

MATHEMATICS EDUCATION IN THE TIMES OF MANUVADAM AND MASSIVE PRIVATIZATION

A EDUCAÇÃO MATEMÁTICA NOS TEMPOS DO MANUVADAM E DA PRIVATIZAÇÃO MASSIVA

LA ENSEÑANZA MATEMÁTICA EN LOS TIEMPOS DE MANUVADAM Y LA PRIVATIZACIÓN MASIVA

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ABSTRACT

Mathematics has, not only a long history in India like in any other ancient civilization, but it also carries a very high value in the present-day India, basically because of its importance in engineering education. India has made some important contributions to mathematics in the last 150 years. Yet, such a description hides the fact that ‘India’ here refers to a tiny minority of Hindu dominant caste middle-class men (and a couple of women from the same socio-cultural and economic background). Though precolonial India had indigenous traditions of education, the caste and gender to which one belonged determined what kind of education one could get. It is only during the colonial rule that access to education was made independent of one’s caste and it is only as late as 2009 that India made the right to education a fundamental right, making free and compulsory education available for all up to the age of fourteen. The representation of those from marginalized castes in institutions of higher education and the public sector has been meagre and to address this the government of India introduced a form of affirmative action that reserved a certain percentage of seats in institutions of higher education and employment for those from marginalized castes and tribes. In the 1990s the union government introduced the Mandal recommendations extending reservation to the backwards castes. Though this led to massive protests by the dominant castes arguing that selection criteria should be one’s merit and not the caste to which one belonged, the post-Mandal period saw the emergence of new knowledge that critically engaged with the notion of merit and the caste question in academia. The National Curriculum Framework in 2005 internalised some of the new understandings and addressed the caste question in school education seeking to empower learners from marginalized caste backgrounds. However, over the decades, there has been a rise in Hindu fundamentalism actively fanned and supported by the Rashtriya Swayam Sevak (RSS) and in three consecutive elections held in 2014, 2019 and 2024, Bhartiya Janata Party (BJP), a Hindu right-wing political party came to power at the centre allowing it the opportunity to introduce a new education policy in the year 2020 and make significant changes to school education and higher education. This policy and its implementation have come for strong criticism from educationists. This paper seeks to engage with the question of marginalization, discuss how caste and gender privilege some and exclude some in mathematics, the small gains made following the Mandal recommendation in the 1990s and argue that Hindu

fundamentalism seeks to restore the manuvadam¹ - the caste order which puts people in a social hierarchy based on caste right at the time of birth. The paper seeks to bring to light the systematic ways in which the RSS-BJP combine deploys manuvadam and increasing privatisation together to ‘saffronize’ school mathematics curriculum on the one hand and nullify the effects of Mandal recommendations by increasing privatization of higher education and employment in the country.

Keywords: mathematics education. caste. reservation policy. privatization of education. ethnomathematics. manusmriti. Vedic mathematics.

RESUMO

A matemática tem, não só uma longa história na Índia como em qualquer outra civilização antiga, mas também carrega um valor muito elevado na Índia atual, basicamente devido à sua importância no ensino de engenharia. A Índia tem dado algumas contribuições importantes para a matemática nos últimos 150 anos. No entanto, tal descrição esconde o facto de que “Índia” aqui se refere a uma pequena minoria de homens de classe média da casta dominante hindu (e a um par de mulheres do mesmo contexto sociocultural e económico). Embora a Índia pré-colonial tivesse tradições indígenas de educação, a casta e o género a que se pertencia determinavam o tipo de educação que se podia obter. Foi apenas durante o domínio colonial que o acesso à educação se tornou independente da casta e só em 2009 é que a Índia tornou o direito à educação um direito fundamental, disponibilizando a educação gratuita e obrigatória para todos até aos catorze anos de idade. A representação daqueles provenientes de castas marginalizadas nas instituições de ensino superior e no sector público tem sido escassa e, para resolver isto, o governo da Índia introduziu uma forma de acção afirmativa que reservou uma certa percentagem de lugares em instituições de ensino superior e de emprego para os de castas e tribos marginalizadas. Na década de 1990, o governo sindical introduziu as recomendações Mandal estendendo as reservas às castas atrasadas. Embora isto tenha levado a protestos maciços por parte das castas dominantes, argumentando que os critérios de selecção deveriam ser o mérito de cada um e não a casta a que pertenciam, o período pós-Mandal assistiu ao surgimento de novos conhecimentos que se envolveram criticamente com a noção de mérito e a questão da casta. O Quadro Curricular Nacional de 2005 interiorizou alguns dos novos entendimentos e abordou a questão das castas na educação escolar, procurando capacitar os alunos provenientes de origens de castas marginalizadas. No entanto, ao longo das décadas, tem-se assistido a um aumento do fundamentalismo hindu, ativamente atizado e apoiado pelo Rashtriya Swayam Sevak (RSS) e em três eleições consecutivas realizadas em 2014, 2019 e 2024, pelo Partido Bhartiya Janata (BJP), um partido hindu de direita. Esta política e a sua implementação têm sido alvo de fortes críticas por parte dos educadores. Este artigo procura abordar a questão da marginalização, discutir como a casta e o género privilegiam uns e excluem outros na matemática, os pequenos ganhos obtidos após a recomendação Mandal na década de 1990 e argumentar que o fundamentalismo hindu procura restaurar o manuvadam - a ordem de castas que coloca as pessoas numa hierarquia social baseada na casta logo no momento do nascimento. O artigo procura trazer à luz as formas sistemáticas como o RSS-BJP combina a implantação do manuvadam e o aumento da privatização para “safronizar” o currículo escolar de matemática, por um lado, e anular os efeitos das recomendações de Mandal, aumentando a privatização do ensino superior e do emprego no país.

¹ The term Manusmriti means the law of Manu and is used to refer to the Hindu code of law. Manuvadam is the ethos of the society governed by Manusmriti

Palavras-chave: educação matemática. castas. política de cotas. privatização da educação. etnomatemática. manusmriti. matemática védica.

