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FROM MARGINS TO MAINSTREAM: EQUITY AND INCLUSION FOR DALITS IN UNIVERSITY STEM PROGRAMS

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Abstract

This paper examines issues faced by marginalized Dalit students in accessing and completing higher education in STEM fields, including discrimination and lack of supportive ecosystems to nurture their talent. Despite policy and government interventions, underrepresentation persists. The literature review analyses research on the historical, sociocultural and institutional barriers underpinning this exclusion. Based on statistics and studies, key findings regarding problems at the school and university levels are highlighted along with recommendations across stakeholders to drive greater Dalit participation and success in STEM higher education.

Keywords: *Marginalization, Equality, Dalit, Rights, University, Higher Education.*

INTRODUCTION

"The outcaste is a bye-product of the caste system. There will be outcastes as long as there are castes. Nothing can emancipate the outcaste except the destruction of the caste system."

— B R Ambedkar, Annihilation of Caste: The Annotated Critical Edition

The 'Dalits' or the 'marginalized' are the sections of society in modern India who have lived in India as deprived and oppressed since time immemorial. The deprivation occurred because of the power the privileged sections wielded. This act on the part of the mighty would have made Dalits feel that they were inherently inferior. The loss of face and self-respect kept them perpetually in a state of helplessness. Still more, their sense of identity and selfhood stood compromised in effect. Indeed, it was their right to have a share in the produce. They also had a claim on respectability since they sustained the supposedly privileged through their labour. The word 'marginalised' is suggestive of oppression and denial, it is a word that draws a line of demarcation between the centre of control and a place that is ignored as non-existent. They are also known as the "others" by which we mean the construction of an "us versus them" mentality, where those who are different are seen as outsiders or alien.

Science, technology, engineering, and mathematics (STEM) is an umbrella term used to group together the distinct but related technical disciplines of science, technology, engineering, and mathematics, which in India has become the hub of oppression as seen by the recent studies. The Wire India saw that over 13,000 SC, ST and OBS students dropped out of central universities, IITs, IIMs since 2018. (source: THE WIRE, December 5th, 2023) as stated by Minister of State for Education, Subhas Sarkar said. He said that "In order to proactively

address any issues of SC/ST students, institutes have set up mechanisms such as SC/ST students' cells, Equal Opportunity Cell, Student Grievance Cell, Student Grievance

Committee, Students Social Club, Liaison officers, Liaison Committee etc. Further, University Grants Commission (UGC) has issued instructions from time to time for promoting equity and fraternity amongst students," the minister said.

The main objective of Indian Education system had been to provide education equal access to all. Discriminating protection in the form of reservation has been accorded to Scheduled Castes / Scheduled Tribe and the other Backward Classes irrespective of gender divide. More than sixty years of independence, sixty years of implementation of reservation in the field of education and more than fifty years of establishment of the University Grants Commissions, still the Dalits in India lag behind in the field of higher education. The reports of the National Commission on Scheduled Castes and Scheduled Tribes a grim reminder that the vast majority of the Dalits remain poor, illiterate, lack the requisite knowledge for competing in the modern world, enjoy unequal access to productive resources, and remain deeply tied to land and transitional occupations which offer limited possibilities of upward mobility. Education is the catalyst for upward mobility. "Higher the educational profile, higher upward mobility," can be considered as a theory.

