BEYOND POVERTY AND DEVELOPMENT: CASTE DYNAMICS AND ACCESS TO MATHEMATICS EDUCATION IN INDIA[1]

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ABSTRACT

In the literature on Mathematics Education, India belongs with other developing countries and in the low-income bracket. There are other narratives about India (some academic and some popular) focusing either on the history of mathematics in the ancient times and or on the fact that like other Asians, Indians are good at mathematics. However, caste as a major determinant of access to mathematics has received practically no attention in the literature or popular accounts. This paper seeks to foreground the centrality of caste in the life of a person in India and argues that there is no way to engage with mathematics education in India without factoring caste in the study.

INTRODUCTION

On 17th January 2016, Rohith Vemula a PhD student at University of Hyderabad committed suicide, leaving behind a moving letter that said: "I always wanted to be a writer. A writer of science, like Carl Sagan. At last, this is the only letter I am getting to write" (Indian Express, 2016; Harvard SAI, 2016). A bright young man, politically sensitive, academically good, a student of science who chose to pursue science studies for his doctoral thesis, Rohith's suicide shook the country like a powerful earthquake. Rohith was not the first student to commit suicide on the University of Hyderabad campus. In the year 1993, Sunita, a student pursuing her master's degree in mathematics committed suicide because of love failure. Sunita was not known to be a good student at the university, though her neighbours in the village thought she was very good in mathematics and lamented the fact that she went to faraway Hyderabad to pursue higher studies in mathematics only to return as a dead body. Between Sunita and Rohith, there were several suicides in many institutions of higher learning (The Citizen, 2016).

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Chinnadurai, a 17-year-old grade 12 bright student from Nanguneri, a small town in Tamil Nadu, endured harassment at the hands of three of his classmates and in August 2023, he and his 13-year-old sister were nearly hacked to death with machetes by the same (Pandian, 2023). In 2015, two brothers Brijesh Saroj and Raju Saroj, who cracked the entrance examination to the prestigious Indian Institute of Technology (IIT), returned home after securing admission to an IIT only to find their house pelted by stones (Basu,2015).

Unrelated to these accounts of suicides on university campuses, violence and bodily harm faced by brilliant youth, at a different space-time co-ordinate, young Nikita, a fifth grade student in a government school in a remote village in the state of Madhya Pradesh, and was part of a longitudinal study that I conducted on alternative approach to teaching fractions during the years 2008-2011 explains that though 2/3 and ½ are both just one piece short of 1, 2/3 is bigger than ½ because 2/3 has 4 pieces of 1/6 while ½ has only 3 pieces of 1/6. To visualize these equivalences, she does not require any material support. Elsewhere, we have discussed how she compares the fractions 4/5 and 7/8 (Subramanian et al, 2015). Though she was not the only one in her class competent to provide valid supporting arguments, Nikita's ability at abstraction and logical thinking was, far superior to her classmates. We do not know how Nikita coped with mathematics at the middle school and high school level, whether she can factorize polynomials, compute square roots, understand the difference between rational and irrational numbers, and prove theorems in geometry; we do not know how well she faired in mathematics in the school final examination. Why this uncertainty about success in mathematics for a student who demonstrated high calibre in mathematics?

What connects Rohith Vemula, Chinnadurai, Brijesh, Raju and Nikita, is not just their brilliance and poverty; what connects Nikita and Sunita is not just their gender and rural government schools where they studied; another crucial factor, a strong identity that connects all of them is their caste. Spread across different geographical regions, all the six of them belong to the scheduled castes. Dreams of becoming a writer like Carl Sagan or hopes to access higher education in mathematics are rarely realized for the likes of Rohith, Sunita and Nikita. Excellence in studies rather than bringing appreciation and warm wishes, may in fact cost them their life as it almost happened in the case of Chinnadurai, Brijesh and Raju. In this paper I propose to discuss caste as a social category that plays a crucial role in the life of a person in contemporary India and its implication for access to mathematics education.

