determinant of academic performance due to the fact that (i) colleges in DU, as compared to other colleges and particularly as compared to the schools attended by these students, have already undertaken several measures to ensure physical accessibility within colleges, a fact endorsed by the views of the surveyed students (as captured by the overall EOA index) and (ii) these are also the students who managed to overcome the obstacles

faced at school level and chose to continue with higher education, while some others succumbed to the hurdles and dropped out at secondary or senior-secondary levels in school. For such students, physical barriers may not be significant. There may also be the possible interdependence between SENSITIVITY_INDEX and EOA_INDEX while impacting college-level performance. Ease of physical access alone is likely to be of little importance if SWDs continue to face negative attitudes and stereotypes in the education system. Lack of knowledge about and sensitivity to disability issues on the part of some educators, staff and students can make it difficult for SWDs to avail of educational services, even when physical accessibility issues have been resolved. However, this interdependence could not be established using the survey data.

Conclusion: Implications for Practice and Policy

The results of the case study of DU broadly highlight the following the requirements:

- (i) Expand, improve and inform: Apart from expanding and improving the availability of resources and facilities for SWDs, it is equally important to generate greater awareness among SWDs and their families of the already existing resources, facilities and support services for them, such as fee-waivers, scholarships and funding schemes, transport and hostel facilities, library facilities, etc.
- (ii) Train and sensitize: There is an urgent need to raise awareness about disability issues and promote inclusive values among students, teachers and non-teaching staff in colleges.

At the national level, there is a need to reframe inclusive education in ways that would enhance the *capabilities* of SWDs towards achieving their valued and reasonable *functionings* through adoption of different practices aimed at providing a barrier-free environment for students. There seems to be misplaced emphasis of most policy initiatives which are aimed at resolving problems of inclusivity, on efforts at ‘mainstreaming’ SWDs by getting them to study the same curriculum in the same mainstream classroom as their non-disabled peers; the focus is more on the location (Dalkilic and Vadeboncoeur 2016). Higher educational institutions need far more comprehensive changes to become inclusive spaces.

While ensuring architectural accessibility is imperative and must be looked upon as an investment to improve the overall functioning of the higher education community, it is time that decision-makers take cognizance of second generation concerns regarding creation of barrier-free learning environment, which focus on teacher-training, curriculum, pedagogy, etc. Initiatives must be undertaken to *increase awareness* among SWDs and their parents, of the various provisions for SWDs so that they can claim the benefits afforded to them under various university schemes. Advances in *information and communication technology* must be utilized to make a broad range of educational services available to SWDs. This will include

adoption of cost-effective multimodal methods of teaching and learning, easy availability of affordable reading material in accessible formats and effective use of assistive technologies and other access-related devices and applications. *Accessible academic material and curricula* must be developed along the lines of the universal design for accessibility and inclusion. *Teachers and staff members* are key stakeholders who need to be *sensitized and trained* to cater to the needs of SWDs. An inclusive culture must be promoted on campus by creating awareness among all students through sensitization programmes. A truly inclusive education calls for a cultural shift that supports and nurtures differences. It generates academic as well as social benefits for all, and not just for students with disabilities.

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