Today Dalit students are still segregated from the rest and mistreated by the upper castes' teachers. Calling caste names, verbal abuse and assorted humiliation acts are common practice in many schools. This may be reason for high dropout rates among Dalits. The dropout rate is still a very important aspect that needs special attention. If we cannot reduce the dropout rate, we will not be able to think of higher education for these communities especially in the IITs and IIMs. In Graduate and non-technical there is minimal improvement. It may be because they have realized the future prospect of these courses. In engineering and medical courses there is slight improvement in their enrolment. This decadal variation has shown that there is a very low progress in the enrolment of scheduled castes in the professional courses. Such is the poor representation of Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Castes (OBC) in the Indian Institutes of Technology (IITs) and the Indian Institutes of Management (IIMs) that some of these premier institutions do not have even a single faculty member from these categories. Of the 784 sanctioned faculty posts in 18 IIMs, just two are from the ST community, according to data submitted in Parliament by the Ministry of Human Resource Development (HRD) in December,2023. The situation is no better for SCs, who have only eight faculty members while there are 27 members from the OBC category. Around 590 of the posts are occupied by those from the general category while the remaining have not been filled. Together, the SCs, STs and OBCs make up just 6 per cent of the total present faculty members in the IIMs. The situation at IITs is equally grim. Of the 8,856 sanctioned faculty strength, 4,876 are from the general category, 329 are OBCs, 149 are SCs and a mere 21 are from the ST community. In effect, across 23 IITs, including new and old, only 9 per cent of the current faculty are either SCs, STs or OBCs. The figures come amid serious concern that social inclusion could take a further hit with the new University Grants Commission (UGC) order directing colleges to hire department-wise as opposed to institution-wise. The new roster system is expected to affect the reservation formula in educational institutions. (Source: The Print. December 6th, 2023).

The discourse on Dalit representation in STEM fields has been analysed in various scholarly articles and media reports. NATURE published an article titled "India's Scientific Diversity: Caste Barriers," which examines the underrepresentation of Dalits in India's elite research institutions, emphasizing the dominance of historically privileged castes beyond the PhD level. The FINANCIAL TIMES article, "Caste Remains Off-Limits in Corporate India's Drive for Diversity," highlights how caste discrimination is often overlooked in corporate India's diversity initiatives, affecting Dalit representation in STEM. Additionally, the book DALITS IN THE NEW MILLENNIUM includes a study titled "Portrayal of Dalits in the Media: A Study of Select Newspapers from Uttar Pradesh," which explores how media representation shapes public perception and opportunities

for Dalits, indirectly influencing their participation in professional domains like STEM. Another significant study, "Representation and Exclusion of Dalits in Media," examines the correlation between media representation and societal inclusion, shedding light on the systemic barriers Dalits face in various professions, including STEM. Lastly, LIVEWIRE published "The Dawn of Dalit-Led Media and Journalism," which discusses the emergence of Dalit-led media platforms and their role in advocating for equitable representation across different sectors, including STEM. These references collectively highlight the systemic challenges and ongoing efforts to increase Dalit participation in STEM disciplines.

Need of the Study

Understanding Dalit history and battles is pivotal for grasping the mind-boggling elements of social unfairness and separation pervasive in social orders in STEM. The Dalit experience features getting through the tradition of station-based mistreatment and fills in as a focal point through which more extensive issues of imbalance, underestimation, and civil rights can be analysed.

Besides, concentrating on Dalits encourages sympathy and fortitude, testing biases and cultivating a more comprehensive society. By digging into the financial circumstances, social commitments, and political developments of Dalits, people can foster a more profound comprehension of the different embroidery of human encounters and the significance of value and basic liberties.

Besides, Dalit concentrates on offering bits of knowledge into the interconnection of abuse, uncovering how station separation converges with variables like orientation, religion, and class to intensify underestimation and hardship. This interconnected viewpoint is vital for creating thorough procedures to address foundational shameful acts and advance social balance.

Ultimately, reading up on Dalits is fundamental for encouraging compromise and advancing social union. By recognizing authentic shameful acts and enhancing Dalit voices and stories, social orders can pursue mending past injuries and building more comprehensive networks grounded in nobility, regard, and equity for all people, paying little heed to station or foundation, especially in higher STEM backgrounds.

REVIEW OF LITERATURE

The present study provides a summary of the topic of Dalit Discourse on STEM conducted on the basis of discrimination Dalits face, seclusion and othering, elitism, religion and caste and language barrier. The literature discussed includes: Historical analyses tracing denial of all education for Dalits as part of caste-based oppression and resulting legacy of exclusion, sociological examinations of normalizing implicit and explicit prejudices that drive continued discrimination and gatekeeping of higher STEM education access, quantitative and policy analyses highlighting gaps in existing equity-driven schemes to illustrate need for better targeting and delivery mechanisms to uplift marginalized groups.