THEORETICAL POSITION AND STRUCTURE OF THE PAPER

The paper seeks to foreground the centrality of caste as a social category that plays a significant role in determining access to mathematics education. There is, very little research in mathematics education in India, that explicitly focuses on success or failure in mathematics at the school level, not to mention if and how caste figures in it. Often failure in education is attributed to poverty, lack of well resources public funded

schools or the absence of educated adults to provide additional support to the learner. It is common to hear mathematicians explain success and failure in terms of the notion of inherent ability to do mathematics, but even the focus group paper on mathematics invokes the notes of the 'talented minority' and the 'disinterested majority' as if socio-cultural factors have nothing to do with shaping ability in mathematics. However, those who belong to the marginalized castes as well as those who study caste and the caste-based struggles in India, know how integral caste is to one's identity in India. Like other social categories such as gender and race, it operates, sometimes in very blatant forms and sometimes in extremely subtle ways, to order the social space, marginalising some sections of the population and privileging others. This paper makes a small attempt to problematize access to mathematics education in India by positing caste as a crucial factor in determining who gets to learn mathematics. The paper is largely descriptive in nature and draws upon several disjoint narratives to illustrate the point.

The major objective of the paper is twofold. At a local level, the paper calls for the need to carry out empirical studies to understand the complex ways in which caste operates to limit opportunities for learning mathematics, for those coming from marginalised caste background, across diverse regional, class and linguistic background. At the larger level, the paper calls for a need for mathematics educators to go beyond race and recognize caste as an equivalent, if not a stronger factor in determining who gets to learn mathematics.

The structure of the paper is as follows: first, the paper gives a brief description of the caste system and its status in the colonial and post-colonial India. Then it moves on to describe some of the policy measures to address under representation marginalised castes in higher education and the resistance faced by students from marginalised castes in the institutions of higher learning. Finally, the paper discusses at a very broad level, how caste operates at the school level.

A BRIEF DESCRIPTION OF CASTE SYSTEM

There is a large body of literature focusing on the historical, socio-cultural, and political dimensions of caste, its link to various religions and on how caste reconfigures itself to have profound impact on the lives of the people in modern India as well as the Indian diaspora. The account of caste and caste system presented here will be very brief, largely drawing from Anand Teltumbe's book '*The Persistence of Caste: The Khairlanji Murders & India's Hidden Apartheid'* (Teltumbde, 2010). For a more detailed understanding of caste, readers could consult Ambedkar (1916), M.N.Srinivas (1962), Jodhka (2017), Yengde(2019), Wilkerson (2020) and other scholars.

It is believed that the word caste itself was used by the Portuguese (who colonised some part of India) to refer to the form of social stratification that operates in India. The equivalent term used in large part of India is *jati*. Another term that is frequently confused with caste is *varna*. The varna system is believed to have evolved and

stabilized between 600 to 200 BCE. Castes may have arisen out of subdivisions among the varnas, but it is caste that determines the rules and regulations of life. Both caste (jati) and varna are hierarchical and the notion of ritual purity and pollution is part of the practice of caste. While there are only four *varnas* consisting of the priestly class (*brahmins*) at the top, the warrior class (*kshatriyas*) below them, the trading class (*vaishyas*) in the third position, and the working class (*shudras*) at the bottom of the hierarchy, there are thousands of castes with a lot of regional variation. And hence it is difficult to place the castes in a linear order, even though within a geographical location one may experience it as a clear hierarchical social order. People who belong to castes that are placed outside the varna system are variously referred to as panchamas (the fifth ones), out-castes (pariahs), or untouchables. The untouchables faced and continue to face in several parts of the country, extreme forms of social exclusion that deny them right to proximity to caste Hindu, to drink water from the same source as the caste Hindus do, or to enter the temples to which caste Hindus go. The exclusion is referred to as 'apartheid' by several thinkers from this category. Castes are closed endogamous units, the membership to which is ascribed by birth and hence unlike one's religious identity, one cannot change one's caste identity. Castes that are higher in the hierarchy are more powerful and have control over those who are placed lower in the hierarchy. Also, contact between any two castes is restricted. Traditionally, each caste group may be engaged in one form of labour. Even now in many parts of rural India, caste-based segregation exists in place of residence, with dominants castes owning the fertile and high lands. Historically, the out-castes were denied the right own land, have largely been engaged in work that those within the caste system refuse to do, such as cleaning and carrying away the night soil, removing and skinning the dead animals, scavenging, and so on; they live in abject poverty in ghettos in the outskirts of the village. There was and there continues to be in some parts even now, caste practices that prohibited the untouchables from drawing water from the same source as other castes or entering into places where the caste Hindus live. It should be noted, however, that large variations exist in these practices. Apart from these castes, there are also indigenous communities referred to as *adivasis* or tribal people who live in forest areas.

