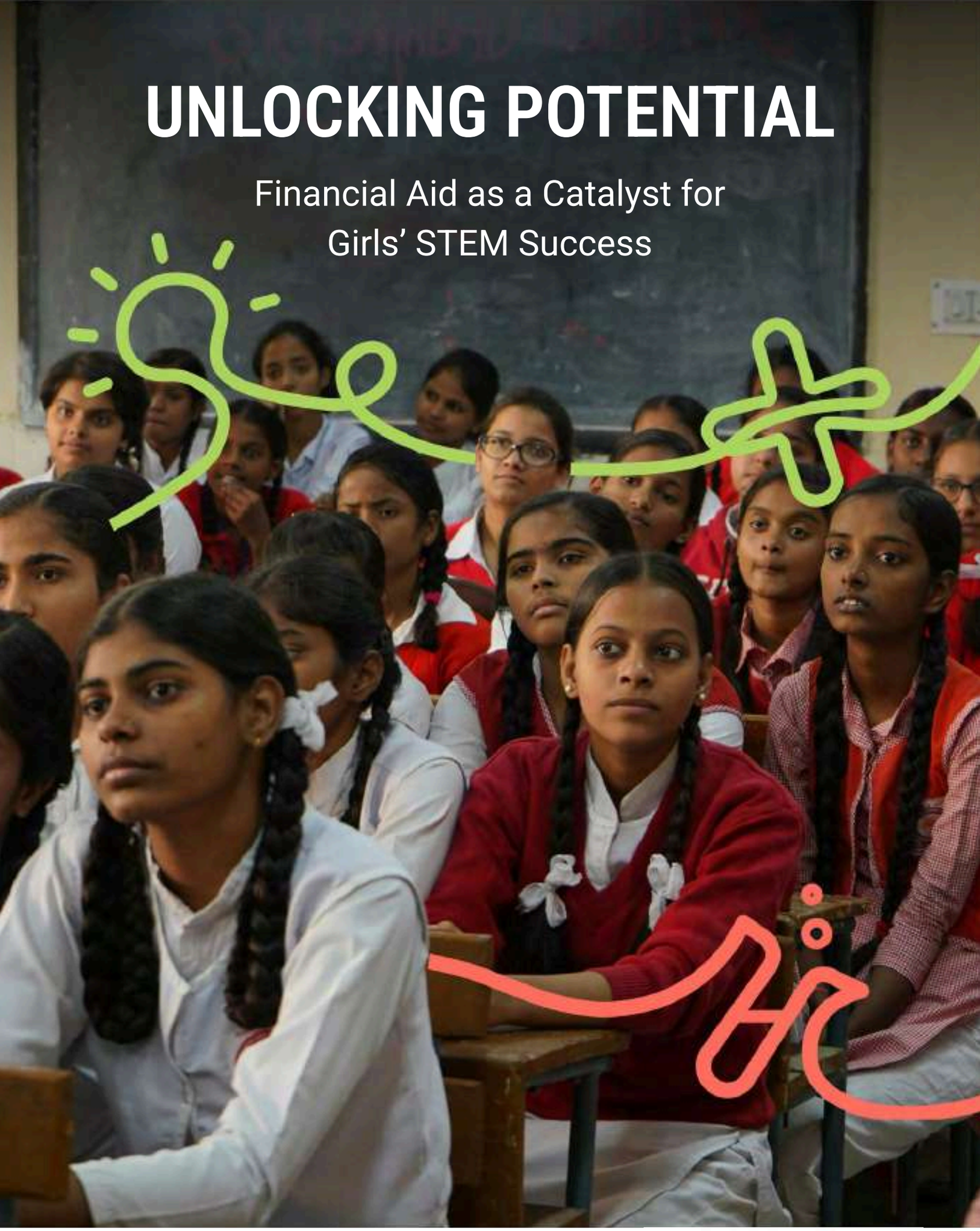
UNLOCKING POTENTIAL

Financial Aid as a Catalyst for Girls' STEM Success



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Sattva Knowledge Institute SKI | AISECT

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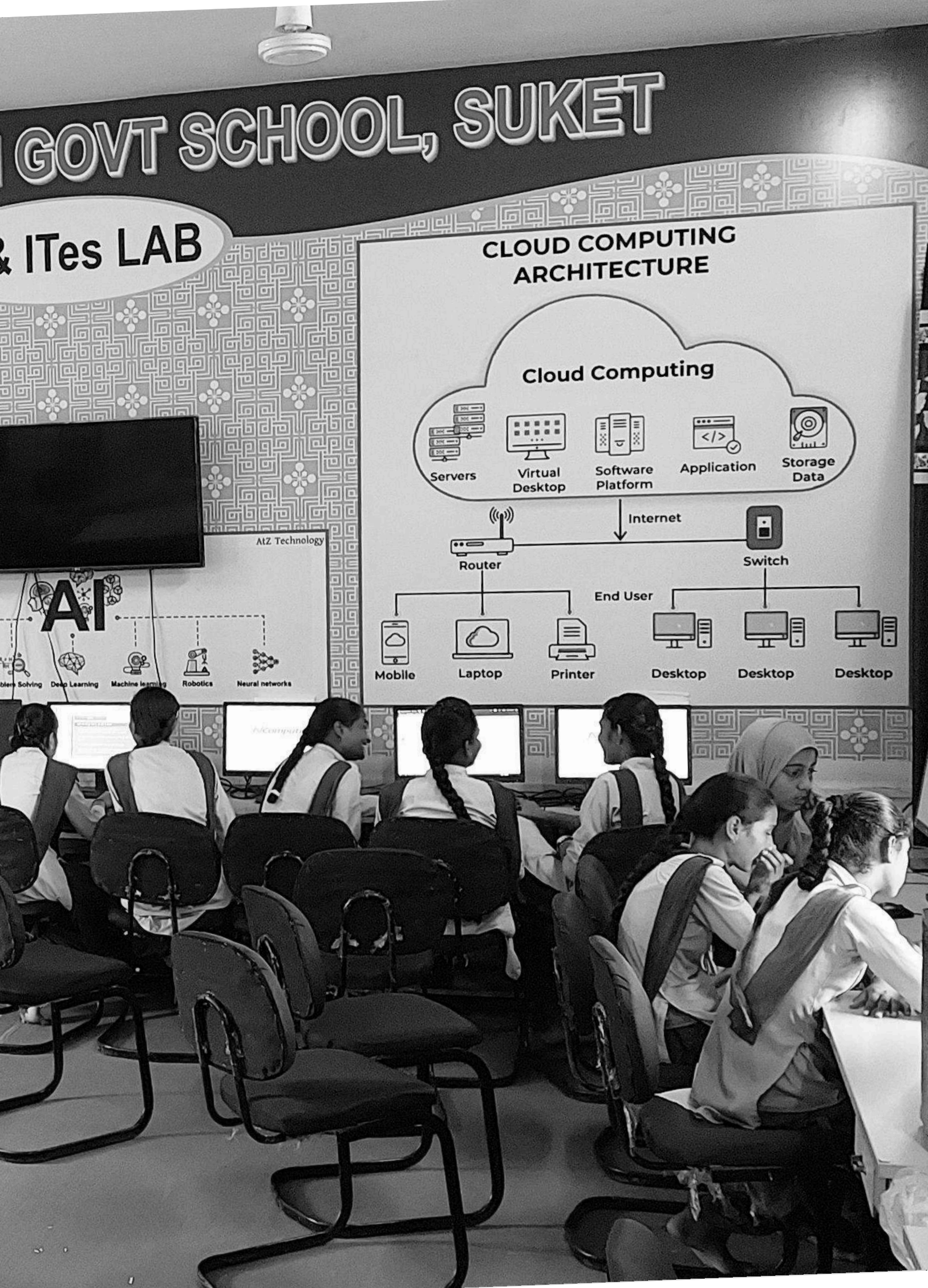
AISECT is India's leading Social Enterprise that is working in the areas of Skill Development, Higher Education, Financial Inclusion, e-governance and other ICT-based services to bring about an inclusive change in the semi-urban and rural areas of the country. Established in 1985, the Bhopal-headquartered organisation has been untiringly reaching out to the remotest corners of the country for the past 40 years to empower people, generate employment for the youth and unfold entrepreneurial initiatives. The AISECT Model is a multi-purpose, self-sustainable, scalable and entrepreneurial model that addresses the demand of local communities for various skills and ICT-based services required in the unorganized sector. The organization has a strong presence in 650 Districts, 3000 Blocks and 11000 Panchayats across 28 States and 6 Union Territories through over 49000 Centers, 22 State Offices and 38 Regional Offices.

To learn more, visit **https://aisect.org/**

Abbreviations

AI	: Artificial Intelligence
AISECT	: All India Society for Electronics and Computer Technology
ASER	: Annual Status of Education Report
BPL	: Below Poverty Line
CIBIL	: Credit Information Bureau (India) Limited
CSR	: Corporate Social Responsibility
DST	: Department of Science and Technology
EWS	: Economically Weaker Section
FY	: Financial Year
GDP	: Gross Domestic Product
IIT	: Indian Institute of Technology
IT	: Information Tehcnology
JEE	: Joint Entrance Examination
MPI	: Multidimensional Poverty Index
NCERT	: National Council of Educational Research and Training
NEET	: Neither in Employment, Education or Training
NEP	: National Education Policy
NFHS	: National Family Health Survey
NGO	: Non-Governmental Organisation
NITI Aayog	: National Institute for Transforming India
NMMS	: National Means-cum-Merit Scholarship
NSDC	: National Skill Development Corporation
NSP	: National Scholarship Portal
NSS	: National Sample Survey
OBC	: Other Backward Castes
PM-USP	: Pradhan Mantri Uchchatar Shiksha Protsahan
SC	: Scheduled Castes
SKI	: Sattva Knowledge Institute
ST	: Scheduled Tribes
S&T	: Science and Technology
STEM	: Science, Technology, Engineering, and Mathematics
UNESCO	: United Nations Education, Scientific and Cultural Organisation
UNICEF	: United Nations Children's Fund
UPSC	: Union Public Service Commission
VET	: Vocational Education and Training
WISE	: Women in Science and Engineering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Mobile
Laptop
Printer
Desktop
Desktop
Desktop
AtZ Technology
AI
Robotics
Neural networks

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Executive Summary

There are stark regional disparities in access and choice of science subjects in higher secondary grades for Indian girls. In 2024 48% of boys graduated from science disciplines, compared to only 39% of girls at the higher secondary level (UDISE+). In states like Andhra Pradesh, Telangana, and Tamil Nadu, 60% of girls pass Grade 12 in the science discipline, while states like Rajasthan (22%), Punjab (18%), Jharkhand (13%), and West Bengal (11%) report much less than the national average.

In partnership with AISECT, Sattva Knowledge Institute explored factors that impede girls' STEM participation in lagging states. Our 2024 report, ***'Barriers to Breakthroughs: Encouraging Girls' Participation in STEM Education'***, identified financial constraints as a significant challenge.

This follow-up study examines the financial challenges hindering girls' continuation in science streams post-secondary levels. **Primary research captured girl students' financial needs in Grades 9 to 12 across four states—Jharkhand, Madhya Pradesh, Punjab, and Rajasthan—through a survey of 4,763 girls.** Additionally, over 30 expert interviews and discussions with parents and teachers offered profound insights into the barriers faced by these students.

The central hypothesis of this study is that providing targeted financial support in higher secondary grades will increase the number of girls who choose to pursue science. This study aims to assess girls' financial needs to sustain their participation in science education and estimate the funding required to facilitate their entry into STEM careers. The study found that financial barriers, limited career awareness, and structural challenges leading to **high dropout rates** of girls from **disadvantaged backgrounds, underrepresentation of women in STEM careers**, and missed opportunities for vocational STEM pathways.

While academic performance may seem to be a key indicator of future career paths, our research shows that this is not always the case. The interplay of five metrics plays an important role in influencing the choice of discipline – **(1) Affordability**- 59% surveyed girls are facing financial challenges while studying, and of these only 27% have actually opted for science. **(2) Availability**- 29% of the surveyed schools do not offer science and although most of schools have science teachers only 13% of them are female science teachers. **(3) Accessibility**- 24% cannot afford transportation costs, and their parents express safety concerns, particularly evening travel for after school tuitions. **(4) Academic competency**- 67% of girls scored above 60% in science in grade 10th, yet only 27% chose it in grade 11. **(5) Awareness**- Only 56% of girls are aware of the available career opportunities related to science. The awareness is limited to a few options like Medical, engineering, teaching and scientists.

Governments, philanthropic institutions, and CSR funds provide financial aid in form of scholarships, but access to these is limited–partly owing to the aforementioned metrics–leaving many marginalised girls behind. Overall, only 29% of girls were aware of any financial aid across sources, and of these, only 23% had actually applied for some form of assistance. Existing supply-driven support fails to address girls' academic needs to excel in science.