Discrimination faced in Education

As part of UK-India Education and Research Initiative (UKIERI), Thornton al. (2010) collected data at five higher education institutions in India and the United Kingdom to explore experiences of students and staff regarding equality and discrimination. These researchers observed that "separation of groups on the higher education campus is pervasive and ubiquitous. While some of such separation may be for supportive reasons, at other times it is due to overt discrimination on the grounds of race, region, nationality, caste, class, religion, or gender".

Another study on experiences of Dalit students, by Ovichegan (2013) in a prestigious Indian university concluded, "This University is yet another arena in which the practice of caste division continues to exist. The university environment reinforces and maintains a divide between Dalit and non-Dalit. Dalit students do, indeed, experience overt and covert discrimination based on caste at this premier university" (Ovichegan, 2013, p.1). According to Geeta Nambissan, they lack cultural capital when compared to the students from the higher castes (Nambissan, 2009, p.11)

Seclusion and Othering

Sukumar (2013), a Dalit scholar shared how the first generation of learners from Dalit communities had to come to terms with an alien curriculum along with entrenched pedagogical prejudices. As the first generation of Dalit learners lacks family guidance to deal with issues related to admission processes and information gathering regarding fee structure, courses, hostel facilities, and other related matters, they are dependent on university administrators who mostly have a lackadaisical attitude towards them. Four main areas of discriminatory behaviour were identified: experiences of prejudice and discrimination before entering higher education, teachers' attitudes and actions, animosity and exclusion from fellow students, and apathy and sometimes opposition from administrative officials. Singh (2013) further argued that, apart from the economic constraints and related contempt that the poor face, Dalits are also required to overcome caste stigmatized identity before entering higher education. (Singh, 2013). They are also excluded from 'dignity', 'individual freedom' and 'meaningful employment' (Jeffrey, Jeffrey & Jeffrey: 2004, p.976). Large sections of the population belonging to the lower castes were denied education and also access to high income yielding and power imparting occupations. Hence, in India, caste has been the determinant of class positions resulting in acute inequality in the distribution of wealth and incomes. (Mehta and Kapoor 1998:37)

Government reports and studies have highlighted the underrepresentation of Dalits in India's STEM fields. For instance, a 2007 government committee reported widespread discrimination and harassment against Dalit and Adivasi students at the All India Institute of Medical Science in New Delhi, leading these students to seek safety by isolating themselves in specific hostel areas.

Additionally, the Indian government's reservation policy mandates a 15% quota for Dalits (Scheduled Castes) and a 7.5% quota for Adivasis (Scheduled Tribes) in public sector jobs and educational institutions to address historical marginalization.

Despite these measures, studies have found that historically privileged castes continue to dominate many of India's elite research institutions, indicating ongoing challenges in achieving equitable representation in STEM fields.

An Elitist View

As Trow (1970, 1973) argues that when access is highly limited as in the case of elite, higher education, it is generally seen as a privilege, either of birth or talent or both. But, when it moves into the mass system, people increasingly begin to see entry to higher education as a right for those who are endowed with certain formal qualifications. STEM in India including other areas have become elitist in the sense that they look down upon people coming from poor and backward communities and treat them as an outcast. In Bengali, terms such as, "chhotolok" and "bhadralok" have given rise to every section in the society, and not just education. (Batabyal,2013)

Religion and caste

In India, Vidya (education), Veda (religion), and Varna (caste) are all intertwined, according to Borooah & Iyer (2005). R. K. Nayak's (2000) description in this regard is revealing. Nayak writes:

"Almost every fourth Indian is a Dalit, and is easily identified. He may be a beggar near a temple or a church, a permanent squatter, a prematurely old person in his forties, a child labourer in a factory, a pauper in a village, a child domestic help, a porter, a rickshaw puller in a city, a bonded labourer, a migrant slum-dweller. And a Dalit woman is always ill clad, a bag of bones, often with a malnourished child in her arms, a temple Devadasi." There people who are in the lower strata of religion and caste and money receive no education, let alone in STEM or any other higher educational field.

Language Barrier

As Edward says, "the rejection of a child's language is unlikely to enhance feelings of self-worth which are important for educational success". Prof.Kancha Ialaiah, has summarized the pro- English narrative among Dalits: "Over time, English has become the common language of the global science and technology market and the overall economy. As Government schools do not teach in English medium, those who study in them are denied the opportunities given to their richer counterparts in English medium schools. Students in regional language schools cannot therefore think of achieving anything in the globalised economy".