Caste in the colonial and contemporary India

During the colonial rule, the period of social reform movements and in the post-independent India significant changes took place in the both the understanding of caste and in the practices (Aloysius, 1997). In the colonial and post-colonial India, there have been strong anti-caste movements across the country; Jyothiba Phule and Savirthribai Phule, Iyothee Thass, Dr. B. R. Ambedkar, E. V. Ramasamy Naiker, and Narayan Guru are some of the leading figures in the anti-caste movement in India. Many of these leaders themselves came from untouchable castes or labouring castes (*shudra* castes). Dr. B. R Ambedkar, from the untouchable mahar caste, lead many struggles against caste discrimination, wrote and spoke extensively calling for annihilation of caste. He was also the principal architect of the constitution of India and made special provisions for reservation in the legislative assembly and has written extensively about caste and

its implication for the life of the 'depressed classes' as the untouchables were referred to in the pre-independent India.

In the post-independent India, in an effort to uplift marginalised castes and tribes, the government of India grouped the castes into caste categories based on the extent of their socio-cultural marginalisation or privilege. The category Scheduled Castes (SC) consists of the so called out-castes, placed castes outside the caste system, the category Scheduled Tribes (ST) consists of adivasi people across the country and the category Other Backward Classes (OBC) consists of the labour classes who are at different levels at the bottom of the caste system. The castes that do not come under any of the above categories and have enjoyed varied levels of power and privilege are grouped under the category Forward Castes (FC) also referred to as general or open category as they do not qualify for any kind of affirmative action. The term Dalit refers to the political awakening among the untouchable caste communities, though sometimes it is also used interchangeably to refer to someone from the SC category. Dalit writing, Dalit struggles, Dalit feminism, and Dalit studies, are some examples of how the term Dalit carries a political connotation. The terms dominant castes and increasingly the term *savarnas* are used by Dalits to refer to the castes that marginalised them. Both in the pre-independent and post-independent India, some form of positive discrimination or reservation system has been introduced by the government to address the socio-economic and political marginalisation of the historically marginalised castes and tribes. According to the highlights of the census data (2011), at present SC&ST together constitute a little more than 25% of the population. It is believed that OBC's constitute another 41% of the population of India. It is well known that these categories are poorly represented in higher education and in employment in the formal sector. To increase the representation of these communities in higher education and employment 15%, 7.5%, and 27% of the seats in government funded higher education institutions and in government jobs are reserved for those belonging to SC, ST and OBC categories, respectively. This means, if suitable candidates from the specified category are not found, these seats cannot be filled by those from other categories.

It is important to note that caste hierarchies and prejudices continue to operate not only in rural India but in newer and subtler ways in the towns and metropolitan cities in spite of modernisation, urbanization, and globalization. The documentary film '*India Untouched: Stories of a People Apart'* (Stalin, 2007) documents how caste operates across the country and across religion. Even though people from marginalised caste backgrounds converted to Islam, Christianity, Buddhism, and Sikhism to escape caste discrimination, they continue to face discrimination from dominant castes who converted into these religions. Moreover, nearly 80% of SC's and more than 90% of ST live in rural India. Among those who migrated to cities in search of better jobs and to escape caste discrimination, a large section lives in urban slums. A significant percentage of SC&ST are poor and are engaged in daily wage labour. A small minority of SCs and even smaller percentage of STs have managed to access higher education and overcome economic deprivation.