RESUMEN

Las matemáticas no sólo tienen una larga historia en la India, como en cualquier otra civilización antigua, sino que también tienen un valor muy alto en la India actual, básicamente por su importancia en la enseñanza de la ingeniería. La India ha hecho algunas contribuciones importantes a las matemáticas en los últimos 150 años. Sin embargo, esta descripción oculta el hecho de que “India” aquí se refiere a una pequeña minoría de hombres de clase media de la casta dominante hindú (y un par de mujeres del mismo entorno sociocultural y económico). Aunque la India precolonial tenía tradiciones educativas autóctonas, la casta y el género al que uno pertenecía determinaban el tipo de educación que uno podía recibir. Fue sólo durante el régimen colonial que el acceso a la educación se hizo independiente de la casta de uno y fue recién en 2009 que la India convirtió el derecho a la educación en un derecho fundamental, haciendo que la educación sea gratuita y obligatoria para todos hasta la edad de catorce años. La representación de las personas pertenecientes a castas marginadas en las instituciones de educación superior y en el sector público ha sido escasa y, para abordar este problema, el gobierno de la India introdujo una forma de acción afirmativa que reservaba un cierto porcentaje de plazas en las instituciones de educación superior y empleo para las personas pertenecientes a castas y tribus marginadas. En la década de 1990, el gobierno de la Unión introdujo las recomendaciones Mandal, que ampliaban la reserva a las castas atrasadas. Aunque esto provocó protestas masivas de las castas dominantes que argumentaban que los criterios de selección deberían ser el mérito de la persona y no la casta a la que pertenecía, el período posterior a Mandal fue testigo del surgimiento de nuevos conocimientos que abordaban críticamente la noción de mérito y la cuestión de las castas en el ámbito académico. El Marco Curricular Nacional de 2005 internalizó algunas de las nuevas concepciones y abordó la cuestión de las castas en la educación escolar, buscando empoderar a los estudiantes de orígenes de castas marginadas. Sin embargo, a lo largo de las décadas, ha habido un aumento del fundamentalismo hindú alentado y apoyado activamente por el Rashtriya Swayam Sevak (RSS) y en tres elecciones consecutivas celebradas en 2014, 2019 y 2024, el Partido Bhartiya Janata (BJP), un partido político hindú de derecha, llegó al poder en el centro, lo que le permitió la oportunidad de introducir una nueva política educativa en el año 2020 y realizar cambios significativos en la educación escolar y la educación superior. Esta política y su implementación han sido objeto de fuertes críticas por parte de los educadores. Este documento busca abordar la cuestión de la marginación, discutir cómo la casta y el género privilegian a algunos y excluyen a otros en matemáticas, los pequeños avances logrados después de la recomendación Mandal en la década de 1990 y argumentar que el fundamentalismo hindú busca restaurar el manuvadam, el orden de castas que coloca a las personas en una jerarquía social basada en la casta desde el momento del nacimiento. El documento busca sacar a la luz las formas sistemáticas en que la alianza RSS-BJP implementa manuvadam y aumenta la privatización en conjunto para “azafranar” el currículo de matemáticas escolares por un lado y anular los efectos de las recomendaciones de Mandal al aumentar la privatización de la educación superior y el empleo en el país.

Palabras clave: educación matemática. castas. política de reserva. privatización de la educación. etnomatemáticas. manusmriti. matemáticas védicas.

Introduction

In the year 2013, Swapna Mukhopadhyay in her plenary paper presented in MES 7 talked about the mathematical practices of those without power. Beginning with a quote from Freire that ‘the intellectual

activity of those without power is always characterized as non-intellectual’ her talk focused on the ethnomathematical knowledge embedded in the work of boat builders of West Bengal, India. Swapna’s paper gave (us in India) a radically new understanding of what constitutes mathematical knowledge and held out hope for uncovering similar mathematical knowledge embedded in the traditional occupation of many communities in India. In the year 2015, Anita Rampal in her plenary paper for MES 8 traced the history of critical engagement with mathematics and science education in India starting with the work of the Hoshangabad Science Teaching Program in the 1970’s and the National Literacy Campaign of the 1990 and situated the development of primary mathematics curriculum and textbook following the National Curriculum Framework 2005 (NCF2005 hence forth) in the context of these interventions. The primary mathematics textbooks for the first time transformed the form and content of mathematics textbooks by bringing in lived realities and everyday mathematical contexts as legitimate sources of mathematical knowledge to be transacted in the classroom. Between these two MES conferences, in the year 2014 Bharatiya Janata Party (BJP), a Hindu right wing political party came to power in the national election with Narendra Modi as the Prime Minister of India. This is the second time BJP formed the union government at Delhi and already during its first stint it came up with a new curriculum framework (NCF 2000) and textbooks. The history textbooks brought out by the union government following NCF 2000 were criticised for communalising the high school history curriculum (Habib et al, 2003; Sundar, 2003). After its election to power in 2014, there were enough indications that BJP would meddle with education and this time it would distort not only history but also mathematics and science to glorify the ‘great Indian (read Hindu) past’. In 2019 the government sought to change the existing educational policy and circulated a 484-pages draft educational policy which revealed more of what is in store for the country than the later 56 pages final version of the national education policy officially brought into existence in 2020, which will hence forth be referred to as NEP2020. The policy came in for strong criticism from senior and highly regarded educationist, academics, activists and concerned public, arguing that it undermines the constitutional educational agenda and goes against the constitutional mandate of right to education, ignores social justice concerns, is market driven and so on (Batra, 2020; Kumar 2019; Rampal, 2020; Govinda 2020, Haragopal 2020, Menon, 2020). In this paper I want to describe the complex context in which mathematics education takes place in India, discuss the importance of caste and gender as intersecting frameworks to decode not only exclusion in mathematics and mathematics education in India, but also in confronting white supremacy (Stinson, Subramanian & Yeh, 2024) in mathematics education and finally discuss the implication NEP2020 for mathematics education in India.

“Indians are so good at Mathematics!” But who are ‘Indians’?

There seems to be a concerted effort on the part of the Indian media to promote the notion that Indians are good at mathematics. Here are some headlines from popular digital media ‘Why are Indians great at Mathematics and Computer Programming?’ (Sureka, 2023), ‘GMAT: Indians good at math, Chinese better’ (Mukherji, 2011) with the subtitle ‘Here’s proof that Indians have a flair for mathematics. Indians scored higher than the global average in GMAT’s quantitative section that tests math skills in 2010’. The content following these headlines would often refer to Aryabhata, Brahma Gupta, Bhaskara and other great mathematicians of Ancient India, to the genius of Ramanujan and to the presence of a large number of Indians in the IT sector, and in the Silicon Valley. Reference will also be made (by those who know) to the works of the 20th century mathematicians such as Harish Chandra, C.S.Seshadri, M.S.Narasimhan, M.S.Raghunathan, V.S.Varadharajan, C.R.Rao, Mahalanobis, and others. What these references do not reveal is the fact that ‘Indians’ here refer largely to dominant caste, cisgender, heterosexual, middleclass men from urban and semiurban India. In fact, both mathematics and the IT industry are dominated by one caste, namely, Brahmins. Problematising the ideology of ‘merit’ and how it excludes many and produces a homogenous workforce in IT sector (Upadhy, 2007) Carol Upadhy says ‘(m)edia reports and hagiographic accounts of the rise of the IT industry often refer to the high level of development in mathematics and astronomy in ancient India as proof of Indians’ special skills in maths and logic’ (Upadhy, 2020) and quotes Gurcharan Das (Das, 2002), Nandan Nilekani and American media according to all of whom, Brahmins’ experience in dealing with abstract

philosophical and spiritual concepts of Upanishads explains why ‘Indians’ are good at mathematics, theoretical physics and cybernetics, and if the Brahmins could ‘hack it in Sanskrit, what is the big deal with Java’ conflating all Indians with Brahmins². Renny Thomas discusses at length how premier science institutions are dominated by Brahmins and other dominant castes and how science is seen as Brahmins’ calling (Thomas, 2020).