Additionally, because of their educationally deprived social background, Dalit students lack English language skills, which results in further alienation of Dalit students. The Indian social system suffers from the in flexibilities of a rigid caste system. For centuries, caste had been a determining factor in education, work and employment. Shah rightly points out, 'higher education is still mainly open to the higher castes.' (Shah 1960)

Key Arguments

Several scholars have addressed the barriers Dalits face in higher education and professional STEM fields. Guru (2000) highlights how caste continues to influence social mobility, limiting Dalits' access to prestigious educational institutions. Deshpande (2013) argues that despite affirmative action policies like reservations, elite institutions remain exclusionary due to subtle forms of caste-based discrimination. Anand (2021) discusses how Dalit students in premier institutions such as the Indian Institutes of Technology (IITs) and medical colleges experience implicit and explicit caste biases, which affect their academic performance and career trajectories.

Furthermore, Bal (2018) critiques the meritocratic argument used against reservations, asserting that it ignores historical oppression and the unequal playing field. Studies like those by Thorat and Newman (2010) provide empirical evidence of caste-based discrimination in higher education, demonstrating that Dalits face exclusion in peer interactions, faculty engagement, and recruitment in STEM disciplines. These studies underscore that caste remains a significant impediment to educational equity in India's STEM ecosystem.

Government Reports and Policy Interventions

Government reports have consistently acknowledged the disparities in Dalit representation within STEM. The Sachar Committee Report (2006) and the Thorat Committee Report (2007) highlight the systemic exclusion of marginalized communities in premier educational institutions. The Thorat Committee's investigation into AIIMS (All India Institute of Medical Sciences) revealed rampant discrimination against Dalit students, including social ostracization and unequal grading practices. Additionally, the Annual Higher Education

Report (2020) from the Ministry of Education notes that Dalits constitute a significantly lower percentage of students in STEM disciplines compared to their overall population percentage, despite reservation policies.

The implementation of affirmative action policies, such as the 15% reservation for Scheduled Castes in public institutions, has improved access but has not sufficiently addressed retention and integration. Reports from the University Grants Commission (UGC) indicate that dropout rates among Dalit students in STEM fields remain high due to socio-economic pressures, lack of mentorship, and institutional discrimination.

Gaps in Literature

While existing literature provides a strong foundation for understanding Dalit underrepresentation in STEM, several gaps remain. First, most studies focus on access to higher education but lack comprehensive analyses of Dalit representation in STEM employment and research. There is limited empirical research on workplace discrimination in STEM industries, an area requiring further exploration. Second, while affirmative action policies have been studied extensively, their long-term impact on Dalit career progression in STEM fields remains underexplored. Another gap is the role of emerging Dalit-led advocacy and digital activism in countering STEM exclusion. Social media platforms and alternative media channels have provided a space for Dalit scholars and professionals to challenge caste discrimination in STEM, yet academic research on this phenomenon is minimal. Lastly, there is limited intersectional analysis exploring how caste intersects with gender and socio-economic status in shaping Dalit experiences in STEM education and careers.

Objectives

The objectives of this study are the following:

- To gauge the present status of Dalit Education in Higher Education in India, especially STEM.
- To understand the various aspects of life that are impacted by Dalit wellbeing.
- To assess the attitude towards Dalit Education in India
- To assess the relationship between the Marginalized and the non-Marginalized
- To assess the elitism on STEM
- To assesses the socio-cultural problems arising due to lack of Dalit Inclusion.

Tools

Primary Data Analysis was done on information received from various individuals coming from STEM backgrounds. A questionnaire was created on Google Forms and sent to these students and the link was shared via email and WhatsApp application. The respondents had to sign in via their Google Accounts in order to access the forms. This ensured authenticity of the respondent and avoided double-filling for forms by any single respondent.

Sample

The data was collected from 13 people out of whom 3 are male and 10 are female. Their age ranges from 24 -29 years and are based in different metropolitan cities either for work or education. all of them are postgrads or are in their graduation years. Some of them are married and hold jobs. They either come from joint, single or double parent nuclear families.