CASTE AND ACCESS TO HIGHER EDUCATION

The discourse on caste and education has largely hovered around the question of merit and that of reservation for SC, ST and, OBC categories. The years 1990 and 2006 saw large-scale protests from the dominant castes against reservation in higher education and government jobs, (particularly for OBCs) saying reservation would result in promoting mediocrity. These protests led to the emergence of Dalit voices across the country arguing in favour of reservation and challenging prevalent notions of merit. Those who entered higher education institutions under reservation have had to face several forms of abuse and marginalisation. Not being able to cope with the situation of academic isolation and social exclusion, a significant number of Dalit students who entered higher education institutions committed suicide, and many dropped out over the years. A series of documentary films under the title *'The Death of Merit*' engage with individual cases of suicide. These unfortunate events drew attention to the socio-economic background of these students, the poor quality of education they received in school, their struggle to overcome the situation, and their high academic achievements at the entry level in spite of poor schooling. They have also brought to the fore the fact that students in higher education institutions dropped out or ended their lives because they were harassed, humiliated, and left with no hope of realising their dreams by the faculty members and fellow students. Caste based discrimination, therefore, could not be dismissed as something of the past; it is an everyday reality even in the institutions of higher learning, in the metropolitan cities of the country (Thorat, 2007).

Rohith Vemula himself was a meritorious student who did not need reservation to join the university. This is because if a student from SC, ST or OBC category earns a high grade that will enable the student get admission automatically, he or she will have to be admitted in the open quota and not under reserved quota. An emerging intellectual, Rohith was active on the campus politics for democracy and social justice. He along with four others were expelled from the hostel on a false allegation by a student affiliated to a right-wing student body. The expelled students set up what they called a *veliwada,* the local term where historically Dalits are supposed to live. Rohith tragic suicide signifies the struggle faced by Dalit students to claim a democratic space on the campuses and it led to a large-scale agitation across campuses for several months, opening up space for Dalit students in the mainstream media to talk about caste discrimination they face in the academic institutions (The Hindu, 2016; The Citizen, 2016).

Chinnadurai, a Dalit, faced continued harassment for four years from three of his classmates who belong to OBC, because they could not tolerate the fact that Chinnadurai's academic performance was exceptionally good. Not being able to bear with the harassment Chinnadurai dropped out, but the school reached out to his parents who brought the harassment he faced to the notice of the school administration. The school gave the three boys a warning and in revenge they tried to hack to Chinnadurai and his sister who intervened to death. The siblings escaped death only because their screams attracted attention from neighbours. In the case of the brothers Brijesh and

Raju, also Dalits, their success in securing admission to the prestigious IITs was resented by some of those who are caste wise higher and as a punishment, they resorted to pelting stones at the house of the bright young men.

CASTE AND ACCESS TO MATHEMATICS

Indian has a long tradition of engaging with mathematics. Indian contribution to mathematics in ancient and pre-colonial India has received much attention in recent times (Plofker, 2012). In colonial and post-colonial India, apart from Srinivasa Ramanujam, whose contribution to mathematics in his short life continues to be an enigma, there have also been several other Indian mathematicians whose work has received international attention. To name a just few, one could consider the contributions of Harish Chandra, P. C. Mahalanobis, C. R. Rao, Subramaniyam Chandrasekar, R. C. Bose, S. Abyankar, M. S. Raghunathan, M. S. Narasimhan, all men and at least half of them Brahmins. A few women like Bhama Srinivasan, Parimala Raman and Sujatha Ramadorai also have received recognition across the world. It would be of interest to note that all the three women mentioned are Brahmins. India has not done well in the International Olympiads, but over the years India has won 20 gold medals. Indian engineers are employed in the software industry all over the world.