Financial investments can catalyse the pursuit of an education in science, leading to the opening of new opportunities for girls to benefit from the STEM revolution. The primary survey highlighted three types of needs that influence girl students' decision to continue with science education: **academic needs** (tuition, coaching, and other resources); **resource needs** (digital gadgets, internet, travel, and accommodation costs); and **career guidance and mentorship.**

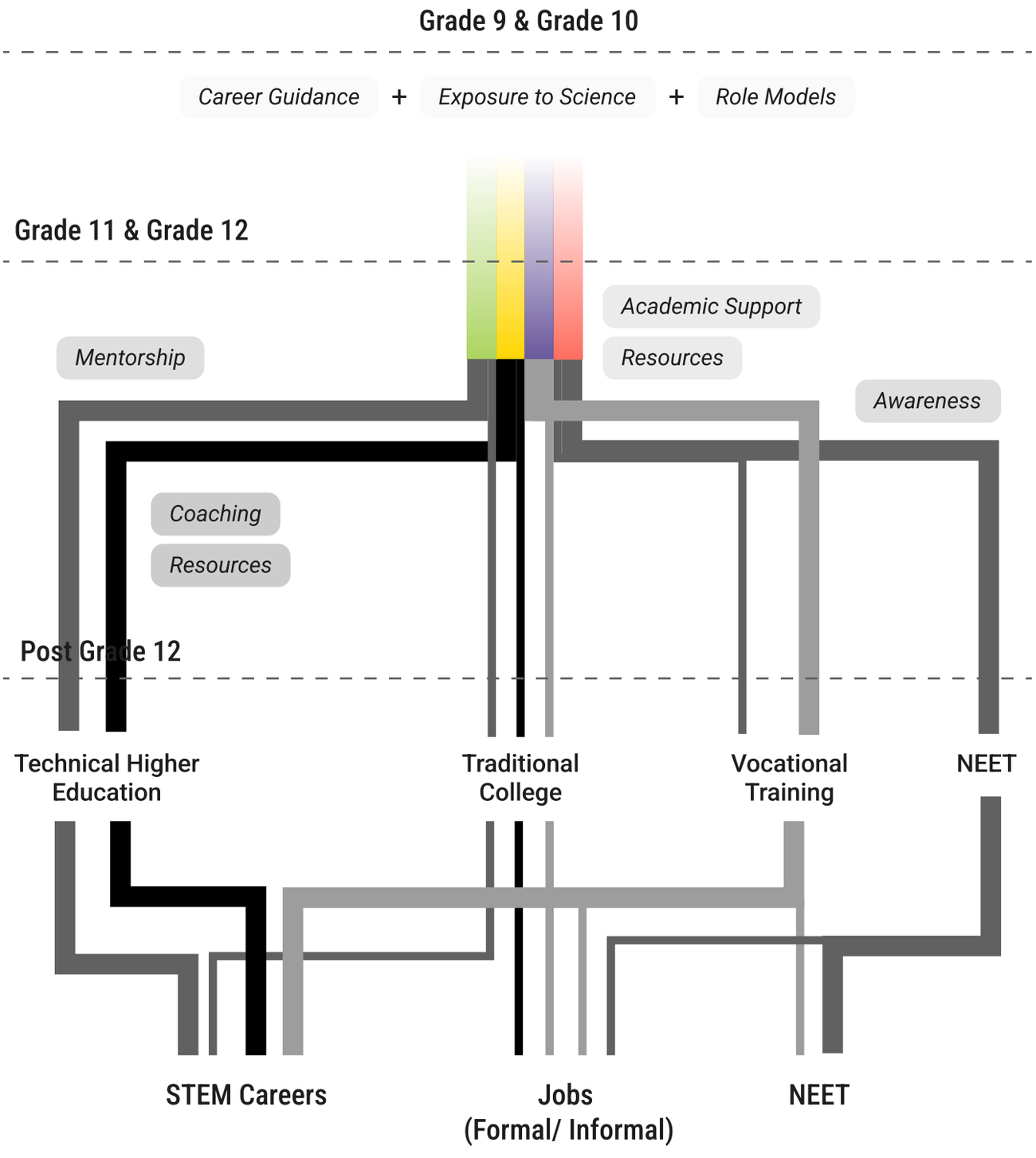
The study employed the BCG matrix to categorise the surveyed students into **four distinct personas** based on their competency and financial needs–**disengaged (17% girls), aspirers (34% girls), trailblazers (26%) and sustainers (23% girls)**– high competency, low financial needs (family or NGO/ scholarship support already existing and require minimal support like mentorship and career counselling). Based on this framework, the financial investment required ranges from ₹22,000 to ₹1,50,000 per girl per year, depending on the pathway and persona. Through this framework, the study recommends **funders to rethink the financial aid model to support girls' financial needs as they transition from high school to higher secondary grades.** It emphasises,

1. Invest more at the school level to improve the pipeline entering college.
2. Offer need-based funding to realise the actual potential of girls based on their competency and aspiration.
3. Results-based funding should support girls in pursuing science education and transitioning into the formal STEM workforce. Financial aid must align with their desired key career pathways for girls who opt for science in Grade 12, and prevent them from entering the NEET (Neither in Education, Employment and Training) population.

Funders must develop a long-term vision for girls in Grades 10-12, emphasising career guidance, exposure, and science competency. NGOs and scholarship aggregators should highlight the on-ground demands of the girls, and use technology-enabled solutions like the Digital Public Infrastructure for transparency and accountability. Building data-backed evidence for funders to make informed decisions will support girls in following their desired career trajectories. **The Government needs to broaden the scope of scholarships to include marginalised students, with a focus on girls in higher secondary grades.** There is a need to partner with schools and teachers to build awareness regarding available scholarships and other financial support provided for students in school.

The report emphasises that providing targeted financial aid and tailored assistance for the girls' academic, resource and career guidance needs can significantly enhance their participation in science education and STEM careers.

Potential Career Pathways for Girls



Introduction

STEM education and skills can enable India to tackle its Employed Poverty.

With the impetus from the Fourth Industrial Revolution, 80% of jobs in India would require STEM (Science, Technology, Engineering, and Mathematics) skills in the next ten years.[1][2] The Fourth Industrial Revolution is set to change the nature of existing jobs across sectors and create several new jobs. This change will be characterised by the evolution of artificial intelligence (AI), smart technologies, machine learning and automation, allowing data insights to guide each step of industry operations. Sectors like information technology, digital communication, cybersecurity, e-commerce, and digital finance are expected to generate 60-65 million jobs by 2025. [3][4][5]

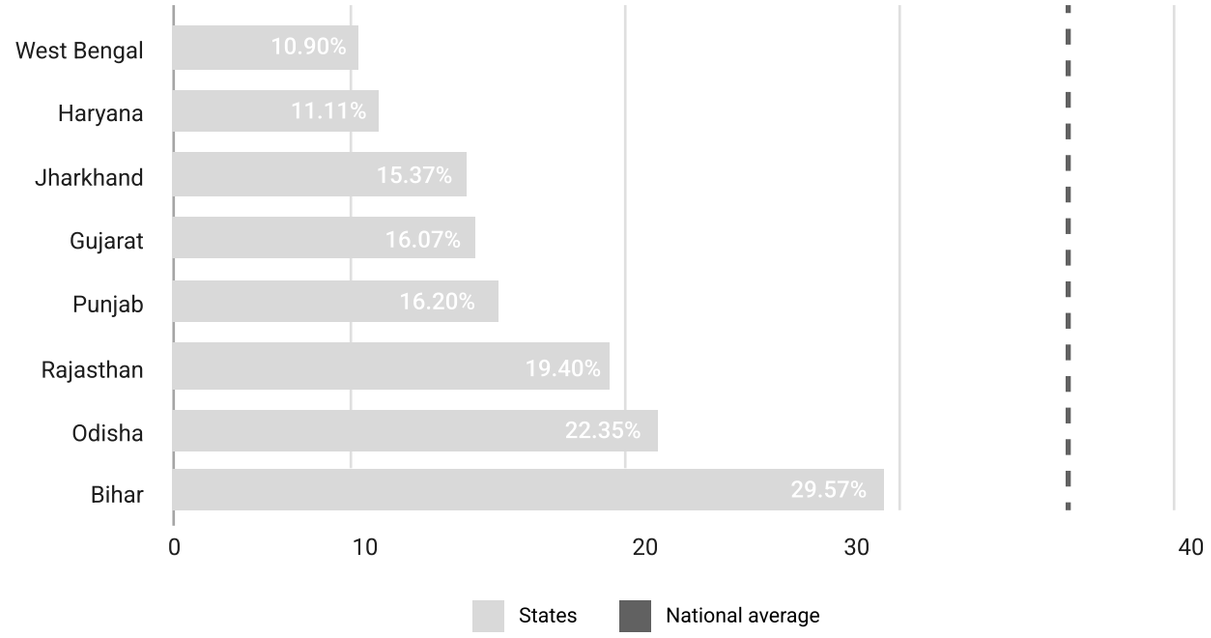
Despite significant educational investments, a persistent gap remains in translating academic learning into employability, which also affects women disproportionately.[6] While the demand for STEM professionals is rising, there is a significant skills gap. According to National Skill Development Corporation (NSDC), India's technology sector requires 107 million professionals, yet only 74 million are available.[7]

While India has reduced gender disparity in higher education, with female enrollment at 48% in 2021-22, women remain underrepresented in technical fields. According to the All India Survey on Higher Education (AISHE) 2021-22, **only 29% of students enrolled in engineering and technical courses are female**, limiting their access to high-growth careers and contributing to persistently low female labour force participation. To bridge this gender gap, the government is enhancing science education and investing in skilling to boost workforce readiness. The National Education Policy (2020) advocates for experiential pedagogy in STEM, fostering competencies such as problem-solving and critical thinking. It also emphasises early exposure to emerging fields like Artificial Intelligence and coding from age 11. Reinforcing this vision, the 2024-25 interim budget earmarked a ₹1 lakh crore corpus in 50-year interest-free loans to empower technologically skilled youth. **The 2025-26 budget allocated ₹500 crores for an AI-focused Centre of Excellence in education.** With the right interventions to enhance girls' uptake of science in higher secondary grades, India can leverage its policy momentum to bridge the education-employment divide, and establish itself as a global STEM powerhouse.[8][9][10]

Unlocking STEM for Girls

Girls in India face stark regional disparities in access and choice of science education. In 2024, at the higher secondary level, an average of 48% of boys graduated from science disciplines compared to only 39% of all girls (UDISE+). Southern states like Andhra Pradesh, Telangana, and Tamil Nadu have over 60% of girls passing Grade 12 with science, while Rajasthan (22%), Punjab (18%), Jharkhand (13%), and West Bengal (11%) report less than the national average.

Only 37% school-going girls graduate from school in science disciplines with six states lagging below 20%



One of the potential drivers for this trend of girls dropping out of science education while transitioning to higher secondary could be the industry trends and visibility of the demand for STEM-related jobs in these regions. North India has a strong presence of traditional and manufacturing businesses. At the same time, South India focuses more on IT, computer science, and engineering, with a strong presence of multinational and national tech companies. However, with the changing nature of manufacturing and traditional businesses, demand for STEM skills in these sectors is also expected to increase, but this anticipated trend is not compelling enough to change the deep-rooted gendered approach to the jobs. If this continues, women's economic opportunities and workforce participation in these states will face severe setbacks, deepening gender disparities in employment.

To understand these issues in depth, Sattva Knowledge Institute and AISECT partnered in 2023 to build evidence around the challenges impeding the uptake of science by girls in higher secondary grades. The study, ***Barriers to Breakthrough: Empowering Girls in STEM Education*** identified **gender-agnostic, gender-accentuated, and gender-specific challenges** that girls face when accessing science education. Building on the findings, this study expands on gender-accentuated challenges by focusing on the **financial barriers that impede girls' choice for science in higher secondary grades**. Financial constraints are a significant factor in school dropout rates, especially in developing countries, as highlighted in the World Youth Report (2018) and NSS 75th Round. Due to the nature of science education, financial requirements for pursuing science are often higher than those for humanities.[11][12]

There is currently very limited evidence regarding the financial needs of girls that may restrict their pursuit of science in school. Due to the lack of on-ground research, the current funding ecosystem for girls in science is supplier-driven.

The challenges faced by girls in accessing available financial support in the form of scholarships or loans are also not well-documented. This study addresses this gap by examining the personas of girls who opt for science, and the factors that influence their decision-making. **The research highlights the financial needs of different types of girls based on their aspirations and competencies, and defines their career pathways and the financial support they require.**

The key objectives of the research study are to:

1. Identify factors shaping girls' aspirations for science education in higher secondary grades.
2. Assess financial requirements for pursuing science in higher education and define target beneficiaries of financial aid programs.
3. Develop a framework mapping girls' financial needs from secondary to higher education.
4. Create a cost model aligning financial support with girls' competency and career aspirations in STEM.

The study is intended for NGOs, governments, academicians, and funders who aim to understand these challenges and design interventions to overcome them.

Methodology

The study employs a mixed-methods research design to comprehensively understand girls' financial challenges in pursuing science education and STEM careers during higher secondary grades and higher education. During the study, 30 key informants interviews were conducted with community leaders, educators, scholarship aggregators, civil society organisations, government officials, CSR professionals, and policymakers to understand the systemic and contextual challenges faced by girls in accessing financial aid for science education. Their knowledge was used to inform the survey design and variable selection.

Data from the field

The research study **focused on four states: Rajasthan, Punjab, Jharkhand,** where the percentage of girls pursuing higher secondary science education is significantly below the national average, and **Madhya Pradesh**, which deviates from the central Indian trend with over 50% of girls graduating 12th grade with science. The survey design investigated the correlation between STEM (Science, Technology, Engineering, and Mathematics) aspirations and financial obstacles encountered by girls when making career choices. It documented the financial requirements and demographic profiles of girls pursuing science education, facilitating the identification of those needing financial assistance and the formulation of targeted, persona-level financial support. Respondents across the four states were selected using convenience sampling.