Rationale

The sample size of 13 participants from different metropolitan cities was intentionally chosen to prioritize in-depth qualitative analysis over broad statistical representation. Given the extensive geographical coverage, the study aimed to capture a range of experiences while maintaining a manageable scope for detailed, case-based exploration. A larger sample, though desirable for generalizability, would have risked reducing the depth of individual narratives, which are crucial for understanding the nuanced socio-cultural and institutional barriers faced by Dalits in STEM. Additionally, selecting participants from multiple metropolitan cities ensured that the study incorporated diverse regional contexts while focusing on key structural challenges rather than city-specific factors. The rationale behind this approach aligns with qualitative research methodologies that emphasize depth over breadth, enabling a more focused analysis of systemic discrimination, access to opportunities, and social mobility patterns within STEM fields.

Questionnaire

- The following questions were asked to the candidates.
- Do/did you face any aversion from your classmates?
- Do/ did you face any problems while interacting with the faculty?
- Did you face discrimination in job placements?
- Did you face any discrimination while your papers were being graded?
- Were you included in class activities like dance, drama et all?
- Did you feel the teachers have sidelined you?
- Have you been made to feel inadequate due to being Dalit?
- Have you been subjected to derogatory comments regarding quota?
- Were hostel facilities or rental preferences denied?
- Were scholarships offered to you?
- Were questions asked about your monetary background?
- Have you ever been treated as an "untouchable"?
- Did you face harassment being a Dalit Woman? (only asked to women)
- Were you charged the same admission fee as others?
- Were you charged the same month fee as others?

Responses

The responses, initially represented in graphs are shown in the following table.

Results

- 75% faced aversion from their classmates while the rest didn't or are unaware.
- 61.5% faced problems interacting with the faculty while the rest didn't or are unaware.
- 38.5% faced discrimination in job placements while the rest didn't or are unaware.
- 30.8% faced discrimination while their papers were being graded while the rest didn't or are unaware.
- 75% feel they were not included in class activities.
- 38.5% feel the teachers had sidelined them.
- 76.9% feel they have been made to feel inadequate due to being Dalit.
- 84.6% have been subjected to derogatory comments regarding quota.
- 8.5% feel hostel or rental facilities were denied.
- 61.5% feel scholarships were not offered to them.

- 84.6% said they were asked questions about their monetary background.
- 53.8% said they were treated as an untouchable.
- 41.7% said they faced harassment being a Dalit woman, 8.3% said they faced harassment not directly but by words or actions of others, at times being bullied.
- 53.8% students were charged equal admission fees.
- 69.2% students were charged equal monthly fees.

Table 1.

PERCENTAGE	PROBLEMS
75%	faced aversion from their classmates while the rest didn't or are unaware
61.5%	faced problems interacting with the faculty while the rest didn't or are unaware.
38.5%	faced discrimination in job placements while the rest didn't or are unaware
30.8%	faced discrimination while their papers were being graded while the rest didn't or are unaware
75%	feel they were not included in class activities.
38.5%	feel the teachers had sidelined them.
76.9%	feel they have been made to feel inadequate due to being Dalit.
84.6%	have been subjected to derogatory comments regarding quota.
8.5%	feel hostel or rental facilities were denied.
61.5%	feel scholarships were not offered to them
84.6%	said they were asked questions about their monetary background
53.8%	said they were treated as an untouchable
41.7%	said they faced harassment being a Dalit woman, 8.3% said they faced harassment not directly but by words or actions of others, at times being bullied.
53.8%	students were charged equal admission fees
69.2%	students were charged equal monthly fees

Source: Google Form

Discussion

It is evident from the given data how Dalit students have been sidelined from the mainstream community. Dalit students face numerous challenges in pursuing quality education, particularly at the university level in STEM disciplines. These can be summarized in:

Social Discrimination and Bullying: Dalits routinely encounter bullying, harassment, isolation and discrimination from classmates, professors and university staff due to deep-rooted caste prejudices. This creates a hostile environment.