Practicing mathematicians too justify the dominance of Brahmins in mathematics as the following example illustrates:

‘I think more Brahmins have gone into science. Tamil Iyengars³ have gone into mathematics maybe because Ramanujan was there as a role model. Some abstraction is... for Brahmins it was easy. Culturally, they were more tuned to refinement; it is there in the culture. The physicists try to look at nature, but at least they have a model. Mathematicians don’t have even that. It is even more abstract. There is a big level difference in abstraction.’ (Subramanian, 2007)

It is worth noting that access to Sanskrit as a language and the Vedic knowledge were limited to Brahmin men, making Brahmin women and people of other caste unworthy of the ‘deva bhasha’ (language of gods) and abstract Vedic knowledge. In other words, historically and in modern India, caste and gender are central to who gets to do mathematics. Indian government does not make data on caste-wise or gender-wise representation in academic institutions readily available in the public space. So, by going through the webpages of different institutions we find that the representation of women mathematicians in premier research institutions, is roughly 10% even though they constitute nearly 50% of the population of India. On the other hand, even at a time a career in mathematics is not as attractive as one in computer science and technology or in management, at a conservative estimate, the representation of Brahmins as faculty members in the same institutions is above 25% even though they constitute less than 5% of the total population (and so brahmin men about 2.5%). It is difficult to find what percentage of mathematicians in these institutions are from other castes.

Gender based overrepresentation of able bodied, dominant caste, middle class, cisgender, heterosexual males start right from the beginning of undergraduate education or even before. In the prestigious B. Tech programs offered by the Indian Institutes of Technology, girls constitute less than 10% of the students enrolled (Banerjee & Mulay 2007). In the regional and national Olympiad exams which are held to shortlist and train students for International Mathematics Olympiad girls are very poorly represented and we do not have information on caste-based representation.

A brief note on Caste as a social structure

Centrality of caste to STEM becomes clear from the overrepresentation of Brahmin and dominant caste people in STEM areas and the contestable justification provided for the overrepresentation of Brahmins as mentioned above. For example, of the 6043 faculty members employed in the 23 prestigious Indian Institutes of Technology, only 149 (less than 2.5%) are from the most marginalised castes and only 21 (0.3%) are from the marginalized tribes (Sahoo, 2021). Also, because the history of ancient Indian mathematics refers to Sanskrit as the language in which most of it was presented⁴ and the so called ‘Vedic’ mathematics⁵, claims that all the western mathematical knowledge was already present in Vedas, they carry a caste connotation. Caste is a social stratification of the Hindu society into hierarchical subgroups, and it is integral to India, and her neighbours. There are thousands of castes, and they are part of the varna system. There are four varnas and each varna has several castes and subcastes. Brahmins, the priestly community are at the top of the varna system. Kshatriyas consisting of the rulers

² The reference to this in a 1997 article by Robert Cringely is only available at the blog <http://aslikhabar.blogspot.com/2011/01/sanskrit-classical-language-of-hinduism.html>

³ Brahmin caste is the only pan Indian caste, but it has subsects which are regional. Iyengar is a subsect of the Brahmins who speak Tamil, the other dominant subsect being Iyer.

⁴ It must be mentioned that Buddhists and Jains too made significant contribution to ancient Indian mathematics and some of the text is in other languages like Prakrit (Jhadav, 2017)

⁵ A set of sixteen shortcuts that a Shanaracharya came up with in twentieth century and named it ‘vedic’ mathematics (Subramanian, 2021)

and warriors at the second level of the varna system. Vysya or Banias consisting of the traders and money lenders etc belong to the third level and Sudras consisting of all castes engaged in productive labour are placed at the bottom of the varna system. Those who are forced to do the kind of work that are considered polluting, such as removing the dead animals, cremating the dead, cleaning the public space, working with leather, etc are placed outside the varna system. These castes are called outcastes, or paraiahs and treated as untouchable. Post independent India constitutionally prohibited the practice of untouchability. Presently the term Dalit is used to refer to those who were considered outcastes or untouchables. One's caste identity is determined even before birth- it is the caste of one's parents; caste is perpetuated by caste endogamous marriages⁶. One cannot easily shed one's caste identity even after converting to other religions is evident from the use of terms such as 'Dalit Christians' and 'Dalit Muslims'

Traditional occupation in India is caste based, and the traditional knowledge associated with the occupation is the preserve of caste. So, for example, weavers belong to one caste, goldsmiths belong to another, each of washermen, barbers, shoemakers to three different castes and so on, which points to the centrality of caste to ethnomathematical knowledge in India.

With access to modern education and with the spreading of enlightenment values of liberty, equality and fraternity under the colonial rule, anti-caste movements emerged in different parts of the country starting from early 19th century. Ambedkar and Periyar E.V.Ramasamy among others called for the annihilation of caste. The constitution of India – shaped under the leadership of Ambedkar- prohibits untouchability, and the practice of casteism in public places. However, the cultural practices, rituals associated with birth, marriage, death, religious ceremonies, vary from caste to caste, and marriages continue to remain caste endogamous as a result of all of which, caste remains a living institution in the personal sphere even though caste-based discrimination, abuse, humiliation are punishable. As every form of social stratification is accompanied by economic inequality, those who belong to the marginalised castes are also poor, with most marginalised castes facing extreme poverty. Also, marginalised castes are overrepresented in poorly paying menial jobs such as cleaning or scavenging or hard manual labour all of which are part of the informal sector in modern workforce; rural India as well as migrant labourers have a large percentage of marginalised caste people (Rawal & Swaminathan, 2011). Moreover, the school dropouts/pushouts, and those who fail in the school final examination belong to the intersection of marginalized castes, genders and economic deprivation.