*The survey included **4,763 girls from Grades 9 to 12 in government schools** across four states- Rajasthan, Punjab, Jharkhand and Madhya Pradesh*

Madhya Pradesh
982 girls

Alirajpur, Dhar, Indore

Jharkhand
808 girls

Jamshedpur, Girdih, Lohardaga, Saraikela Kharsawan, Simdega

Punjab
1109 girls

Ludhiana, Amritsar, Moga, Sangrur

Rajasthan
1864 girls

Ajmer, Alwar, Baran, Beawar, Bharatpur, Bhilwara, Bikaner, Chittorgarh, Churu, Dausa, Dhaulpur, Dungarpur, Hanumangarh, Jaipur, Jalore, Jhalawar, Jhunjhunu, Jodhpur, Karauli, Kota, Nagaur, Sawai Madhopur, Sri Ganganagar, Sirohi Tonk

Questionnaire Design

To understand girls' financial constraints and aspirations regarding science education and STEM careers, data was collected on the availability and adequacy of financial support, awareness of scholarships, aspirations for STEM careers, and perceived financial barriers to pursuing science education.

In-depth Interviews

In-depth interviews were conducted with parents, school teachers, headmasters and AISECT field coordinators to complement survey findings. Expert interviews were conducted with industry recruiters, experts working at the ground level and government officials for the promotion of gender equality in STEM.

Chapter Outline

This report is organised into six chapters.

Chapter 1:
Financial Support: The Catalyst in enabling Girls' STEM Aspirations

It highlights the factors influencing girls' aspirations and decisions regarding STEM, and dwells on the role of financial support as an enabling factor for girls to pursue science education.

Chapter 2:
The Existing Financial Support System

- Landscape of financial support system for girls.
- This chapter also highlights the efficacy and challenges of the available financial instruments like loans and scholarships in enabling girls' transition into science education.

Chapter 3:
Identifying The Beneficiaries

- Identifying the different personas of girls based on their financial needs and competency.

Chapter 4:
Understanding Financial Needs

- Defining the areas for financial needs and aspirations for students, based on different personas.

Chapter 5:
Emerging Career Pathways and Associated Costs

- Outlining possible career pathways and specific financial needs for each of the personas.

Chapter 6: Way Forward

Limitations of the Study

This study acknowledges several limitations that may have influenced the scope and findings:

1. **Limited Geographical Coverage:** The research was conducted in select districts rather than statewide, due to time constraints.
2. **Scope of Study:** Focuses on the financial needs of girls studying in government schools in four states, assuming they belong to marginalised social groups.
3. **Exclusions:** Does not cover financial needs of girls in low-income private schools or EWS students in private schools, as they receive financial support and better infrastructure.
4. **Social Desirability Bias**: Some students may have provided socially desirable answers, potentially skewing the findings.
5. **Limited Awareness among Students:** Younger participants (Grades 9-10) may lack knowledge about financial challenges, limiting their insights.
6. **Parental Input:** Limited parental access reduced the sample size for consultations, restricting insights into familial influences on students' aspirations and challenges.

01

Financial Support: The Catalyst in Enabling Girls' STEM Aspirations

Key Highlights

- An interplay of familial aspirations, social identities, and self-assessments of academic capabilities, and above all, financial capabilities of the family influences girls' choice of discipline.

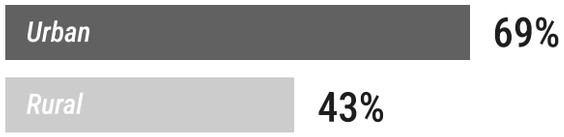
- 59% of girls cited lack of financial aid as a major challenge, impacting their ability to pursue science education.

Financial constraints influence the aspiration and subject choice

Field data reveals that multiple interconnected factors shape students' aspirations for opting for science during their transition to higher secondary grades. These influences often reinforce each other, creating a complex web of impediments to girls' STEM participation.

Comparison between children of the age 14-18 showing basic arithmetic skills

Source : Annual Status of Education Report (ASER) 2022



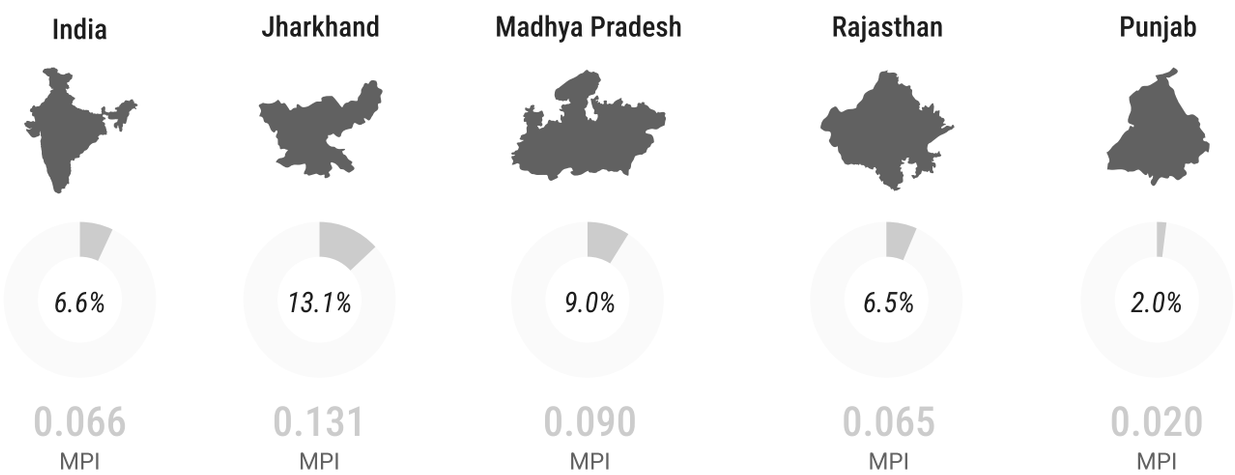
This puts **emphasis on place of residence as the determinant**. Greater distance of the educational institution also plays a negative impact on choice and completion of courses. Career prospects in science, influenced by the **affordability of technical higher education, shape girls' decisions more than their academic achievements**. The interventions with girls at the high school level affects their participation in STEM fields later. Studies highlight this **interplay of several factors** that affect students' choice of stream in Grade 11, rather than any one specific factor.[13][14][15][16][17]

The NITI Aayog's Multidimensional Poverty Index (MPI) analyses the percentage of the population deprived of education, health, and basic infrastructure. All four states covered in this study rank low on the index, indicating a strong link between limited educational opportunities and financial constraints. Research by Sahoo & Kalsen (2021) and Abhishek & Mukherjee (2023) establishes a significant correlation between poverty, traditional parental attitudes, caste, and gender, which contribute to girls' limited access to and continuation in science education.

MPI comparison across chosen states

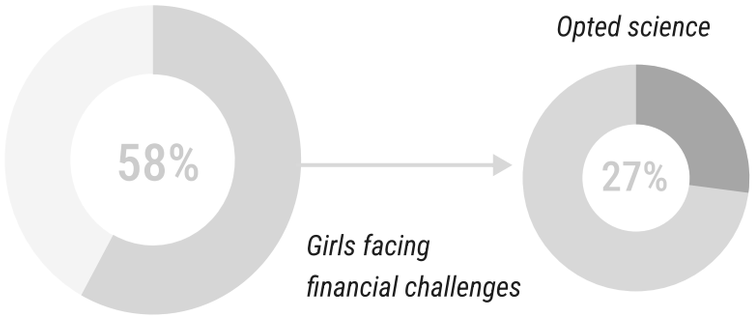
(MPI) Multidimensional Poverty Index score 0-1 is a poverty measure that reflects the deprivations in multiple dimensions of education, health and living standards, analysing the percentage of the population lacking these essentials.

Source : IDI Sattva



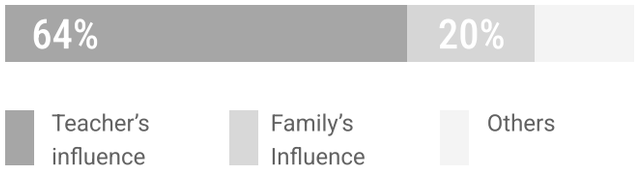
5 key metrics for uptake of science in higher secondary grades

1 Affordability of STEM courses



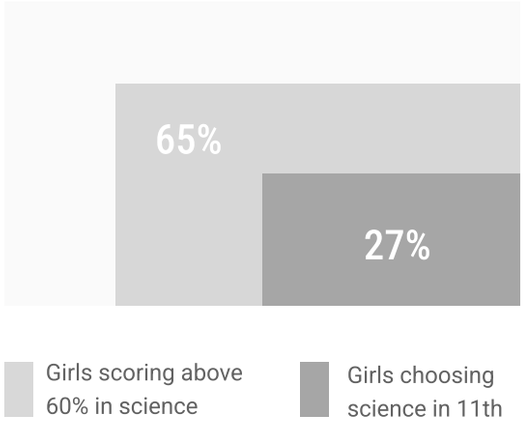
2 Availability of relatable role models

People who act as role models for girls opting science



Number of female science teachers

3 Academic Competency



4 Access to STEM resources

Schools offering science

5 Awareness of STEM Careers

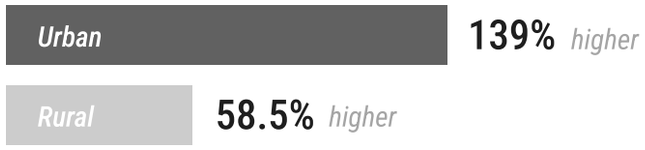
Girls aware about careers in STEM

Finance emerges as the most critical enabler, *facilitating access to all five metrics and enhancing girls' participation in STEM education at the higher secondary level.*

Source: Primary data from survey conducted across the 4 states

1. AFFORDABILITY

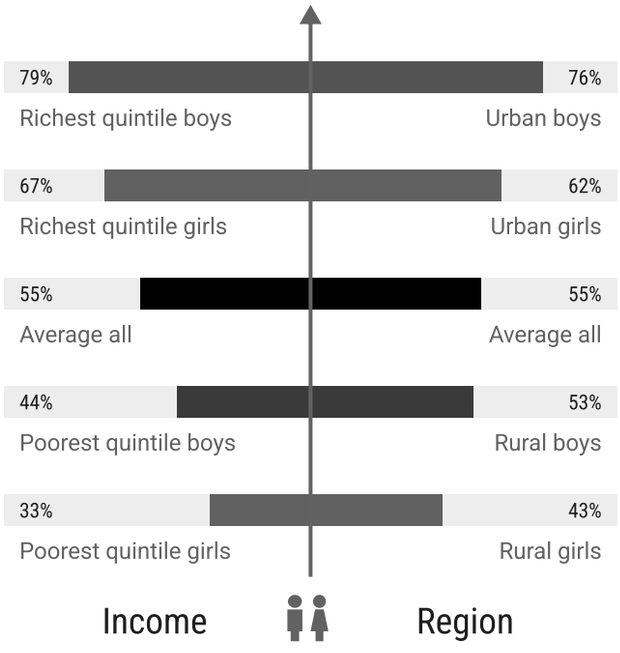
Difference in the cost of pursuing Science as compared to Humanities in higher secondary schools[18]



Even in cases where families are willing to enroll daughters in science courses, they need financial support to afford it. Dr. Anushila Chatterjee from VigyanShaala pointed out that the cumulative expenses to be borne by the family–which include logistics such as housing and food, besides the fees for tuition classes in science–becomes exorbitant and burdensome, especially if the girl moves to another city. Additionally, parents' preference to save for girls' marriage hinder higher education options for girls in science streams.

Influence of income level and region on the average school completion rate for girls

A Brookings Institution Study across forty nations found that family income levels and place of residence impact girls' school completion rates.



This trend is not unique to India, but can also be witnessed across developing countries. A Brookings Institution Study across forty nations found that family income levels and place of residence influence girls' school completion rates. A study in Pakistan reveals how affordability and travel costs positively influence Science choices, but inadequate scholarships and high out-of-pocket expenses often push students toward Humanities and Social Sciences. In rural regions, poor proximity of higher secondary schools with science streams add to the already existing higher cost of science education. Economically disadvantaged families struggle to afford basic expenses like transportation and essential resources like textbooks or devices. Primary survey results align with the statement, with 59% of girls citing lack of financial aid as a major challenge, impacting their ability to pursue science education. [19][20]

There are 400 girls enrolled in our school located in Kekdi, Sarvad. They come from impoverished households and remote villages. Absence of funding means the absence of science education. I had a student named Devi (name changed), who achieved a score of 94.3% in Grade 10; she possesses extensive knowledge of various subjects. She aspired to pursue science; however, due to financial constraints, she opted for arts instead.

Mr Mishra,
Educator, Sarvad Senior Secondary School

Despite a significant interest (71%) in science among girls, financial limitations for girls remain a substantial barrier to their pursuit of STEM fields.

When examining trends across the states, a significant percentage of girls from Jharkhand report facing financial challenges compared to those in the other three states. Furthermore, most of the girls choosing to pursue science come from Below Poverty Line (BPL) families, which aggravates the financial hurdles they encounter in accessing education and support.