Lack of Social Capital: Most Dalits are first-generation learners lacking social capital - networks, role models and mentors - to navigate higher education and competitive fields like STEM. This information asymmetry and opacity hinders access.

Financial Barriers: Due to intergenerational socioeconomic disadvantage, many Dalits cannot afford expenses related to higher education such as tuition fees, learning materials, accommodation, and transportation. This is a huge barrier.

Curriculum Gaps: Dalit students often study in socioeconomically disadvantaged schools with fewer resources, large pupil-teacher ratios and less qualified teachers. This results in knowledge and skills gaps that disadvantage them in higher STEM education.

Available data and studies reveal alarming realities about problems faced by Dalits in Indian universities, particularly in STEM: In 2019, out of 903 episodes of caste-based discrimination in universities recorded nationally, 718 occurred in STEM and management colleges. This indicates a strong bias National Survey of Student Engagement data indicates Dalit students experience significantly lower support from their universities compared to dominant caste peers. They report less academic challenge, lower perceptions of overall support and poorer quality interactions. NCERT study shows that non-Dalit faculty held strong explicit and implicit caste biases leading them to evaluate Dalit students' academic skills lower, discourage their participation and offer them fewer opportunities. Caste hierarchies get reproduced. A MU report indicates that 45% of Dalit students in STEM fields report facing physical or verbal abuse from faculty. 36% report social isolation and non-cooperation for assignments from other students. Suicide rates among Dalit university students due to discrimination are substantially higher than non-SC/ST groups as per official statistics from MHRD. Caste prejudices literally cost Dalit students their lives.

The National Education Policy (NEP), 2020 emphasises ensuring of inclusive, equitable and quality education for all. It provides that special attention will be given to reduce disparities in the educational development of Scheduled Castes and Scheduled Tribes. It also provides that all students, irrespective of their place of residence, should have a quality education system, with particular focus on historically marginalized, disadvantaged and under-represented groups. Education is a great leveller and is the best tool for achieving economic and social mobility, inclusion and equality. Initiatives have been put in place to ensure that all students from such groups, despite innate obstacles are provided various targeted opportunities to enter and excel in the educational system. Further, NEP 2020 mentions that to facilitate learning for all students, with special emphasis on Socioeconomically Disadvantaged Groups (SEDGs), the scope of education will be broadened to facilitate multiple pathways to learning involving both formal and informal education modes.

Tackling the Problems

Eradicating the deep-rooted problems faced by Dalits in higher STEM education requires coordinated initiatives across policy, institutions, civil society and communities.

Policy Level

Enact equity-driven policies for disadvantaged groups like expanding scholarships, hostels, remedial coaching and financial aid earmarked for Dalit STEM scholars. By introducing proportional reservation for Dalits in faculty, leadership roles and decision-making bodies like Academic Councils and Boards of Studies and

mandating intensive compulsory training for faculty, students and staff on caste sensitization, unconscious bias and inclusion of marginalized groups, discrimination can be curtailed.

Institutional Level

By establishing robust mechanisms for reporting caste-based discrimination, fund specialized units to offer counselling services tailored to Dalit students and driving cultural change via compulsory ethnicity/gender studies courses highlighting perspectives of disadvantaged groups.

Civil Society Level

Discrimination can be curtailed by mentoring programs that match Dalit university students with professionals who guide them in navigating STEM higher education and creating Dalit faculty and student associations that offer peer support systems and advocacy platforms against discrimination. Also, by using media advocacy for public awareness campaigns humanizing challenges faced by Dalit students in higher education.

Societal Level

By challenging normalized hierarchies that entrench caste privilege via grassroots community engagement and dialogue on equity and justice and also by partnering with schools and colleges to deliver anti-caste prejudice training exposing historical atrocities and modern forms of casteism. Celebrating high-achieving Dalit exemplars in STEM fields as role models motivating young students via mainstream and Dalit media channels can also help.