Modern Indian state classifies the castes in to broadly three official categories in order that the state can take measures to provide protection from caste-based oppression, and some opportunity for education and employment outside the caste structure for the marginalised castes. The Scheduled Castes (SC) also referred to as Dalit consists of castes that face extreme forms of social discrimination such as untouchability and severe economic deprivation. The castes which are poor but are slightly better off than those falling under the SC category are grouped into the category Other Backward Castes (OBC) with some regional differences- in some parts the most backwards castes among them are categorised as Most Backward Caste (MBC). The remaining castes which are relatively more powerful are referred to as 'dominant castes' or 'forward castes.' According the 2011 census SC constitute 16.6% and OBC 44.4% of India's population. In order to ensure access to higher education for the marginalized castes, Indian state introduced reservation for SC and ST⁷ students in the 1950's and later with Mandal Commission recommendations, it was extended to OBCs in the 1990s. These lead to large scale protest across the country and to the recognition of caste not just as a social structure or a dying practice but as a strong political force shaping almost all spheres of activity in modern India (Illaiah, 1990, Das, 2000). In her compelling book 'Caste of Merit' Ajantha Subramanian (2019) discusses how the Indian Institute of Technology, Madras (IIT Madras) transformed from a place where students never mentioned the word

⁶ See Ambedkar (1916) for a detailed discussion on what distinguishes caste from other forms of social stratification and Deshpande (2003) to understand how caste determines one opportunity for life changes in Independent India.

⁷ The tribal people of India, fall outside the caste society. Referred to as forest dwellers or mountain dwellers the tribal people also face severe economic deprivation, social ostracization and educationally backward. The term Scheduled Tribes (ST) is used by the modern Indian state to refer to them. They constitute roughly 8% of India's population.

caste to a place today where caste is a very visible factor, and this has to do with the fact that it is only now marginalized castes have been able to enter the IITs taking advantage of the reservation policy.

Mathematics as a gatekeeper under the facade of ‘Mathematics for All’

True to its commitment to link everything to the glorious Indian past, and to declare that the latest and the most advanced ideas of the highly industrialized modern world were already known in ancient India, NEP2020 says,

The aim of education in ancient India was not just the acquisition of knowledge as preparation for life in this world, or life beyond schooling, but for the complete realization and liberation of the self. World-class institutions of ancient India such as Takshashila, Nalanda, Vikramshila, Vallabhi, set the highest standards of multidisciplinary teaching and research and hosted scholars and students from across backgrounds and countries. (NEP2020, pp2)

This hides the fact that access to education in ancient India was caste based as occupations were caste based and access to scholarly knowledge was denied to all except brahmin men. It is only in the early 19th century, under the colonial rule that access to school education was made available to all formally and only in 2009, the Right to Education Act made education compulsory for children between the age of 6 to 14, making it the responsibility of the state to ensure that children in the above age group are enrolled in school, attend school and complete schooling.

It is important to note that starting from the 19th century, India saw several movements from the marginalized castes across the country to make modern education available for their people. Jyothiba Phule and Savithri Bai Phule, Fatima Sheik, Sree Narayana Guru, and Ayothi Thassa Pandithar are some from the marginalized castes or minority religion themselves, who realized the importance of education for emancipation and worked for the education of the depressed classes (as the marginalized castes were referred to then). The significant role Christian missionaries played in taking education to the marginalized castes should be acknowledged. In spite of these efforts, even after two centuries, quality education and employment remain distant dreams for the socio-economically marginalized sections and as is the case elsewhere in the world, mathematics plays an important role as a gatekeeper in this.

In India, as in many other countries, mathematics is a compulsory subject in school from grade 1 to 10. The Position Paper on Mathematics by the National Focus Group on Teaching of Mathematics (Position Paper 2005) declares ‘(o)ur vision of excellent mathematical education is based on the twin premises that all students can learn mathematics and that all students need to learn mathematics. It is therefore imperative that we offer mathematics education of the very highest quality to all children.’ Such lofty goals notwithstanding, mathematics in fact functions as a gatekeeper, denying young adults from the socio-economic margins, their chance to successfully complete school education, pursue higher education and escape from poverty and social stigma associated with caste based occupation. To know if ‘mathematics for all’ is a mere slogan, we need to fragment ‘all’ into sociopolitical, cultural, and economic categories which shape educational opportunities in general and the opportunity for learning mathematics more specifically.

India is perhaps one the few countries fragmented by several intersecting hierarchies with each having a strong implication for success or failure in mathematics education. In addition to gender, sexual orientation, class, and disability which shape opportunities for pursuing mathematics successfully almost across the world, caste, ethnicity, language, religion, region, zones under conflict, migration for labour are important factors that determine the quality of mathematics education one receives and one’s

opportunity to succeed in it in India⁸. Moreover, the way universal categories, such as gender and class operate depends on the specific social context in which they operate.

To understand if ‘mathematics for all’ can be realized and if ‘mathematics education of the very highest quality’ be given to all children, we need to look out for learning obstacles (Skovsmose, 2018) on the way. We need to ask, what could be the scope for learning mathematics, leave alone mathematics education of very high quality, when,

- students study in schools that are so under resourced that there is not even a proper blackboard on which the teacher can successfully workout one problem or
- the classrooms do not have benches to sit on and the bare floor is too cold in the winter and too wet in the rainy season to sit and focus on what is being taught or
- the teacher finds the classroom too cold, assigns some writing work to children and goes and sits in the sun or
- students are enrolled in a primary school with a single teacher⁹ to teach all the five grades all the subjects, or
- girls, too poor to have private transport, drop out after grade 5 because there is no public transport to go to the nearest elementary school and it is not safe for adolescent girls to walk the distance alone, or
- they are girls from the marginalized caste, rural poor whose teachers believe that there is no point in trying to teach fractions, algebra, and geometry to these girls because they will eventually go to work in the agricultural fields or
- they are children from urban slums studying in private schools catering to the low-income bracket and the teachers are underqualified and over worked or
- the learner’s home language does not match any of the languages in which mathematics education is offered¹⁰, or
- the curriculum does not invite the learners to ponder about the mathematical ideas embedded in activities such as boat building, ikat weaving, Kholapuri shoes making and so on that their parents engage in without knowing the language of mathematics that they learn in school, or
- a learner’s parents migrate in search of work several times in a year that it is difficult to find schools which offer education in the same medium in which the learner learnt in the previous school before the most recent migration, or
- schools remain closed for months on because of political conflict such as what we encounter in Jammu-Kashmir or now in Manipur, or
- a section of learners from across the socio-economic spectrum find it difficult to cope with mathematics and has anxiety attacks, or
- the schools have no provision to address the needs of disabled learners or
- they are girls from affluent homes, studying in high-end private schools but the schools do not believe girls are good enough to take part in regional mathematics Olympiad, or
- the mathematics curriculum does not acknowledge the fact that a large number of learners would never need to use most of the mathematics that is presently taught to them in school.