Percentage of girls facing financial challenges

Rajasthan
50%

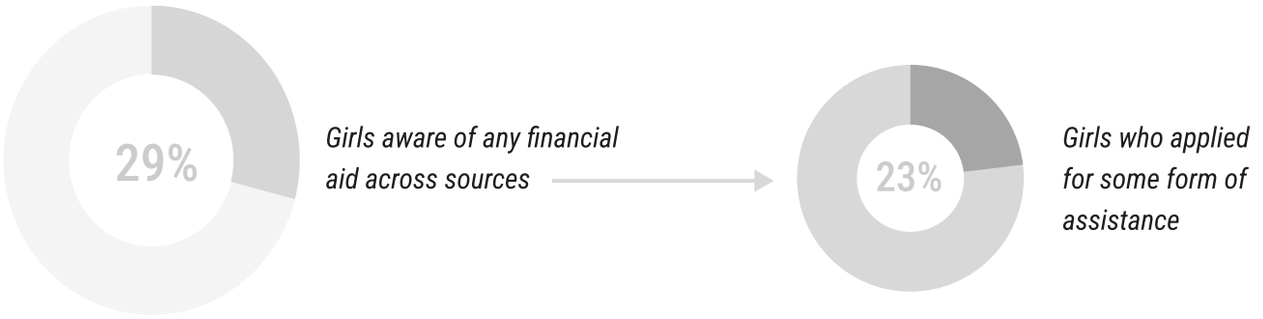
Punjab
55%

Madhya Pradesh
56%

Jharkhand
86%

Awareness regarding availability of financial support in the form of targeted schemes and scholarships is very low.

Girls from Rajasthan and MP had higher overall awareness about STEM scholarships, possibly due to stronger state-level promotions and girl-centric education initiatives. However, they exhibited lower awareness of general financial aid by the government or other sources like Sukanya Samridhi Yojna (21% and 23% respectively). In contrast, girls from Punjab (41%) and Jharkhand (38%) were better informed of general financial aid, but showed lower awareness of STEM scholarships, likely due to limited outreach and eligibility constraints in these states.



General financial support schemes like Sukanya Samriddhi Yojana (cash transfers) have higher awareness (50-60%) compared to STEM-specific ones across the four states (14-22%).

Girls from all the states mentioned the Merit-cum-Means scholarship and Post-Matric scholarships, both of which require students to clear a state level competitive exam.

Spending gap by parents between boys and girls further aggravates the financial barriers disproportionately affecting girls' access to Science

Research by Rashmi et al. (2022) reveals significant gender disparities in educational spending in Indian households.

Per capita spending gap between boys and girls

This spending gap between boys and girls highlights the financial barriers disproportionately affecting girls' access to Science.[21]

> *When resources are limited, families often prioritise boys' education, viewing it as an investment for future earnings. In contrast, they see education for girls as redundant since they will marry and join another family.*
>
> **Dr. Indumati,**
> **Independent consultant in STEM and Gender Education**

2. ACADEMIC CAPABILITIES

Familial aspirations and social identity shape the choice of discipline, often lowering girls' self-confidence in their academic abilities. Family aspirations significantly influence girls' educational outcomes in India. This pressure increases during adolescence, with social identities taking shape and their interest in science plateauing by age 15, resulting in a **20 percentage point gap between male and female students opting for science.**[22]

*The National Family Health Survey (NFHS) shows that **only 30% of families encourage daughters to pursue STEM careers**, with varying rates among different castes.*

Rebecca Gordon's study in Bihar found that mothers' aspirations was to educate sons for employment and family support, while their aspiration for daughters is to ensure comfortable lives and better marriage prospects. Educationist Nitya Rao's study 'Aspiring for Distinction: Gendered Educational Choices in an Indian Village' explores how socio-economic backgrounds shape gendered educational choices in an Indian village in Jharkhand. Families from marginalised backgrounds see boys' education as an investment for future earnings, while girls' education is often linked to improving marriage prospects. **The primary research highlighted that inspite of having academic competency, fewer girls chose science streams in Grade 11.**

However there also is evidence to the contrary, and the trend is shifting with parents viewing a professional degree as an important marital negotiation tool. They are investing in girls coaching and also supporting them to enter technical colleges, especially engineering. However, financial constraint becomes a deterrent for these parents. Financial constraints and traditional gender roles push girls toward non-technical fields, limiting their career opportunities.[23][24]

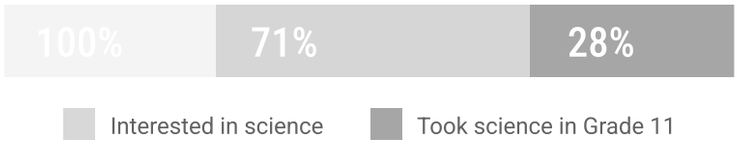
Teachers and parents are both responsible for girls' poor career aspirations. Both are strict with girls and don't encourage inquisitiveness. Besides, both lack information regarding career opportunities in science-related fields. So, girls are not empowered to take an active part in decision-making when choosing the discipline in higher secondary grades.

Mr Bharat, NSQF, AISECT

Girls' poor self-assessment of academic capabilities further aggravates the situation

Girls' self-assessment of their academic abilities greatly influences their decision to pursue Science. The PISA 2019 study found that girls believed their math performance was worse than boys', even though they performed almost equally. Ludwig's 2010 study showed that female middle school students were more critical of their Science and Mathematics abilities than boys with the same grades. Studies also highlighted the adverse effect of poverty on academic performance and their decision-making agency. **This poor self-assessment, along with financial challenges, pushes girls away from science**. [25][26][27][28]

Out of 71% girls interested in science, 60% of them with low grades chose Arts in Grade 11



3. ACCESS TO SCIENCE RESOURCES

71% **of surveyed schools offer science, and fewer schools have labs and computers**

Limited access to STEM resources significantly impacts girls' participation in science education. The NSS 75th round highlighted that only about **38% of rural households–compared to around 70% of urban households**–reported secondary schools within the recommended distance of three kilometers. **Only 21% of India's schools are higher secondary schools**, and many do not offer science streams, creating educational inequities.

Unequal access to science in secondary schools

54% *Schools with a science lab*

46% *Schools with operable computers*

24% *Govt. schools with Internet connectivity*

Schools offering science across surveyed states

Rajasthan	Punjab	Jharkhand	Madhya Pradesh
40%	77%	100%	100%

In many cases, families consider high school education sufficient for girls, expecting them to focus on household responsibilities.

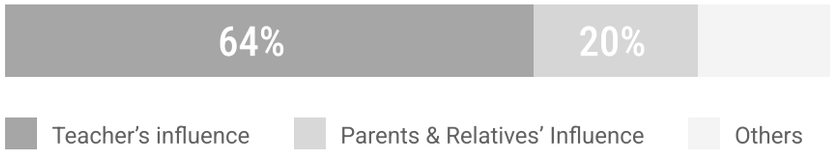
> *Students, especially girls, are restricted in their education in rural regions where they only have grades up to high school. Parents assume that she has completed secondary education, and now she should focus on household chores.*
>
> **Mr Mukesh Sharma, DPI MP**

4. AVAILABILITY AND EXPOSURE TO ROLE MODELS

13% **surveyed schools had female science teachers**

This lack of female Science teachers as role models impacts their aspiration for pursuing science streams

Influencing factors for girls choosing science



Availability of female science teachers across surveyed states

Madhya Pradesh	Rajasthan	Jharkhand	Punjab
1%	15%	16%	19%

The overall shortage of teachers compounds this issue—**over 1.46 lakh vacancies at the secondary level and 92,666 at the higher secondary level** were reported in 2022-23.[31] [32]

5. LACK OF AWARENESS ABOUT JOB OPPORTUNITIES RELATED TO STEM

Survey highlighted that **only 56% of girls are aware about the available career opportunities** related to STEM fields. Conversations with girls, teachers and practitioners revealed a gap in understanding science career pathways, such as necessary courses, coaching, and job roles. During our discussions, girls interested in Science cited teaching, medicine, and engineering as their top professions, reflecting their lack of awareness of several science-related jobs. Only in rare cases, students had multiple options planned for their future.

> *My goal is clear. I will try to crack the entrance exam after 12th and if I get through, it is excellent; if not, I will graduate in science, write the civil service exams and become a police officer.*
>
> **Female Student,**
> **Jamshedpur, Jharkhand**

However, teachers highlighted that such clarity is rare, often observed in girls from educated families. DPI Mukesh Sharma revealed that students have no clarity, even after finishing their masters, about what careers they want to choose. He highlighted that very few students chose Grade 11 subjects based on their future aspirations, and that career guidance at this stage was therefore essential.

Conclusion

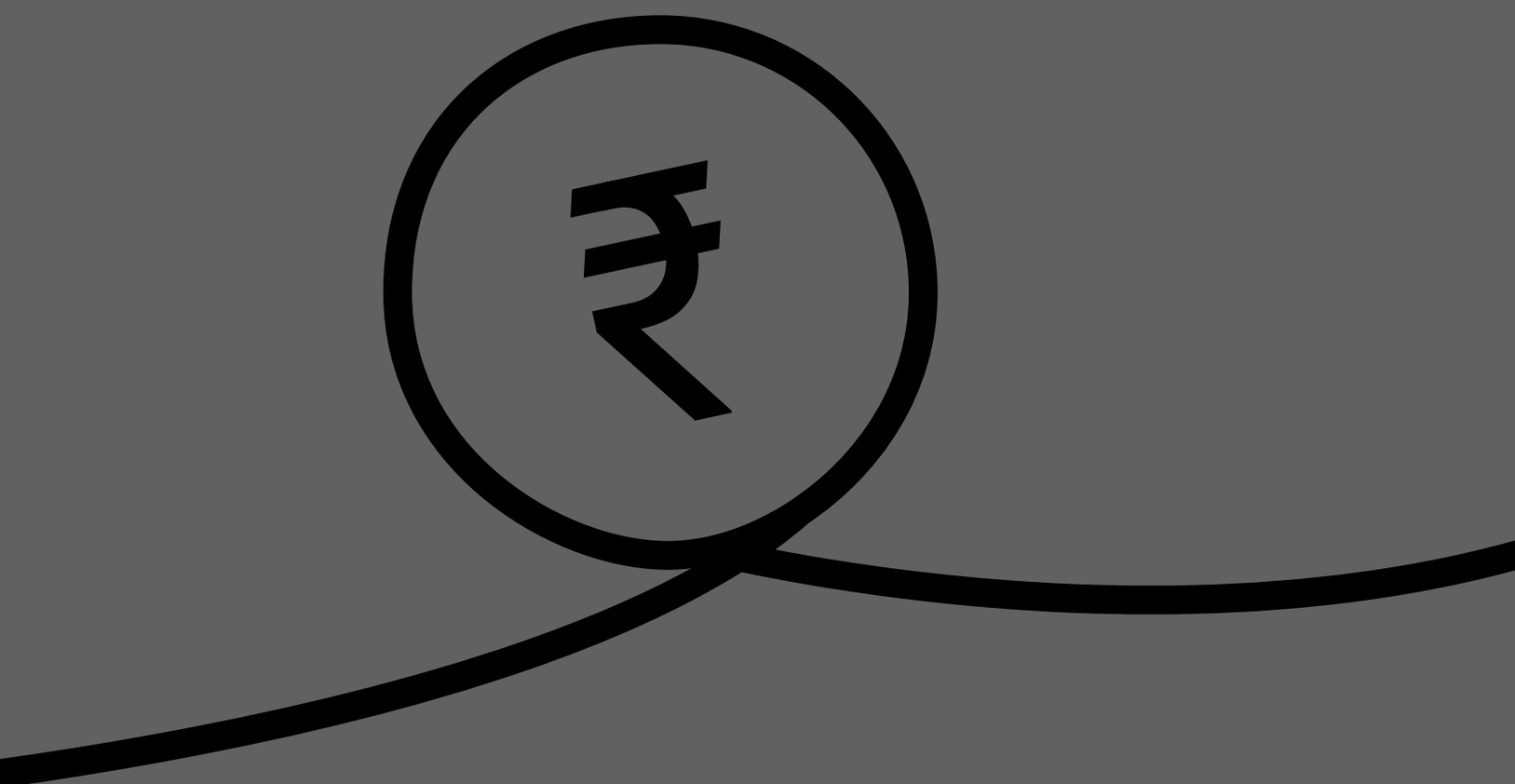
While academic performance may seem to be a key indicator of future career paths, our research shows that this is not always true. Many factors influence career decisions, and a family's financial situation is a major one. The data showed a weak correlation between girls' STEM career aspirations and awareness of career opportunities and financial assistance, and a negative correlation with subject competency. These findings highlight the complex interplay of multiple factors, rather than the influence of a single factor, on girls' aspirations for science careers. **Financial support can be a catalyst in fostering girls' interest and aspirations in science education and STEM careers.** It can provide access to career guidance and raise awareness of the girls about STEM careers, as well as support preparation for entrance exams, and the affordability of technical courses. **These factors can lead to improved academic performance and ultimately increase girls' interest and aspirations in STEM fields.**

The government has launched several financial schemes to support students from rural and remote areas. There are schemes designed with a focus on promoting gender equality in science subjects. The effectiveness of these financial support programmes for girls pursuing science is discussed in the following section.


PowerDirector

02

Financial Incentives and their Limitations in Bringing More Women in STEM



Key Highlights

- Although there are several schemes to promote education in girls, very few focus on enabling girls to pursue science in grades 11th and 12th.
- Despite having a one-stop solution for disbursement of scholarships in form of National Scholarship Portal, a huge gap persists between the budget outlay and actual expenditure on scholarships. Interest-free education loans are available, but not popular among students.
- Lack of awareness, long waiting time, insufficient amount and complicated paperwork impede students from accessing scholarships.
- Merit-based scholarships fail to consider marginalised students in need of assistance.
- Scholarships driven by CSR funding show greater focus towards girls in science education. Various factors inhibit the utilisation of private financial aids, especially geographical disparity in CSR expenditure, competitive nature of scholarships, limited awareness among students leads to narrow outreach.