From a certain location mathematics education in India would seem at a par with some of the most developed countries. A number of 'International' schools that follow the IB curriculum have emerged in the last couple of decades. Children seeking admission in grade 1 in these schools are expected to know numbers up to 100 at the time of entry. And these are several alternative schools such as Waldorf schools, Krishnamoorthy Foundation schools catering to the elite of the country where mathematics learning is integrated with learning in other subjects. Apart from these, there are top ranking schools (all private or private aided schools) and coaching centres that train students (who can afford their fees) to get admission in the prestigious Indian Institutes of Technology or other engineering colleges. And in the recent past, some students are even choosing to go abroad for higher education. Most of the children who have been though any of these programs, would be comparable to children from anywhere in the world.

But if we step out of this location and take a look at education in the country as a whole, then, the scene presented above almost disappears from one's vision. Even though education alone offers some hope for escaping poverty and the kind of dehumanising jobs carried out only by those from the marginalised castes, only 28.4% of the youth from all castes and only 25.9% of Dalit youth of the college going age access higher education in India. Among them, those who can get world-class education would be a tiny minority. In the larger domain of mathematics education, India figures alongside other developing countries in the low-income bracket with poor literacy (72.1% according to the UNESCO report for the year 2015) and numeracy levels.

In the post liberalization and globalization era, school education in India is getting more and more privatised. Among the private and aided schools affiliated to the central and state boards of education in India there is a fine gradation in fee structure corresponding to the variation in the economic status in the region. Apart from these, there are also public funded schools run by the state governments, referred to as 'government' schools where education is free.

The government schools cater to the poorest of the poor in the urban locations. Even in rural India, education is slowly getting privatised. From a study conducted in the year 2012 (Ramachandran & Naorem, 2013) to understand the caste dynamics in six states of the country, we find that in the government schools, the total percentage of children belonging to SC, ST, and OBC categories in the primary grades is between 73.6 (in Assam) to 97 (Orissa) and in the secondary grades it is between 57 (Assam) to 97.6 (Orrisa). Among these, SC's constitute about 20 to 28 %. In some states ST's constitute nearly 40% and in others about 8%. Except for Rajasthan, in all the other state, the savarnas or dominant caste form only about 7%. In Rajasthan the dominant castes are about 15% of the total enrolment. Moreover, nearly 70% of the children from SC category study in government schools. It is not clear what percentage study in private schools and what percentage have dropped out. From these statistics and the fact that about 80% of the SC population lives in rural India, it is evident that school choice depends on the caste category to which a student belongs and that a child from SC category is most likely in a government school in rural India. Equally, a child from dominant caste background is in a good private school in an urban location. In fact, even in villages where there are no private schools, a family belonging to a dominant caste would move temporarily to a nearby area where there is a private school. It is important to note that everyone wants to put one's children in a private school the moment one has a little more money to pay the monthly school fees. Thus, private schools catering to low-income background have a significant number of OBCs and a few SC, and ST children.

Caste as a living reality in the schools

Caste is a living reality that figures in the school in many ways. Ramchandran and Naorem (2013, p. 48) list in detail the ways in which caste figures in government schools. Dalit children do not have access to drinking water from the same pot or tap. Opportunity to go to the board and write does not always exist for Dalit children. Often Dalit children are asked to clean the classrooms and toilets in the school. Caste determines directly or indirectly who gets to sit where in the class: children from dominant caste and OBC categories sit in the front while Dalit and tribal children sit at the back (Ramachandran & Naorem, 2013). Casteist practices from teachers also reinforce what the students bring in from their everyday life, resulting in the formation of caste groups in the classrooms. Following the Naguneri incident where Chinadurai was hacked, the Tamil Nadu state government constituted a one-man committee consisting of Justice Chandru committee to study how caste enters the school space and how to prevent it. Based on a survey of 644 students in 441 schools (of which 321

are government schools, 58 are government aided schools and 62 are private schools) says in 15 schools Dalits students are made to clean the toilets, in 19 schools caste based segregation exists for drinking water, in 25 schools caste based clashes were witnessed and in 33 schools, students sport wrist bands, bracelets, earrings etc in a specific colour to indicate the caste to which they belong (Ramakrishnan, 2024). These reports show what scope children from marginalised caste background have to see themselves as equal in the school and learn from their peers regardless of the caste background gets limited.