In the above list the first 8 groups are made up of students from only SC, ST and OBC castes which only reiterates the importance of caste in taking advantage of education and the deficit that the learner would carry forward in each case is systemic. In other words, even as people from the marginalized castes and tribes aspire for education and employment to escape poverty, dehumanising caste-based work and seek to live a life of dignity, their aspirations remain unfulfilled because of the systemic failure on the part of

⁸ Speaking in the context of education Padma Velaskar (2010) argues that ‘Caste, class, religion, language, gender powerfully shape everyday life of schools, through cultural values and common-sense meanings. The processes have visceral emotional, cognitive and pedagogic effects on children’. It goes without saying that the same holds for mathematics education.

⁹ 11% of the primary schools are single teacher schools according to Jha and Parvati, (2014)

¹⁰ India is a multilingual country with several thousand living languages of which 270 mother tongues have more than 10,000 speakers. As a result of linguistics reorganization of the states in post Independent India, there are 22 standardized state languages called scheduled languages in which mathematics education takes place, calling for studies to understand the challenges involved some of which I discuss in a recent paper in ZDM (Subramanian & Venkateswaran, 2023).

the state to provide them schools with basic facilities, teachers with professional commitment and adequate training to teach socio-culturally marginalised students, and transportation. And ‘mathematics for all’ under these conditions functions to ensure that those who overcome the many hurdles in the system and hope to finish school will fail to do so because they will fail in mathematics.

Ole Skovsmose (2005) uses the term foreground of a person to ‘understand the opportunities, which the social, political and cultural situation provides for this person. However, not the opportunities as they might exist in any socially well-defined or ‘objective’ form, but the opportunities as perceived by a person’. And he says a ruined foreground is a learning obstacle and ruining certain group of students’ foreground is a socio-political act. In the name of free education or low fee taking private education, when students are provided schools where learning cannot happen, the education system ruins the foreground of the students who are already facing severe socio-cultural and economic marginalization.

The normative learner that mathematics curriculum and textbooks address is an able bodied learner from dominant caste whose parents place a very high value on education and are in a position to supplement the efforts of the school to ensure quality education for their children, whose aspiration could be as high as to become a Ramanujan, a Sundar Pitachi or a Satya Nadella or at least to become a run of the mill mathematician, scientist, or engineer and who is not intimidated by mathematics. Indeed, the Position paper (NCF 2005) makes repeated reference to the talented minority and the disinterested majority even as it calls for quality mathematics for all.

It is not surprising therefore that able bodied heterosexual dominant caste men are overrepresented in the mathematics departments of premier institutions, in the selection committees for faculty positions, in the list of awards and recognitions, in committees that design school mathematics curriculum, and dominant caste boys are overrepresented in undergraduate mathematics and technology programs in the top-ranking institutions, and among those shortlisted to appear for International Math Olympiad. Nor is it surprising that students from the marginalised socio-cultural, economic, linguistic, caste, ethnic backgrounds are overrepresented among those who fail in mathematics in the 10th grade examination, or among those who drop out of school or those who have no chance of successfully completing higher education in mathematics even with the support of reservation.

Action sans Research: Interventions in Mathematics and Science Education

India invests next to nothing in education research although every state has its own State Council of Education Research and Training apart from the National Council for Education Research and Training (NCERT). The teacher training programs, except for the 4-year Bachelors in Elementary Education program launched by the Delhi University in 1994-95, the 4-year BSc Ed program offered by the NCERT, and the recently introduced teacher education programme at TISS, leave much to be desired. Curriculum design and textbook development are rarely informed by current research in mathematics education with the singular exception of National Curriculum Framework 2005 which attempts to bring in recent research in cognitive sciences and socio-cultural aspects to inform curriculum development. This leaves the field of education, particularly mathematics and science education, open for interventions of all kinds, the least ambitious being commercial tuition centres run by anyone who feels confident enough to teach mathematics to supplement what is taught at school, help with homework, and provide more drill and practice. In some of the metropolitan cities there are branded tutorial platforms (which call themselves educational technology company) that run online and offline classes like Byjus, Cue Math etc which offer additional training in mathematics beyond what is offered by the school mathematics curriculum- it could be abacus or Vedic mathematics or whatever else might be the current fashion. There are elite private coaching centres which offer specialized higher-level mathematics to motivated and capable children to get an edge over others in competitive exams and massive coaching centres that provide intensive coaching to excel in the entrance examination for IITs and other engineering colleges. Some of these parallel coaching centres are powerful enough to even undermine the prescribed mathematics curriculum at grade 11 and 12 in the sense that students attach more value and invest more time and energy in what they learn in the coaching centres than what is taught at school.

These interventions which are outcome based, and not necessarily concerned with cognitive issues could be called interventions by the middle-class dominant caste for themselves. These interventions, uninformed by research in mathematics education are not concerned with cognitive issues aimed at providing the learner a meaningful, conceptually rich experience of mathematics. These commercial interventions offered by the middle-class dominant caste people mostly in urban India function as a parallel education 'system' that seeks to undermine school mathematics and give their children an advantage over those who can only afford what school offers.

At the other end of the spectrum are NGOs, also run by middle class, dominant caste people (with a few exceptions), that seek to address the unequal opportunity for education of the children from marginalized background. They institute study centres or even alternate schools, which experiment with alternate approaches to teaching and learning. Eklavya Foundation, an NGO in Madhya Pradesh deserves a special mention here because of the support it received from the government to run a parallel science teaching program called Hoshangabad Science Teaching Program (HSTP) in a few districts on Madhya Pradesh which allowed for large scale intervention over a period of twenty years, resulting sustained in-service teacher development programs, alternate curriculum and material development, learning science by carrying out experiments using locally available material, innovation in approaches to assessment (Balagopalan, 2003, Rampal, 1992). Prashika, the primary school program of Eklavya came up with the innovative approach that combines language and mathematics education in the early grades, draws upon local resources like stories and songs to enrich the textbook and also raises the language question in primary education including mathematics education (Agnihotri et al 1994). Eklavya's experience brings to light the politics of language, the difference between mother tongue/home language and the standardized state language and how the Sanskritized and/or standardized Hindi used in the textbooks make them inaccessible for Hindi speaking learners whose Hindi is not Sanskritized or standardized, and the multiplicity of Hindi spoken by people in different parts of Madhya Pradesh (Saxena & Mahendroo, 1993). Jodogyan, an NGO in Delhi, Adharshila which works with tribal children in Madhya Pradesh for social change through education are just a couple of examples from hundreds of similar initiatives from NGOs across the country. While learnings from some of these interventions, particularly the work of Eklavya have contributed to NCF2005 (Rampal, 2015, Kumar, 2005), it should be emphasised that even hundreds of such interventions cater to only a tiny minority of students studying under resourced and understaffed schools.