The Indian government has introduced various financial interventions to encourage girls' participation in science education.

Government allocation and private expenditure for education in 2023

₹11L Cr

Government budget for education- 12% increase from 2022

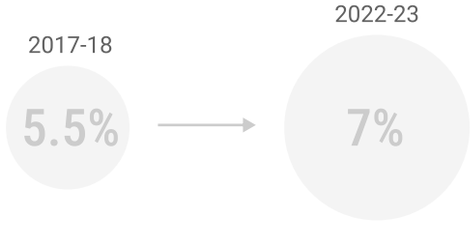
₹9,832 Cr

CSR expenditure FY 23- 24

Over the years, the government has prioritised financial assistance through **scholarships, reservations, and incentive programmes**. However, despite these efforts, **girls—especially from economically marginalised communities—remain underrepresented in science streams in several states.**

Although the National Education Policy recommends spending 6% of the GDP on education, India's total education spending remains below 3.5% of GDP, significantly lower than the global average of 4.7% (World Bank, 2023). Moreover, the education sector also grapples with the issue of budget underutilisation.

Gap between budgeted and actual expenditure has widened



This shortfall limits the impact of existing initiatives, creating a persistent demand-supply gap in financial aid for STEM education. While several interest-free loan programmes have been launched, uptake remains low, pointing to awareness and accessibility challenges.[33]

This chapter examines public and private financial initiatives designed to enhance girls' participation in STEM.

Government Financial Initiatives Empowering Girls' Education

The government has been assisting and promoting science education through various schemes and funding interventions. **However, in 2024-25, pro-women schemes accounted for just 6.8% of total education budget allocations, highlighting the need for targeted funding to support girls in science.**[34]

Our focus states have implemented initiatives involving monetary and non-monetary transfers to encourage girls' completion of school. However these initiatives do not focus specifically on incentivising girls to pursue science education in the higher secondary grades.

NON-MONETARY TRANSFERS

Rajasthan: The Rajasthan Free Scooty Yojana provides free scooters and incentives to girls in the state who have passed the 12th board examination with a score of 75% or more. The KG to PG Scheme offers free education from kindergarten to post-graduation for girls from disadvantaged backgrounds. Additionally, KGBVs (Kasturba Gandhi Balika Vidyalayas) provide free residential schooling for rural girls.

Punjab: The Government of Punjab provides free textbooks for school students from Grades 11 and 12.

Jharkhand: Sampurna Shiksha Kavach in Dumka, Jharkhand is providing technological support to government school teachers to solve challenges in Biology, Physics, Chemistry and Mathematics.

Madhya Pradesh: The Cycle Distribution Scheme has been implemented by the Tribal Affairs Department, Government of Madhya Pradesh, with an aim to provide cycles to village girls students to continue their education.

MONETARY TRANSFERS

All the four states are offering the Merit-cum-Means scholarships to their students, based on the written entrance exams conducted across states. Additionally, several other schemes are provided by different departments and ministries, a few to be mentioned are:

Madhya Pradesh: The **Ladli Lakshmi Yojana** provides **conditional cash transfers** for girls upon achieving key education milestones, while the **Mukhya Mantri Kanyadan Yojana** supports **higher education and marriage** for girls from low-income families.

Rajasthan: The **Mukhyamantri Hamari Beti Yojana** for top two meritorious girls in each district offers **₹25,000 per year for Class 12 girls scoring above 75%**. It helps fund technical and science-related coaching and residential costs **up to ₹1 lakh after submission of receipts.**

Jharkhand: The **Mukhyamantri Maiya Samman Yojana** ensures direct cash transfers of ₹2500/ month to school-going girls, reducing financial barriers. The Maanki Munda scheme provides ₹1500/month to girls from rural regions to commute to polytechnic colleges (admission fee is waived for girls).

Punjab: **Dr Hargobind Khurana scholarships** are meant to provide ₹2500/month for girls in higher secondary grades from marginalised backgrounds. Each girl from Scheduled Castes, studying in Grades 11 and 12, is provided ₹3000/year.

While these interventions have improved enrollment and retention rates, challenges remain in **accessibility, implementation, and long-term impact on STEM participation**. Although financial initiatives are implemented to increase girls' participation in education, most of the schemes are not taking into consideration the needs of the students. These schemes offer financial support ranging from **₹1,500 per month to ₹3,000 per year,** but the assistance varies **without considering regional requirements and subject-specific needs.**

> *A survey conducted in villages revealed that households typically spend ₹5,000 to ₹8,000 per year on a child's education. Current scholarships only cover less than 50% of these expenses. The parliamentary committee has advised the government to implement inflation-indexed scholarship amounts to meet these rising costs better.*
>
> **Anindya Gupta, CIFF**

Additionally, students **cannot avail multiple schemes simultaneously**, limiting their overall benefit—a challenge highlighted by the **Registrar of BBMK University, Dhanbad, Jharkhand.**

> *Maanki Munda scheme is a great scheme that provides fee waiver for girls in polytechnic colleges and assures ₹1500/month to commute to the college. However now the Maiya scheme is providing ₹2500/month to every girl who is 18 years old. A girl can avail any one of the schemes, and girls are confused about which scheme to avail.*
>
> **Dr. Dhananjaya Kumar Singh**

In the past 15 years, the Government has introduced several schemes and initiatives to enable interest-free educational loans, but the uptake of these schemes is still not widespread. Financial support for students through low-cost loans is not a lucrative scheme.

2024-2025 Budget

₹10L	1L	3%
Education loans	Students to receive e-vouchers annually	Interest rates

PM-USP CSIS (FY22-23)

Pradhan Mantri Uchchatar Shiksha Protsahan Central Sector Interest Subsidy Scheme

3L
Applicants received subsidies on education loans

₹7.5L
Loans in recognised govt. institutions for families with less than ₹4.5L

Central Sector Scheme of Scholarship (FY 23-24)

₹1054 Cr
To provide interest subsidies on education loans taken from scheduled banks under the Model Education Loan Scheme of the Indian Banks Association

Only a minuscule percentage of students applied for this subsidy from the surveyed states

Madhya Pradesh	Jharkhand	Rajasthan	Punjab
14000	4992	5991	1409

Vidya Lakshmi Scheme

Since 2016, the Vidya Lakshmi Scheme has provided interest-free loans for IIT undergraduates, covering the study period plus a one-year moratorium.[35][36]

Students are deterred from using loan schemes by their lack of awareness, difficulty accessing them due to stringent bank criteria, and long waiting periods.

While interest-free loans exist, very few students are able to repay them. The education loan market has shrunk by 25% in the last five years, owing to banks' policy of prioritising more extensive loan requirements of ₹9 lakh or more, over sub-₹4 lakh loans, thus marginalising poor students further. A **high default rate** of 17.5% of student loans due to a poor job market is also a reason for this shift. **This default has been observed more frequently in sub-four lakh rupees loans**. [37][38]

Parent's poor or no CIBIL records are another reason for students' inability to access the Vidya Lakshmi scheme. Despite the scheme and courts repeatedly announcing that instead of parents, the student is the prime borrower, it is a significant deterrent in the provisioning of the loans.

Owing to these challenges, in 2018, the Government initiated a single window portal, Vidya Lakshmi, empanelling 34 banks for education loan applications. However, more support is required to develop awareness amongst the students, and reduce the cumbersome paperwork to ensure that more students avail this facility.[39][40]

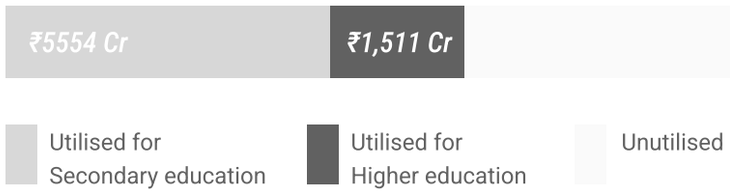
Only 21%

Funds allocated under the Samagra Shiksha programme are for secondary education.

Of these, 55% of the funding for school education and 32% of the budget for higher education remains unutilised.

The Government has allocated financial resources to the Department of Science and Technology's programmes and initiatives aimed at women in STEM, as highlighted in the Indian Gender Budget. Specific allocations are made for additional funding in the form of scholarships by various Ministries, and a total of ₹652 crores have been disbursed as scholarships under 148 schemes in the FY 2023-24.[41][42]

Underutilisation of the scholarship budget FY 22-23



The DISHA Programme

launched for women in science

₹135.50 Cr → **₹50 Cr**

Initial allocation in 2024-2025

Revised allotment in 2023-2024 [43]

Vigyan Jyoti Programme

One-year scholarships are awarded to girl students in Class 12

₹5841.08 L

Total scholarship sum granted under the scheme since its inception in 2020

Only 30,451

beneficiary female students in grades 9-12 pursuing STEM for higher education.[44][45]

₹33 cr

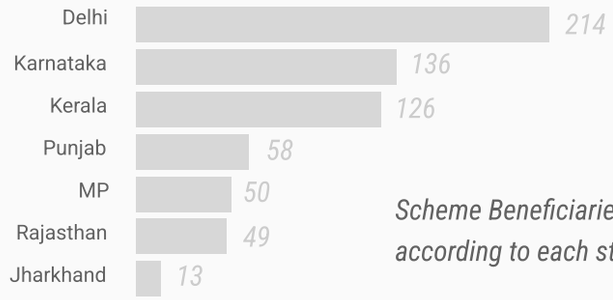
discrepancy between released and required funds

The Women Scientist Scheme (WISE- KIRAN)

Supports women scientists in advancing science and technology (S&T) research careers.

1,962 women scientists

have benefited from the Women Scientist Scheme.



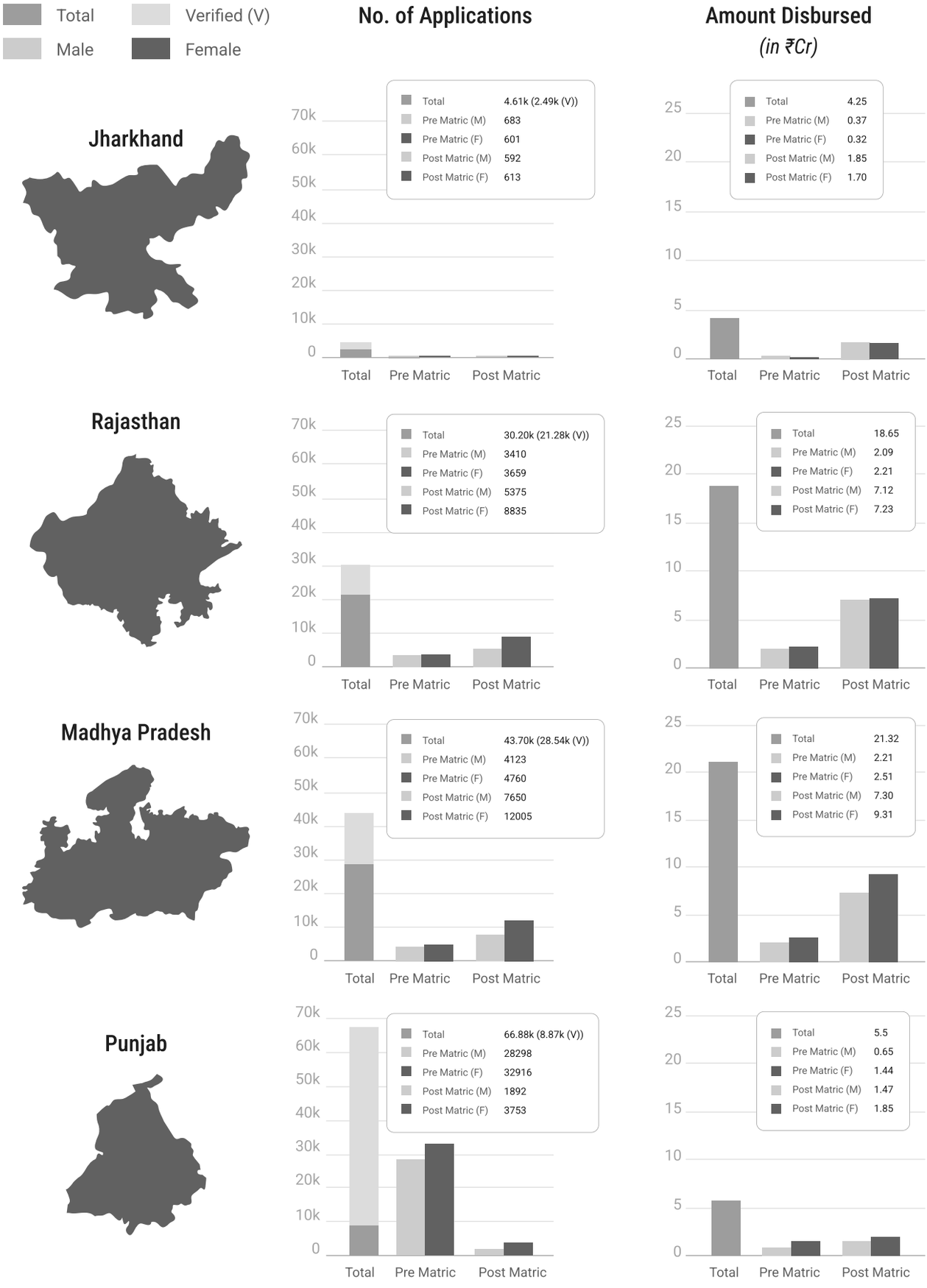
Scheme Beneficiaries according to each state [46]

State-wise distribution of scholarships

The National Scholarships Portal (NSP), a Government of India initiative, provides a one-stop solution for students seeking scholarships. The portal streamlines the process from application and receipt to processing, sanction, and disbursal of various scholarships. Although it is a great endeavour by the Government of India, to bring transparency and tech enabled solution, it still depends upon manual verification processes, complex paperwork and cumbersome application process leading to delays in disbursement of scholarships. One of the experts who was part of the team who created the NSP, also highlighted that NSP 3.0 is needed.