Teachers' knowledge and attitude in teaching mathematics

In our experience with schools and teachers in several parts of the country we found that there are many possible situations because of which Dalit and tribal children miss out their opportunity to learn mathematics unlike their counterparts from dominant castes. Often Government primary schools have just one or two teachers teaching all the students from grades 1 to 5. In such situations, teachers may not be able to devote the time required for teaching even if they wanted to do so. On the other hand, in private schools catering to low-income families, typically teachers are underpaid and as a result those who come to teach may not have the competence or liking to teach mathematics.

In schools where the teachers do have the subject knowledge, they are reluctant to teach these children because they do not believe these children have the ability to learn and they must be taught what is prescribed for them. In our work with government schools and private schools catering to low-income background in Madhya Pradesh, we found that the schools were poorly resourced, with blackboards not writing and classrooms crammed (Subramanian et al, 2015). In the school where we experimented an alternate approach to teach fractions, we faced unwanted sympathy from the teachers saying, "you are working so hard with these children" the implication being, "unless one worked very hard it would not be possible to teach these children and in any case it is not worth it". In the longitudinal work spread over a period of three years when we worked with the same set of children, moving with them from grade 3 to grade 5, none of the teachers from the school showed any interest in knowing what we were trying to do or what the students have accomplished. The achievement of these children did not attract their attention. That the same students who otherwise would have struggled to compare ½ and 1/3, can compare fractions using meaningful approaches, provide argument to support their claims, place fractions on the number line, did not surprise the teachers because, they never really cared to find out that the students can do these. Their only response to the alternate approach was to taunt students by asking "Oh, will you always share rotis whenever you have to answer a question on fraction".

We found the same response from teachers in other schools where we experimented with teaching children the notion of angle and how to measure angles. In several instances, teachers found one excuse or the other not to teach. When we visited classrooms, we found that children were either copying pages and pages of mathematics from a guidebook in which answers to the problems were worked out or

they were reciting the tables. Teachers also told us that the kind of children who are coming to government school these days are not interested in learning. Teacher absenteeism is known to be a common phenomenon in these schools. In short, even at the primary level, teachers who could teach mathematics chose not to teach, showed no interest in learning new approaches, ignored the evidence that when taught using appropriate approaches, children can reason very well, because they did not think that there is any value in these children learning mathematics. Nikita who is a Dalit girl and Bharati who is a tribal girl, both very keen and bright studied in these schools. If only they were not from the castes to which they belonged and if they studied in schools where the dominant caste, middle class children studied, there would have been no doubt that they would excel in mathematics.

In very remote locations, it is difficult to find teachers who know mathematics enough to teach what is required of them at the upper primary and secondary level. This is because, no one qualified enough wants to work in these locations and anyone from the same location who has managed to do better in schools leaves the place for better opportunities in life. Families belonging to dominant castes have migrated from these locations leaving behind only those from SC, and ST and a few from OBC categories. Even private schools catering to low-income background find it difficult to attract competent teachers because neither the pay is good nor is it a matter of pride to teach the socio-economically marginalised children.

We also found some very motivated and competent mathematics teachers when we were involved in mathematics curriculum and textbook development in the state of Rajasthan and during textbook revision in the state of Andra Pradesh. The teachers from government schools in Andra Pradesh were adept at using digital resources for teaching mathematics. However, their knowledge does not always reach the Dalit and tribal children in the government schools where they are employed. Rather, they put their knowledge to use outside the school, in the private tuition centres where they teach those children who have the money to pay and deserve to learn. For children in government school, they teach just that much mathematics that will help them scrape through the final examination. In other words, children from the marginalized castes are systematically denied opportunity by the teachers and the education system, to learn what their dominant caste counter parts learn.