In the absence of state support to committed research in mathematics education, periodic curriculum revisions do not amount to anything but a radical curriculum imposed from above that is often shelved by the teachers or a rehashing the old stuff with minor changes such as for example including some female names and images, including a festival celebrated by a middle level¹¹ castes or introducing a new topic because it has found entry in international curriculum. Curricular innovations carried out by NGO's are largely limited to the primary grades for several reasons, one of the most important ones being, from the middle school onwards school mathematics is strongly influenced by disciplinary concerns. For learners who carry the brunt of systemic deficit such as studying in poorly resourced schools, or schools with single teacher and so on mentioned earlier, the systemic deficit would disable them in accessing the mathematical content at the middle school level. If students do not have a good grasp on fractions, they will not be able to cope with rational numbers and understand why some quantities, like for example the length of the diagonal of a unit square cannot be a rational number. Interventions at the middle school level is very challenging when we work with students who bring in systemic deficit. The deficit could be as basic as grade 7 children writing two hundred and thirty-seven as 200307, not knowing how to carryout multiplication by a two-digit number or how to do division using the division algorithm or not knowing what the numerical symbols $\frac{1}{2}$ and $\frac{1}{3}$ represent and how to compare them. How would a middle school teacher complete her syllabus if she tries to attend to the systemic deficit that students bring in and in what way is she equipped to not attribute the systemic deficit to the learner's caste, class and gender background?

¹¹ Rather than the binary of dominant castes and oppressed or marginalized castes, it should be noted that there are middle level castes in graded levels of oppression and privilege.

In the absence of mathematics education research or systematic studies instituted by the state that aim to understand what percentage students at the middle school level bring in systemic deficits or strengths from primary grades, what kinds of systemic deficit and strengths they bring in, what specific factors within the system contribute to producing the deficits and strengths in the learners, what kind of mathematical knowledge they bring in from their socio-cultural background, what measures would make middle school mathematics a meaningful learning experience for the learners from diverse background, with a range of aspirations, the best middle school mathematics curriculum would fail these learners. In fact, rather than compensating for the systemic deficit produced at the primary grades, the learner from the socio-economically marginalised background studying in public funded schools may be faced with additional systemic issues such as not having a teacher to teach mathematics at the middle school level. This does not happen at the primary grades because a primary teacher is expected to teach all the subjects. If the state looks to interventions from NGO's to inform mathematics curriculum development beyond primary grades, it is unlikely to find much.

I would like to say that middle class tries to silently subvert the school mathematics curriculum, and the pedagogic approach determined by the state by opting for textbooks brought out by private publishers. In other words, there is a political undercurrent to school mathematics curriculum that remains unacknowledged and hence unexplored.

Missing Perspectives from the Margins in Mathematics Education

International research in mathematics education has a long engagement with the questions of equity and social justice in mathematics education. Gender question in mathematics education has a half a century long history and continues to be a central to the question of equity in mathematics education in the international context. Though the initial studies sought to argue that there is gender difference in ability to do mathematics, over the years, deeply informed by feminist, queer and intersectional theories, research on gender and mathematics education has expanded to enrich our understanding of complex ways in which gender, sexual orientation, race, class figure in teaching and learning of mathematics- this includes teachers' beliefs and practices, text book content, peer interaction and much more. There is also a critique feminist critique of mathematics as a discipline.¹²

Similarly starting with the Algebra Project of Bob Moses (Moses, 1993) and acknowledging race as a factor shaping opportunity for teaching and learning mathematics, mathematics education and mathematics education research have moved forward from denying that race and ethnicity matters in mathematics education. Critical race theory, and intersectionality theory for example provide theoretical framework to engage with the race and ethnicity question and in mathematics education. Critical engagement with race has led to formulating the notion of white supremacy in mathematics and mathematics education and resisting white supremacy (Martin, 2019).

A significant contribution to mathematic education research also comes from perspectives that systematically challenge eurocentrism and call for decolonising mathematics education. Research in ethnomathematics¹³ challenges received notions about what constitutes mathematical knowledge, brings to light historical, cultural and hybridised contemporary mathematical knowledge that emerged and emerges in the context of peoples' life and labour. Rich literature from the Latin American, Australian and African contexts engages with questions such as incorporating ethnomathematical knowledge in school mathematics curriculum, the challenges and limitations of incorporating ethnomathematics in school curriculum and ethnomathematical barter that allow for community and the school to come together in knowledge sharing.

The language question in mathematics education has received continued attention from researchers for at least four decades now. From studying the language deficit faced by a 'bilingual' learner in

¹² See for example Damarin (2008), Fennema (2000), Leder (2015), Leyva (2017)

¹³ See for example D'Ambrosia & Rosa (2017), Parra-Sanchez (2017), Powell & Frankenstein (1997)

mathematics classrooms, research has moved onto see learner's home language as a resource than a deficit, and to engage with multilingualism in classroom in an increasing globalized world we are living in (Barwell et.al. 2016).

Similarly, critical interrogations from scholars engaging with disability in mathematics education (Tan et al. (2019), Marcone (2019)), have enriched our understanding of how uncritical, taken for granted notions about 'normal' bodies and mind operate to marginalize disabled learners their opportunity to participate and excel in mathematics.

Research from each of the perspectives mentioned above is of immense value to India. Given the multitude of differences and hierarchies that come together in complex ways and the centrality of caste to every aspect of Indian reality, there is no way that India can bypass investing in mathematics education research and instead rely on international research to inform its practice.

Feminism and queer theories have a reasonable presence in India. However, in STEM areas there is only a reluctant admission that gender could make a difference to doing mathematics. In fact, there is also an attempt to say that notions such as girls cannot do mathematics operate only in the west. Sporadic studies show that girls and women are underrepresented in STEM areas. There is a women in mathematics program which organises conferences periodically where women get mathematicians get together and present their work.

However, there is a dearth of systematic studies from feminist and Dalit feminist perspectives that go beyond the question of representation and seek to understand how the learner experiences the space of learning as a gendered being, what notions about gender and the ability to do mathematics are held by teachers and by the learners, how gender figures in peer interaction in mathematics and so on. These questions may bring very different responses for students belonging to different caste, class, region and religion. This for a country as large and as diverse as India is a mammoth task and cannot be done one odd feminist or researcher.

Caste is a very touchy subject in India. The state for example does not publish the data on caste census. It is impossible to even figure out the representation of OBC, SC, ST categories in the institutions of higher education. The caste to which one belongs cannot be found by looking at a person. Sometimes the surnames such as Trivedi, Shastri, Pande, Reddy, Chaudhary, Bose, etc give away the caste, but no one has the exhaustive list of caste surnames used across the country and nor are all surnames caste names. In the state of Tamil Nadu for example, no one uses caste-based surnames anymore. In the modern Indian state where those from the marginalised caste background desire to annihilate caste while those from the dominant castes believe and propagate the convenient myth that caste has already disappeared from the public sphere, it is considered offensive to directly ask the caste to which one belongs. It could be very threatening to the marginalized caste people to be asked to which caste they belong.