> *The National Scholarship Portal is the result of the GoI's efforts and strong intent to enable the integration of 150 scholarship schemes across several Ministries and the State governments. With the advancement of technology and AI, the Portal should now aim to integrate Digilocker and private scholarship providers, to build a robust automated verification process.*
>
> **Soumitra Mandal, Part of the national awarded team for building the NSP**

State-wise distribution of scholarships*



***Note**: The data was referred in February. The latest data is available on National Scholarship Portal

Challenges in accessing public financial aid

A communication gap between scholarship providers and seekers leaves many students unaware of financing opportunities. Providers need help to reach candidates, while students need more resources. But limited scholarships and inadequate guidance create intense competition and a demand-supply mismatch, even among deserving students. For instance, **National Means-cum-Merit Scholarship (NMMS) offered approximately 1 lakh scholarships in 2021, while an estimated 3 lakh students applied**.

Only 23% **students had applied for scholarships, primarily for government-funded programmes**

PM Scholarship Scheme, Narayana Talent Scholarship, Swami Vivekananda Scholarship, Gargi Award, and MPTAAS.

The following limitations of current scholarships and their disbursements impact students accessing available funds:

1. POOR AWARENESS REGARDING SCHOLARSHIPS

Out of the 4763 girls, surveyed only 29% are aware of some scheme or scholarship providing financial aid. The table below shows that there is a lack of awareness surrounding the various scholarships provided. This contributes to the underutilisation of the allocated scholarship budget.

State	Unique Scholarship Name	% Girls Aware (Approx)
Punjab 	Post Matric Scholarship for SC/ ST/ OBC	42%
	Chief Minister Scholarship Scheme	38%
	Dr. Hargobind Khurana Scholarship (STEM- Specific)	22%
	Merit- Cum- Means Scholarship for Minority Students	18%
Rajasthan 	Rajasthan KG to PG Scheme	48%
	Mukhyamantri Hamari Beti Yojana	35%
	Kasturba Gandhi Balika Vidyalaya (KGBV)	30%
	Rajasthan Yuva Vikas Prakoshth Scholarship	16%
Jharkhand 	Mukhyamantri Maiya Samman Yojana	50%
	Savitribai Phule Kishori Samriddhi Yojana	32%
	Birsa Munda Scholarship for Science & Technology	14%

State	Unique Scholarship Name	% Girls Aware (Approx)
Madhya Pradesh 	Ladli Laxmi Yojana	60%
	Mukhya Mantri Medhavi Vidyarthi Yojana (MMVY)	44%
	Gaon Ki Beti Yojana	38%
	Pragati Scholarship Scheme for Girls (STEM-Specific)	21%

2. COMPLICATED APPLICATION PROCESSES

It prevent students from applying for scholarships. Furthermore, language barriers also tend to limit students' ability to complete the applications.

> *Many of these forms are difficult to understand. This becomes more difficult for girls from rural backgrounds as they often do not have the support to fill in these applications from their families. The ease with English and the length of the applications is also a major issue.*
>
> **Vijay Roy, Founder, Scholarify**

3. REQUIREMENT FOR NUMEROUS DOCUMENTS

50% **scholarship applications are rejected during verification**

According to data from the National Scholarship Portal (NSP)

Incomplete documentation is a key reason for these rejections.

This results in 70-80% rejection rates due to incomplete or incorrect applications, and discourages many from applying altogether due to the extensive documentation process. Consequently, only a small percentage of students apply; of those, only 5-6% receive scholarships, with an even lower proportion of female recipients. [47]

4. DELAYED DISBURSEMENT OF FUNDS

Due to the rigorous verification process of shortlisting the deserving candidates, it takes time to select the final students. Although the National Scholarship portal is online, it still follows old-fashioned processes for verifying documents and distributing funds. Students have to deal with a lot of paperwork, get approvals from authorities, keep multiple copies of documents, and go through long application procedures.

Even small mistakes can lead to reapplying, deadline extensions, and major delays in receiving scholarship funds due to slow verification. After the application is submitted, the funds can take three to nine months to reach the students, thus discouraging the students from applying for the scholarships.

4. MERIT-BASED SCHOLARSHIPS

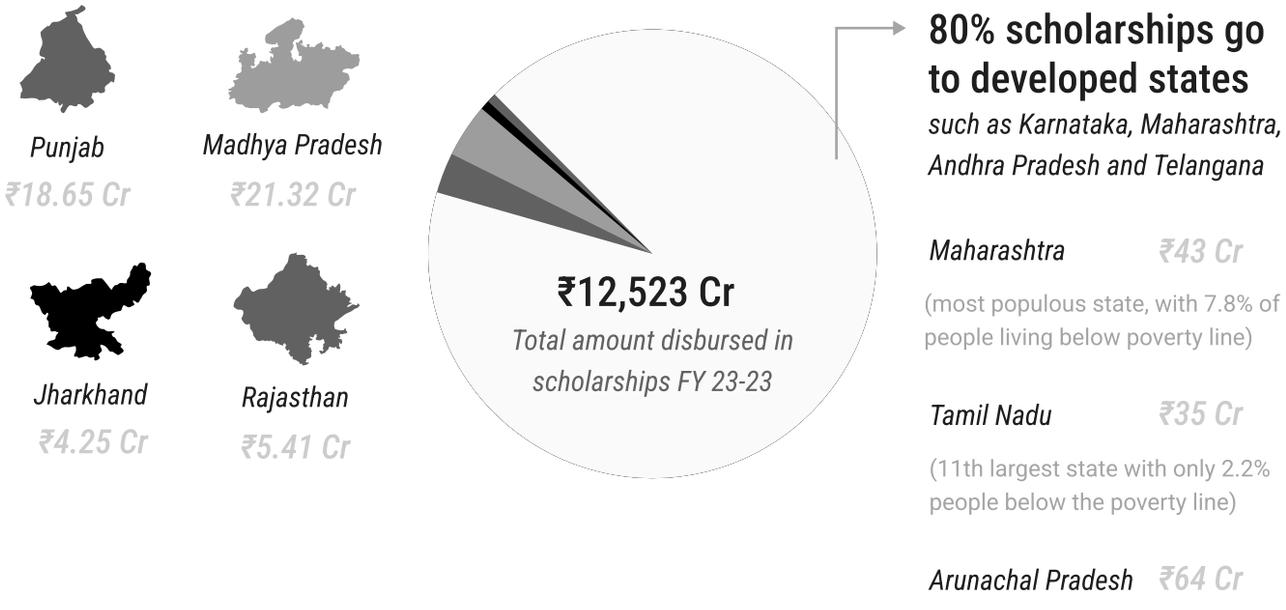
Scholarship criteria are often academically focused, excluding girls from disadvantaged backgrounds who may struggle academically due to their circumstances. This creates an additional barrier for marginalised students, who may not have achieved grade-level competencies despite advancing to higher grades.[48]

5. DESIGN OF SCHOLARSHIPS

Student's don't feel motivated to apply for scholarships that do not fulfill their academic requirements. There is no consistent recognition of students' financial needs across grades. Science students face higher costs than Humanities students, but scholarship designs fail to address this gap. States offer varying scholarship amounts without considering students' actual needs. For instance, the National Means-cum-Merit Scholarship Scheme (NMMSS) provides ₹12,000 per year for grades 9–12, which is not only insufficient , but also does not account for rising academic expenses over time.

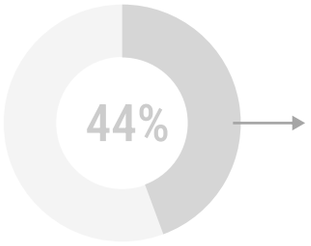
5. GEOGRAPHICAL AND SEGMENT-BASED IMBALANCE

As most students have little access to resources in rural regions, leading to a lack of awareness of scholarships, and limited early interventions for girls. There are fewer scholarships specific to science education for girls, and even fewer for Jharkhand, Punjab, Madhya Pradesh, and Rajasthan. [49][50]



CSR Initiatives Empowering Women in STEM

Despite private funds being significantly lesser than government funds, CSR funds are increasingly aiding STEM education for girls.



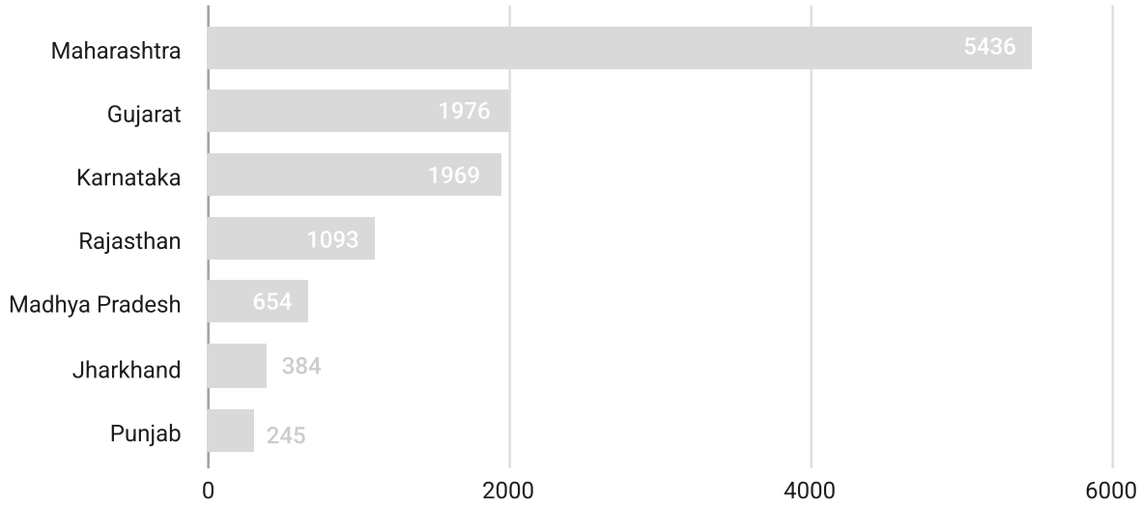
Education is the most popular sector chosen for CSR projects

receiving ₹13,209 out of total CSR funding of ₹29,987crore in FY 22-23

CSR education funds have been **directed predominantly towards STEM education.**

Further, CSR education funds have also been directly predominantly towards science education and come from various sources, including large corporations and startups. **Reliance Industries Ltd.**, for example, allocated ₹215 crores in FY '22-23 for education, providing scholarships to 687 students (the total number crossing 12000 since inception). **Kotak Kanya Scholarship 2024** supports girl students pursuing professional graduation courses, with 525 students receiving aid in 2023. The **L'Oréal India For Young Women in Science (FYWIS) Scholarship programme** has assisted 385 young women from economically disadvantaged backgrounds, granting each a scholarship of ₹2,50,000. While these scholarships provide significant aid, less than 1,000 students have accessed them.[54][55]

Top recipient geographies of CSR Spend vs. Surveyed States (INR Cr)



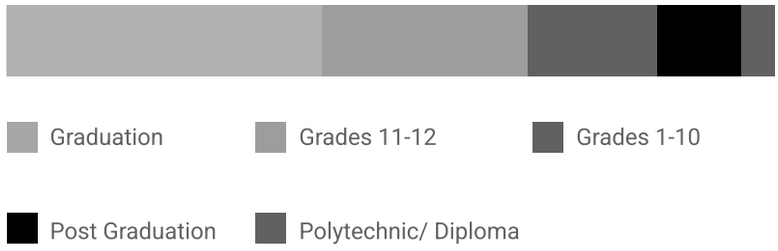
Only 20% **of available scholarships are primarily focused on STEM subjects, and even fewer are for schoolgirls**

According to Pratham's 2020–21 study, compared to general scholarships

This problem is also highlighted by the **Kotak Kanya Scholarship**, which receives **55,000 applications from girls nationwide for 350 scholarship slots**. There exists a huge gap between the demand and supply of the scholarships, and private funded scholarships are also directed by similar intent of 'Merit cum need approach', thus making then unattainable for a large chunk of population.[51]

In contrast to government funds, there is a smaller discrepancy between the budget allocated and the expenditure by private initiatives. The utilisation of mediators, including NGOs and aggregators like Protean, Buddy4Study, Nirmaan, Scholarlify and Impactis has facilitated the efficient allocation of funds, thereby enhancing and securing student financial aid.