Dalit Learners experience of mathematics in school

Murali Krishna, a Dalit academic who says he succeeded in not dropping out of school because he managed to barely pass in mathematics in the school final examination talks about the kind of discrimination and exclusion that Dalit children face in school (Murali Krishna, 2012). In a personal conversation, I told him that if he had had the opportunity to study in a good school, where the teachers were knowledgeable and competent, he would have probably excelled in mathematics; he responded by saying that studying in a good school is not a sufficient condition, because often teachers do not want to teach mathematics to Dalit children. Echoing his voice, another Dalit educator who managed to study mathematics up to graduation says, many Dalit

children who get very good grades in the school final examination are refused opportunity to opt for mathematics and science at the intermediate level saying they will not be able to cope with mathematics at that level. Two Dalit women who were pursuing higher education in an institution where I taught say they hardly got an opportunity to learn any mathematics in school. They say that they managed to pass the school final examination with whatever oral mathematics they learnt from their illiterate parents. One of them says in a classroom with 120 students, Dalits students never had the courage to talk to teachers or ask questions. Teachers only addressed the 'good' students seated in the front. Another says, dominant caste children had opted to learn mathematics outside the school paying additional tuition fees, which the poor Dalit students could not afford. So, they were mostly ignored in the classroom except when the teacher was angry and ask them a question with the intention to punish.

CONCLUSION

For Nikita and Bharati, it is not their economic status or lack of ability in mathematics that is responsible for poor access to mathematics. It is the caste background that determines their scope for learning mathematics (Sadafule & Bernstein, 2017). They have managed to pass the school final examination on their own resources and enrol pursued higher education, though not in mathematics. It is easy to see that purely on account of her own efforts Sunita, coming from a similar background, finished school and pursued mathematics at the undergraduate level and enrolled to graduate in the master's programme in mathematics from a prestigious university. Ill prepared as she was and marked as a dull student and ignored by the university, she committed suicide when even her love life failed.

Given that 80% of the Dalits and 90% tribals live in rural India and a large percentage of Dalits and tribals are poor, it is fair to assume that predominantly Dalit students study in government schools or low-fee taking private schools and face caste-based exclusion in the school. Typically, they are forced to sit in classrooms where no teaching happens, and so they struggle to cope with school education on their own and get to learn very little compared to their cohorts from dominant castes. As a result, for every Murali Krishna and others who have miraculously managed to pass the mathematics paper school in final examination and succeeded in accessing higher education, there are several Dalit and tribal children who fail in school mathematics often leaving them with no option but to return to the kind of demeaning occupation that they desperately want to escape. The minority among the Dalit learners who did not drop-out of school at some stage, fail in mathematics in the school final examination, and were not counselled to opt for mathematics at the intermediate level, enter college wanting to major in mathematics with limited knowledge of mathematics, irrespective of their ability and interest in the subject, and pushed to occupy the back benches in the college. For female Dalit and tribal students, it is even more difficult to access mathematics because they suffer both caste-and gender-based discrimination in

school. It is a miracle that some of them managed to reach a university to pursue a master's degree in mathematics as Sunita did.

Segregation in education in India may appear to be based on the economic background with a negligibly small minority accessing quality education in mathematics. This picture does not reveal the fact those who can afford good education in India belong to the dominant castes; moreover, for those coming from dominant castes but low economic background, their caste privileges overweigh their poor economic status in ensuring mobility in socio-economic status. The bulk of students who have very poor access to quality education in mathematics do so because they belong to marginalised castes. Poverty alone therefore is not adequate to understand issues in mathematics education in India. Caste needs to figure as a central factor to understand access and exclusion in mathematics.

It would be ethically appropriate to for me state my own positionality in what I have presented. I was born and brought up in a dominant caste lower middle-class family that saw education and economic independence as achievable for its daughters and prioritised them.

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