Dominant caste mathematicians and mathematics educators believe caste has nothing to do with teaching and learning of mathematics. Even in the left leaning progressive spaces there is a strong reluctance to raise the caste question in education. However, there is anecdotal evidence to show caste and ability to do mathematics are deeply linked. Very recently a Dalit mathematician with a PhD from an IIT said 'they will never find me good enough to get a permanent position' referring to the reluctance to give a faculty position that is earmarked for those belonging to SC category- it is so hard to find many applicants for these posts and very rarely those with a PhD from an IIT. The fact of the matter is, after a couple of attempts and 'failure' to find a 'suitably qualified' person from the SC category, the post could be declared as an open category position which can go to anyone irrespective of the caste category to which one belongs. It is not uncommon to hear dominant caste mathematicians describe Dalit mathematicians as lazy and lacking in sincerity and commitment to pursue mathematics actively. Recently a research scholar pursuing PhD in mathematics education in a premier research institution was expelled from the program because the candidate had not met even the extended deadlines set. Written statements expressing doubts about the sincerity and commitment of the scholar were made

while in fact the scholar, working towards building solidarity networks during the Covid lockdown, got exposed to the plight of the rural poor during the lockdown and went into depression. Though the scholar never thought of oneself as a Dalit, reference to the caste to which the scholar belongs were made by others in informal conversation, indicating how the caste to which one belongs is noticed even as we believe caste does not matter. Year after year we read about suicides by Dalit students in the institutions of higher education- though not all of them may be students of mathematics. These suicides clearly are just the tip of the iceberg, drawing attention to the fact that narratives about how students from marginalised castes who seek to pursue mathematics experience caste in schools and institutions of higher learning are yet to be told. The fact that in 30 years since the Mandal recommendations were implemented, these narratives have not emerged speak volumes about the culture of denial and hostility within which mathematics education takes place.

At the school level, students experience caste in several ways though most of this is passed off as arising out of bias against the poor. It is only very recently that caste has been acknowledged as factor worth taking note of in mathematics education. The position paper (NCF 2005) refers to the learner as bringing in knowledge from their cultural background and the primary mathematics textbook draws content from the lives of fishermen and junk sellers to teach mathematics, even though the word 'caste' does not figure explicitly in these invocations.

Ethnomathematics research in a country where traditional occupation is caste based is bound to enrich our understanding of the domain. However little effort has been made explore any of these. The right wing ruling party is making a strong attempt to pass off the spurious Vedic mathematics as the only culturally specific mathematical knowledge from India.

It must be mentioned that though there is reservation for jobs, there is no reservation in committees that design curriculum and textbooks. As a result, we have no information on if there is any representation from the marginalised castes in these committees. Mathematics education research has not engaged with caste, and it cannot be done till such time as we do not have members from the marginalized castes within the community of mathematics education research and efforts are made to introduce courses that engage with caste as an experiential and analytical category.

NEP2020 and Mathematics Education

In what I said up to now I have attempted to give a picture of mathematics education as a domain of action from below. I have tried to draw attention to a large section of student population from the marginalized backgrounds, who are faced with a dysfunctional system, carry the systemic deficit and are left behind by mathematics education sooner or later and pointed out that this population is fragmented by caste, a very powerful social structure, ethnicity, gender, economic class, regional diversity, language, (dis)ability and more. I have lamented about the paucity of research in mathematics education and what it means for a domain plagued by a complex mix of issues. I have briefly described the interventions by middle class for themselves and for the others and the contribution of the latter to mathematics curriculum development, particularly NCF2005; I have also indicated how the middle-class dominant caste silently exerts pressure on the school mathematics curriculum. I have argued for the need to critically examine mathematics education from caste and gender as theoretical frameworks while highlighting the positive changes that NCF 2005 and the primary mathematics textbooks brought in. In this section I want to briefly discuss the implication of the most recent education policy, NEP2020 and the new mathematics curriculum framework (NCF 2023).

Referring to the first two education policies introduced in the years 1968 and 1986, Padma Velaskar (2010) discusses in detail how the Nehruvian dream of 'growth with equity and social justice' and the state's commitment to quality with equality in education have been systematically undermined in the post Nehruvian India by an essentially capitalist and patriarchal state in the hands upper caste-class political, bureaucratic and intellectual elites, including right-wing elements in the ruling dispensations. She describes in detail how over the decades, economic liberalization on the one hand, and increasing

enrolment in school on the other, has led to the proliferation private schools. It has also led to differentiation in education with a preference for schools which offer English as the medium of instruction. She says,

neoliberal capitalist logic relentlessly operates to intensify market forces and privatisation at all levels of the educational structure, accentuating both class divisions and mobility struggles. The outcome is the consolidation, differentiation and polarisation of the systemic hierarchy. Schools in the uppermost ranges, the so called best schools are the exclusive preserve of wealthy elites. They offer a choice of exclusive curricular packages, embellished with prestigious, international credentials, which are delivered amidst luxurious opulence. Higher standards get continuously set and scaled here. At the bottom end are the two layers described above: the diminished system of state schooling and somewhere above this bottom is located the new privatisation. The former is now associated with the most poverty stricken core of rural and urban global economy. (Velaskar, 2010. Pp 80)

NEP2020 builds on and only accentuates the hold of private players on education. Higher education has seen profound changes once NEP2020 came into force. From an era when universities were public funded with several private colleges affiliated to them, private universities were very few and a degree from a private university did not carry the same weightage as one from a state or central university, we have moved to a time when there are ever so many private universities whose quality is determined by ranking agencies such as NIRF. State and central universities are faced with severe shortage of funds, recruitment of new faculty members has come to a near halt pushing down the public funded universities in rankings. In other words, state is pushing for privatization of higher education, and this will lead to a situation where public funded state universities will mirror the public funded schools which are under-resourced and understaffed. Privatization of higher education will significantly undermine the efforts to bring in students from SC, ST and OBC backgrounds under reservation, as private universities are not obliged to implement reservation or waive the tuition fee for them. This means if they can afford to pay the huge tuition fees that private universities charge, students from SC, ST and OBC background can also join the private universities, but they will have no right to form student bodies to raise their concerns and fight against caste based discrimination. Private university will not function as a space to raise and nurture students' critical thinking and consciousness about caste. As students from SC, ST and OBC background can avail the benefits of reservation only in public funded state universities which are starved of fund and faculty, (or the central universities and IITs if they get thorough the common entrance tests like CUET/JEE), state funded universities become ghettos for poor students from the marginalised castes while a range of private universities with adequate faculty and technology enabled smart classrooms will cater to aspirational classes who pay heavily for acquiring a degree that has some value in the job market. Privatisation of education should therefore be seen as means to perpetuate the caste based segregation and hierarchy and deny those from the marginalised castes the benefits of education.