Distribution of scholarship amount across the life cycle of a student



Buddy4Study

65L
Scholars on the platform

4.9L
Students registered

FY21-22 ₹89 Cr
FY22-23 ₹110 Cr
Ongoing FY23-24 ₹207 Cr

32%
Scholarships to Grade11-12

15%
Scholarships to Grade1-10

Vidyasaarthi

₹87.5 Cr
CSR amount disbursed in the form of scholarships

1694
Scholarships awarded

2.3L
Applications processed

Sources for Buddy4Study and Vidyasaarthi [52][53][54][55]

Challenges in accessing private aid

1. GEOGRAPHICAL DISPARITY IN CSR EXPENDITURE

CSR expenditure is predominantly **concentrated in industrialised states such as Maharashtra, Gujarat, Karnataka, and Tamil Nadu**. Maharashtra, for example, obtains nearly ₹6,800 crores in CSR contributions, whilst North-Eastern states such as Mizoram and isolated areas like Lakshadweep and Leh receive far less. This regional disparity constrains the benefits of CSR in areas with limited development.

2. COMPETITIVE NATURE OF THE SCHOLARSHIPS

Due to the limited funding compared to public funds, there are fewer scholarships, and therefore, **most of these scholarships require students to earn more than 70% marks to be eligible**. This restricts many students from accessing the scholarships due to a lack of grade-appropriate learning. Fewer scholarships are available for school education than higher education, furthering the competition.

> *For the Smile Foundation, scholarships are part of the bigger plan of empowering the girl and the community. We work closely with the community, understand the needs of the girls and then design the financial support. Sometimes it is for basic tuition to achieve grade appropriate competency, we know the need, and thus design it for the success of the child.*
>
> **Seema Kumar, Smile Foundation**

3. LIMITED AWARENESS

As most CSR scholarships are advertised online, students and regions with limited access to online platforms often lose out on information. According to Oxfam's India Inequality Report 2022, **access to the internet through any kind of device was better in urban India (44%) than in rural areas (17%)**. Across different caste groups, as well, **only 4 per cent of students from SC and ST communities had access to a computer and the internet.** [56]

4. DELAY IN DISBURSEMENT OF FUNDS

Due to strict and several layers of verification process, it takes very long in disbursing the scholarship amount to the deserving candidates.

> *At times, it takes about six months for the entire process to complete. Depending on the donor supporting the learner, we need to do intensive follow-ups; sometimes, students lose trust in the process and drop out.*
>
> **Shrestha Ganguly, Impactis Global**

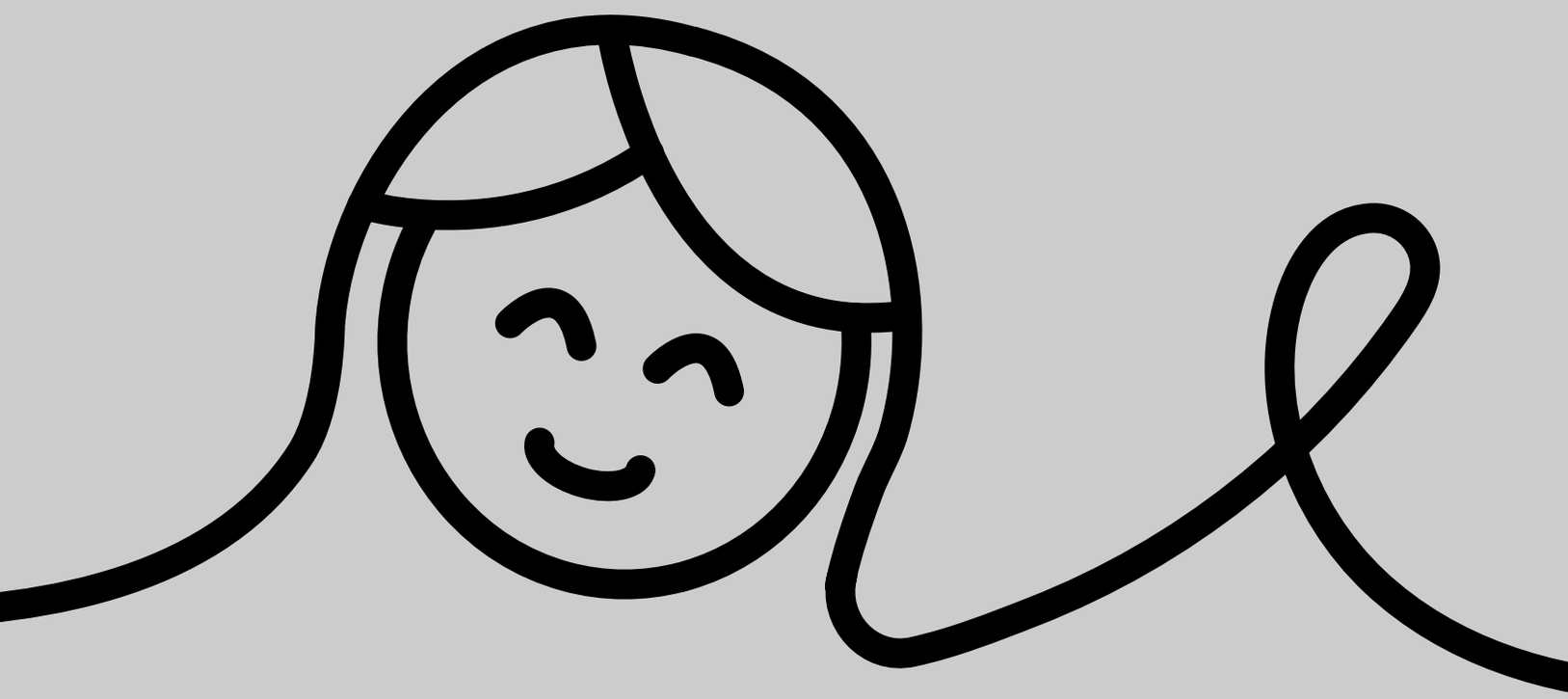
Conclusion

Financial support for girls in STEM is limited and provider-focused; it lacks demand insights to design effective solutions. Raising awareness of existing financial aid options, such as scholarships and loan programmes, is critical among marginalised students, particularly girls. Most of these funding sources do not adequately meet students' requirements as they are restricted to tuition fees and stipends, not accounting for accommodation and transportation costs.

Consequently, the amount of scholarship money allocated to girls must be reevaluated to ensure that it covers a greater portion of their expenses. Furthermore, the **criteria for scholarship eligibility need to be revised**. Since most financial aid programmes prioritise academic performance, systemic inequalities that hinder the educational achievements of disadvantaged students are overlooked. Excessive and complex documentation processes and inefficiencies in spending of allocated scholarship amounts are big challenges that need to be addressed. Innovative methods of outreach must be explored to make scholarships more accessible to students in need.

03

Identifying the Beneficiaries



Key Highlights

- The interplay of various factors influencing girls' aspirations in science delineates four distinct profiles among girls in government schools.
  - Those who have minimal financial needs and low academic potential (disengaged);
  - Those who have low financial needs and high academic potential (sustainers);
  - Those with low academic potential and high financial needs (aspirers)
  - Those with high academic potential and high financial needs (trailblazers).

- ***Targeted financial aid for Trailblazers and Sustainers*** to enable them to get into STEM careers through technical colleges drives the strongest impact on STEM participation.
- ***Career guidance and skill-building investments for Aspirers*** enhance their transition into STEM careers through alternate pathways of vocational education.
- ***Financial aid alone is ineffective for Disengaged girls***—success requires community awareness and agency-building interventions first.

Understanding the personas of girls

To develop targeted financial interventions, this study utilises the BCG Amazon Matrix framework to categorise girls based on their financial needs and academic competency levels. This approach enables the identification of high-impact areas for funding, ensuring that resources are allocated efficiently to help more girls pursue and sustain their education in science. Additionally, it will support the girls in identifying their career pathways and prevent them from becoming part of the NEET (Not in Employment, Education, or Training) population. **The intertwining of financial needs with competency and aspiration uncovers four unique profiles of girls in government schools (Adopted from BCG Amazon Framework):**

Key personas

HIGH FINANCIAL NEED

ASPIRERS

CHARACTERISTICS
- Girls interested in science but lacking academic competency
- High financial need

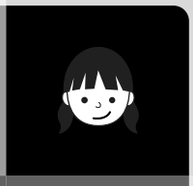
INTERVENTIONS
- Awareness of financial aid to attain grade level competency
- Build skills to enter workforce

34%
of the sample

TRAILBLAZERS

CHARACTERISTICS
- High academic competency
- Need financial support for tuition, coaching or science material

INTERVENTIONS
- Scholarships or direct financial aid spread across 2 years based on their specific needs



26%
of the sample

17%
of the sample

23%
of the sample

LOW FINANCIAL NEED

CHARACTERISTICS
- Minimal financial barriers
- Not interested in science or have socio-cultural barriers

INTERVENTIONS
- Awareness campaigns and community interventions needed to make financial aid effective

DISENGAGED

CHARACTERISTICS
- Strong academic potential
- Receiving some financial support (NGOs/ Govt.)

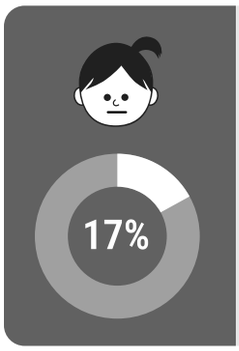
INTERVENTIONS
- Ensuring continuous guidance for 2 years to maintain their progress towards higher education

SUSTAINERS

↓ LOW ACADEMIC COMPETENCY
(<60% in science & maths)

↑ HIGH ACADEMIC COMPETENCY
(>60% in science & maths)

DISENGAGED GIRLS



Low academic competency

Minimum financial need

Building agency in girls and fostering community engagement to negotiate with prevailing gender norms. Financial investment in coaching or resources will be ineffective until these are in place

Students are asked to make subject choices at that juncture of their academic journeys, where they have limited awareness, agency and exposure to future career opportunities related to different streams. Several experts expressed these sentiments and highlighted the lack of career guidance leading to poor decision-making by students in stream choice.

> *Girls are unaware of opportunities even after completing B.Sc., the government job aspiration is still prevalent in rural areas. They lack relatable role models, career awareness, mentors and self-efficacy. No exposure to the practical applicability of science.*
>
> **Dr. Anushila Chatterjee, VigyanShaala**

> *School students are unaware of career opportunities after school. Career conversations should start very early in schools. We should not limit our guidance only to STEM. Several other streams of studies should help map students to careers.*
>
> **Dr Partha Sarathi Basu, Chief HR Officer, VE Commercials Vehicles**

Rigid gender norms discourage girls from independent decision-making, leading them to accept parental choices that limit their engagement in science education and careers. Concerns over safety and societal expectations further curb their aspirations, especially for fields requiring relocation. Parental and teacher biases often dissuade them from higher education, particularly if they struggle academically. In regions like Jharkhand and Rajasthan, where child marriage is common, many girls face intense pressure to abandon education entirely.

> *The moment girls enter grade 10, their marriage is set. Once they get married, it is difficult for them to manage their studies, and they don't sustain themselves, especially in science fields.*
>
> **High school teacher**
> **Government Higher Secondary school, Dhar**

The District Public Instruction (DPI) official from Bhopal also pointed out that completing school is already a struggle for girls in rural areas, and pursuing science education is even more challenging. In his words,

> *Rural regions do not have appropriate resources, and most schools are high schools in villages. Once girls pass high school, it is the end of their academic career. God forbid, if they fail in this process, then the journey will be stalled earlier.*
>
> **Mr Mukesh Sharma , DPI, Bhopal, MP**

Despite industry efforts to increase female workforce participation, **deeply ingrained gender norms** surrounding **relocation at marriageable age** remain a significant barrier.

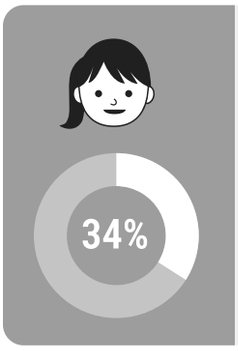
> *Despite giving priority to hiring fresher girls, their retention, relocation, and marriage are the biggest challenges for recruiting them from remote areas. At job fairs, only 30% of students show up for the joining date after receiving the offer letter.*
>
> **Sushil Dharan, HR Manager, Aerial Telecom**

Lack of resources and perceived difficulty of subjects make science less desirable.

A high percentage of girls reported finding science subjects challenging to grasp. While 20% of girls prefer non-science subjects due to their better relatability, others are unaware of opportunities that science offers and also perceive them as too difficult. This disinterest and poor academic performance in science subjects contribute to the disconnect. Parents, who are the primary decision-makers for their children's life choices, are also unaware of career pathways in science-related fields.

Addressing these issues requires building awareness of STEM careers, especially for women, enabling female science teachers' availability, and implementing community engagement interventions. Financial investment in coaching or resources will not be effective until these underlying challenges are resolved.

ASPIRER GIRLS



Low academic competency

High financial need

Encouraging them to enroll in skill development programs within the school system, or one- or two-year vocational courses after school; thus equipping them to enter STEM careers

These girls also showed higher aspirations towards science subjects and awareness of some career opportunities in STEM fields.

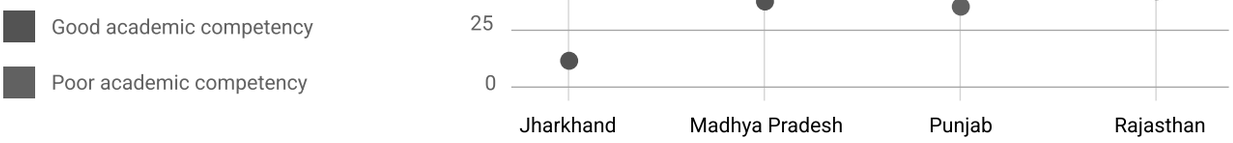
Poor academic performance stems from low learning levels in early grades, and is worsened by the family's financial constraints. Wilima Wadhwa, Director of ASER, highlighted in her article published in The Economic Times that students who progress in education without foundational numeracy and literacy skills are unlikely to acquire them later.