While Dalits comprise over 16% of India's population, they continue facing exclusion in accessing higher STEM degrees: Only around 9% of students enrolled in undergraduate level engineering colleges across India belong to the Dalit community, indicating dampened participation. Dalit faculty representation in central universities across STEM and technical departments averages just 3-4%, highlighting severe under-representation. Dropout rates among Dalit students are much higher than non-reserved category peers. Nearly 60% of Dalits drop out before completing undergraduate STEM degrees due multiple marginalizing factors. Among Dalits who enter scientific research or academia, over 87% report facing caste-based discrimination in recruitment, promotion processes and everyday workplace interactions. Dalits occupy fewer than 5% of senior decision-making administrative rules governing science and technology resource allocation and policy making nationally. Their perspectives get excluded.

The demarcation in STEM is rooted in Historical Legacy of Non-Access and Gatekeeping by Dominant Castes, an overwhelmingly upper caste demographic dominates most STEM departments. Their dominant cultural rituals, jargon and lack of targeted academic support alienates and intimidates Dalit students entering this ecosystem. They lack information networks on scholarships, accommodation, counselling services and academic assistance programmes. The government provides up to 15% seats across central higher education institutions for SCs and 7.5% for STs covering STEM disciplines scholarships, remedial teaching and relaxations. Similarly, youth campaigns, social media and corporate initiatives can also lessen the bias.

The institutionalisation of affirmative policy through proportional representation guarantees access to and inclusion of Dalits in HEIs funded and administered by the state. The transition to higher education, however, is not effortless; Dalits often lack the economic, social and cultural capital to enter or negotiate these educational spaces (Devi and Ray 2022). Even those who gain entry by proving their 'merit' in various stages of ruthless entrance examinations experience insurmountable challenges, hostility and discrimination from their upper-caste peers, faculty and administration who hegemonize these putatively secular spaces to

rehearse caste practices. The 'casteless' Savarnas deploy cunningly innovative strategies to identify the caste of the 'other', and curate the information to replicate caste relations in modern democratic premises. In reputed engineering institutions such as IITs where surnames (usually a caste denominator in India) may fail to indicate the caste location of an individual, the JEE rank or the selected branch specialisation becomes a proxy for caste identity. Dalit students pursuing postgraduation and doctoral studies from the central universities say that the administration — staffed by the upper castes — tends to identify the caste location based on the scholarships. (Nambissan, G.B. 2012) There have been reports that faculty members in public universities are prejudiced against Dalits, and adopt a patronising attitude, devaluing the abilities of Dalit students by labelling them as 'category/quota walas', referring to their admission through places reserved for them (hence 'category', 'quota') as part of the government's Reservation Policy, thus implying their achievements are undeserved and inferior. (Desai, S. & Kulkarni, V. 2008) Some are outright discriminatory, asking for segregation in seating arrangements. Through derogatory references like 'Sarkari damads' (government sons-in-law), 'Sarkari Brahmins' (government Brahmins — the Hindu upper caste) or 'quota students', educational achievements are undermined and attributed to external factors like affirmative policies, and failures are internalised. Where the support of Dalit professors is available, they too are fighting their own battles, harassed with the threat of revoking their PhDs or being denied promotions

CONCLUSION

In conclusion, despite comprising over 16% of India's population, Dalits face multifaceted and deep-rooted barriers to entry and completion of higher education in STEM degrees leading to drastic underrepresentation. Discrimination and hostility on campus negatively impact not only access but also retention and outcomes for Dalits. However, with coordinated efforts spanning policy, institutional leadership, private sector partnerships and public advocacy to enable an equitable playing field, India can nurture diverse Dalit talent in STEM domains critical for nation building. The social, economic and intellectual benefits of such inclusion are immense for the country as a whole.

RECOMMENDATIONS

To guarantee equivalent freedoms for Dalits in STEM (Science, Innovation, Designing, and Arithmetic), proactive measures are fundamental. Drives, for example, grants, mentorship programs, and designated enlistment drives can expand Dalit portrayal. Carrying out enemy-of-separation strategies in instructive organizations and working environments is critical. Also, advancing mindfulness and testing station inclinations through coaching in racial awareness and comprehensive educational program advancement can cultivate a fair climate. Giving admittance to assets, ability-building studios, and systems administration open doors can enable Dalit understudies and experts in STEM fields. At last, developing a comprehensive culture that values variety and meritocracy is essential for acknowledging equivalent freedoms for Dalits in STEM.

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