At the school level NEP2020 goes back on the progressive changes brought in by NCF2005.

Among the disturbing departures that NEP2020 makes from the previous policies are (1) a concerted attempt to glorify what it refers to as ancient Indian knowledge, particularly the kind of knowledge available in Sanskrit, and incorporate it into the school curriculum, (2) involving in education, individuals, charitable groups and other private players who may not have the required training or established credentials in realising the objectives of public education, (3) increasing privatization of education, (4) a strong focus on developing in the individual learner competencies that have currency in the capitalistic global market economy instead of a commitment to equip the learners to critically engage with their physical and socio-political environment and play their role as democratic citizens, and (5) an attempt to introduce vocational education without appropriate measures to ensure that it does not contribute to reproducing the existing social hierarchy. (Subramanian, Book Chapter. In Press)

While the position paper on mathematics (NCF2005) sees the learner (including Dalit and tribal children) as bringing in knowledge to the school which should be integrated into school mathematics, NEP2020 refers to these children as belonging to weaker sections requiring bridge courses to fill the gap. The 600 pages long NCF 2023 mentions the term caste exactly 8 times and tribes exactly once and in none of these there is a mention that students from these backgrounds bring forms of mathematical knowledge that could be integrated with school mathematics. Going against the Right to Education bill that makes

it compulsory for children in the age group of 6 to 14 to be in school, NEP2020 allows students to dropout and come back later if and when they want to. By allowing students to dropout and return, NEP2020 indirectly encourages students from poor families, many of them from the most marginalised castes who have been deprived of education for generation, to dropout of formal school knowing fully well that they will have no chance to return back to school. Moreover, by introducing vocational education as an option at the school level, it opens the possibility for schools to offer only vocational education in schools where working-class children study. In a country which continues to see traditional occupation as caste based, the introduction of 'vocational education for all' will result in vocation education being offered to SC, ST and OBC children, bringing Manu dharmam¹⁴ back.

In the case of mathematics, the Position Paper of National Focus Group on Teaching of Mathematics says,

In Indian villages, it is commonly seen that people who are not formally educated use many modes of mental mathematics. What may be called folk algorithms exist for not only mentally performing number operations, but also for measurement, estimation, understanding of shapes and aesthetics. Appreciating the richness of these methods can enrich the child's perception of mathematics. Many children are immersed in situations where they see and learn the use of these methods, and relating such knowledge to what is formally learnt as mathematics can be inspiring and additionally motivating. (NCF2005)

Neither the National Policy on Education 2020 (NEP2020) nor the National Curriculum Framework 2023 (NCF (2023)) build on the above in spite of the fact that in the intervening period nearly two decades since NCF2005, there has been a lot of research in mathematics education that emphasise the importance of integrating out of school mathematical knowledge with school mathematics. The term ethnomathematics find no place in NCF 2023 while it encourages the introduction of ancient Indian achievements in mathematics as part of the school curriculum and Vedic mathematics as an optional course in college. I have discussed in detail in an earlier paper titled 'Mathematics education as a tool for spreading religious fundamentalism: the case of Vedic Mathematics in India' presented at MES11 (Subramanian, 2021) and in the forthcoming book chapter titled 'Mathematics education under the national education policy 2020 in India: A Janus-faced highbrow mathematics instead of hydra headed Bahujan mathematics' the problems with Vedic mathematics and the implication of NEP2020 for mathematics education in India. The purpose of introducing Vedic mathematics is much less to teach students shortcuts for faster computations and much more to promote Hindu supremacy, in fact a Brahminical supremacy and pass on and instil the myth that Vedas contain all knowledge. Indeed, the Shankaracharya says this in his book

Ever since (i.e. since several decades ago), we have been carrying on an incessant and strenuous campaign for the India-wide diffusion of all this scientific knowledge, by means of lectures, blackboard-demonstrations, regular classes and so on in schools, colleges, universities etc., all over the country and have been astounding our audiences everywhere with the wonders and marvels not to say, miracles of Indian Vedic mathematics. (Tirthaji, 1965, pp xv).

RSS affiliated Vidhya Bharati schools which cater to 3.4 million students from economically marginalized background from across the country teach five additional subjects apart from the subjects prescribed by central or state board of education to which the school is affiliated. Vedic Mathematics is one of the five additional subjects. In the BJP rules states Vedic mathematics is included in the mathematics curriculum. The draft version of NEP2020 mentioned Vedic mathematics but the final version does not contain these references- which means, the school education will be a carrier of Brahminical Supremacy theory, and it will do this without explicitly stating that it will do so. What this means to the everyday experience of mathematics for students belonging to Dalit, tribal and minority religions need not be elaborated on.

Conclusion

¹⁴ Manu dharmam also refers to Manusmrti, the Laws of Manu

Education for all and mathematics education for all have remained mere slogans for decades in post independent India. Children from the marginalized background carry deficit arising out of a dysfunctional system. Increasing privatization of education at all levels has only contributed to normalizing differential opportunity for learning mathematics, with the socio-culturally and economically marginalized sections investing a substantial part of their earning in the education of their children in poorly resourced private schools with ill trained and poorly paid teachers. The dominant caste academia and even the left leaning intellectuals have been extremely reluctant to acknowledge and address caste openly. In the post Mandal era, Dalit voice and Dalit feminist voice have got some attention, but school education continues to remain in the hands of the dominant caste middle class educationists. NCF2005 is the first time the question of caste is recognised as important and in the context of mathematics education, children from marginalized backgrounds are seen as bringing in alternate forms of mathematical knowledge which, it says should be drawn upon in the primary grades in mathematics. However, mathematics education in India is still a long way from being enriched by the critical perspective emerging from Dalit and Adivasi (Tribal) and feminist perspectives. Even as the marginalized castes invest their best for the education for their children and sometime also the community, the state is promoting privatization in education and allowing for differentiated schooling. The small gains made owing to the national curriculum framework NCF 2005, are being lost with the education policy NEP2020. The right-wing political party BJP which is in power seeks to reestablish the old Hindu order which means reestablishing Brahminical patriarchy that would subjugate women, bring back caste-based occupation and legitimize caste hierarchy. It wants to do this while also pursuing the dream of India emerging as an economic superpower. The education policy NEP2020 that it has come up with seeks to use school education to spread religious fundamentalism and is systematically destroying rational, scientific, critical thinking in education and to promote a kind of mathematics education that would match the best in the world for a few and skill-oriented education for the large majority who are already marginalized.

I want to end with the hope that the hitherto silent Dalit and feminist voices in mathematics education would emerge, not magically but because of the sustained struggle over the last several decades and also because there is no alternative but to confront the forces that seek to send us back to kind of subjugation that took centuries to escape from even in a limited way.

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