> *For STEM mindsets, the way girls look at problem-solving is different. When I work with marginalised adolescent girls, I realise their vocabulary is extremely limited. No reading is happening, and where will they build their logical thinking? Everything gets messed up right at the foundational level. Girls are not encouraged to ask questions, so they cannot identify problems; solving is the last stage.*
>
> **Surabhi Yadav, Founder and CEO, Sajhe Sapne**

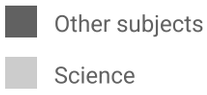
ASER 2024 reiterated that in rural India, only **50% of children in grades 11th and 12th (16–18 years of age) could divide a three-digit number by a single-digit number**. Additionally, experts and students have noted that the pedagogy used in classrooms is repetitive and outdated, making it difficult for students to engage with science. [58][59]

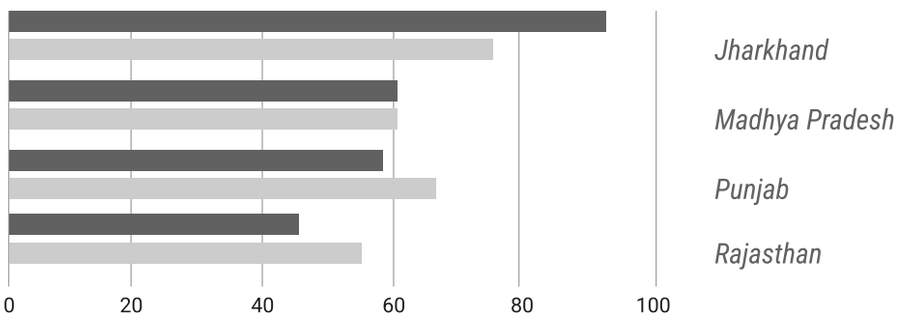
Results from primary research indicate that academic proficiency was lacking in 35% of 11th-grade students who chose the science stream. This reveals a considerable disparity between student aspirations and actual performance in science and mathematics. The graphs below show that Punjab and Rajasthan girls show better academic competency in science, subjects compared to MP and Jharkhand.

Distribution of students across states based on academic competency



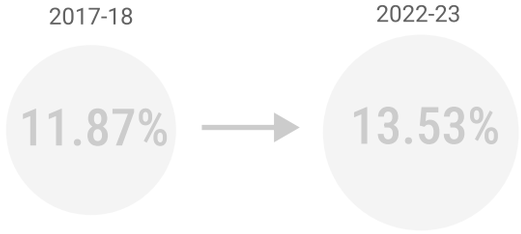
Choice of stream by girls across surveyed states





The trend highlights the need for career guidance to enable informed decision-making and better resources and support in the form of remedial classes or tuitions to enhance students' learning outcomes. The burgeoning after-school tuition culture is addressing this learning gap. However, these girls face academic challenges and end up with subpar academic skills.[60]

Annual education expenditure for coaching and tutoring has increased



Source: National Sample Survey data

> *It is the problem of plenty. Where several engineers exist, they are not employable. People from very poor academic backgrounds are studying technical subjects. How will they grasp the content without filling the foundational gap?*
>
> **Dr. Partha Sarthi Basu, Chief HR Officer, VE Commercials Vehicles**

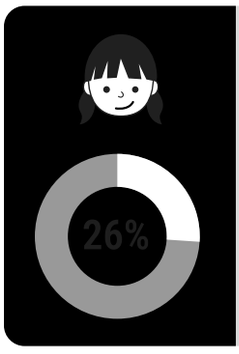
Traditional financial support for coaching and counselling to prepare for entrance exams in technical fields is unlikely to be effective for these girls due to their limited academic preparedness.
A conventional funding approach may not achieve the intended goal of enabling them to pursue science and transition into STEM careers. Instead, integrating them into STEM through vocational skill training and training presents a more viable pathway.

A well-defined financial support for enabling grade appropriate learning levels, enhancing awareness of STEM career opportunities and defining career pathways following the vocational education pathway, can play an important role in the entry of Aspirer girls into the formal STEM workforce. Expanding funding to access vocational education is essential, as it can serve as a bridge for these girls to enter STEM fields. **By encouraging them to enrol in skill development programmes within the school system, or one- or two-year vocational courses after school, will equip them with industry-relevant skills** thus opening up alternative entry points into STEM careers.

> *Students often waste valuable time in their professional journeys by starting late after graduation. They could have begun 4-5 years earlier and gained internal growth if they had pursued vocational-technical education during higher secondary grades.*
>
> **Mr Sushil Dharan, HR Manager, Aerial Telecom Solutions**

The outcome, however, cannot be predicted with this intervention. The students can get into STEM related jobs after school or choose higher education or even decide to be part of the NEET population. Nonetheless, providing financial support to open up new opportunities is vital to ensuring these girls have the opportunity to excel academically and reach their full potential.

TRAILBLAZER GIRLS



High academic competency

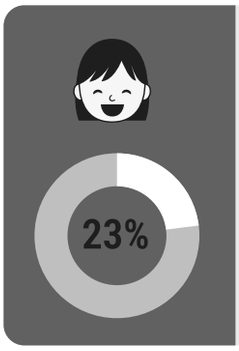
High financial need

Providing targeted financial aid to trailblazers, that aligns with the academic calendar, will positively influence their decision to choose STEM fields for higher education and careers

This group has the capability and motivation to study science. Financial support equipping with necessary skillsets to enter the technical colleges can help them move towards higher education seamlessly. These girls are motivated by social mobility and a genuine interest in the subject. However, financial constraints impeding their access to guidance and proper resources hinder them from achieving their desired careers pathways. This demands academic skills and sustained motivation and agency in girls. **Scholarships, mentorship programmes, affordable resources, and access to good coaching** can be instrumental in tackling these challenges, nurturing aspirations, and bridging the gap.

Supporting these girls requires sustained financial aid for 2-4 years, ensuring they can compete academically. Funding must align with academic needs and schedules, empowering trailblazers to pursue STEM education and careers with confidence.

SUSTAINER GIRLS



High academic competency

High financial need

Targeted microfinancial aid distributed throughout the academic year can significantly support them, enabling informed decisions and fostering successful STEM career paths

Several of them may also have access to coaching through certain NGOs or other organisations. However, they still require additional support, such as mentoring or refresher books, to maintain good academic performance and pursue science in higher education. This was substantiated during our conversations with Akshay Saxena (Avanti Fellows) and Meenakshi Shahi (CSRL), as they revealed that girls would benefit from micro-financial aid for entrance exams, refresher books and mentorship to keep them motivated.

> *Studying science, and preparing for competitive exams is demanding. Students experience a lot of change. Right from the time they have filled in the forms to actually attending classes, most of the content is in English. It becomes an additional challenge if one has to relocate for the same, adjusting to the new city*
>
> **Anu K Malik (Dakshana Foundation) and Meenakshi Shahi (CSRL)**

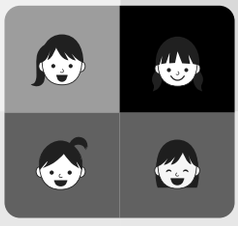
Targeted microfinancial aid distributed throughout the academic year can significantly support girls. Financial constraints are a primary barrier to pursuing STEM careers, with needs varying across grade levels. Hence, it is essential to tailor financial aid to suit the specific requirements of individual students, enabling informed decisions and fostering successful STEM career paths.

Conclusion

The data from the field shows a marked difference between girls' academic competency and their aspirations to study science. There is also a discrepancy in terms of affordability of science coaching in spite of being competent in the subject. There is a great need across all profiles to provide career guidance and reduce the gap between competency and aspiration. Financial assistance – if tailored according to the persona of the girls – will help uplift students who are capable of studying science and have the potential to pursue STEM-related careers. It will also help those girls who lag behind due to poor academic proficiency, to enter STEM-related careers by enabling access to vocational skills.

Finally, based on the persona of the girls, the financial investment can be guided by the following:

ASPIRERS	TRAILBLAZERS
Funding alone for building academic capability is not enough. Pair it with skill-building and academic support	**Maximise funding** since they have both academic potential and financial need
Avoid financial investments on girls' coaching unless other interventions can change their trajectory.	**Provide minimal, strategic support;** they're already on track
DISENGAGED	SUSTAINERS



The next chapter explores the specific financial needs of girls based on these personas and emerging career pathways for each of the personas. Addressing these needs will ensure that all students have equal opportunities to succeed in their chosen career paths.

04

Understanding the Financial Needs of Girls: Aspiration-Competency Based Support System

Key Highlights

- Girls' educational and financial needs evolve in specific ways from grades 9 to 12.
- Tailored financial support is essential at each stage of education aimed towards pursuing STEM careers.
- The highest need is observed for textbooks and study materials, gadgets and career guidance across all states.
- Academic needs, technological and resource needs, and need for career guidance vary significantly across the personas of girls.

Tailored and continuous financial support, instead of a one-time transfer, is essential for girls to pursue Science education and careers. These include various smaller needs that vary throughout the year and encompass both academic and non-academic aspects. While these needs differ between high school and higher secondary grades, they start emerging in high school.

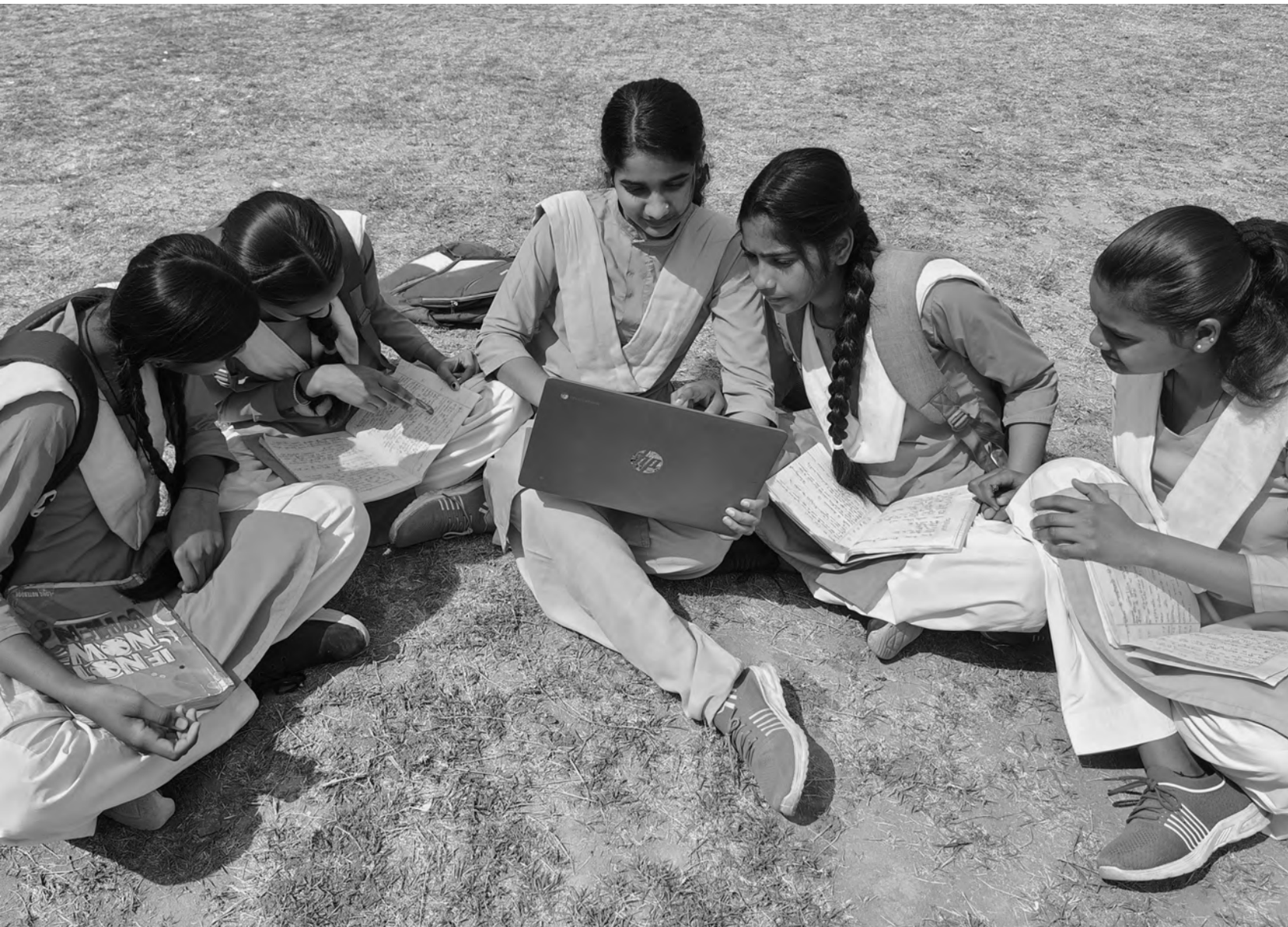
The primary survey revealed that financial challenges faced by girls pursuing Science education vary based on grade level:

Grades 9-10
- *Grade-appropriate academic tutoring*
- *Exposure to role models*
- *Career guidance*

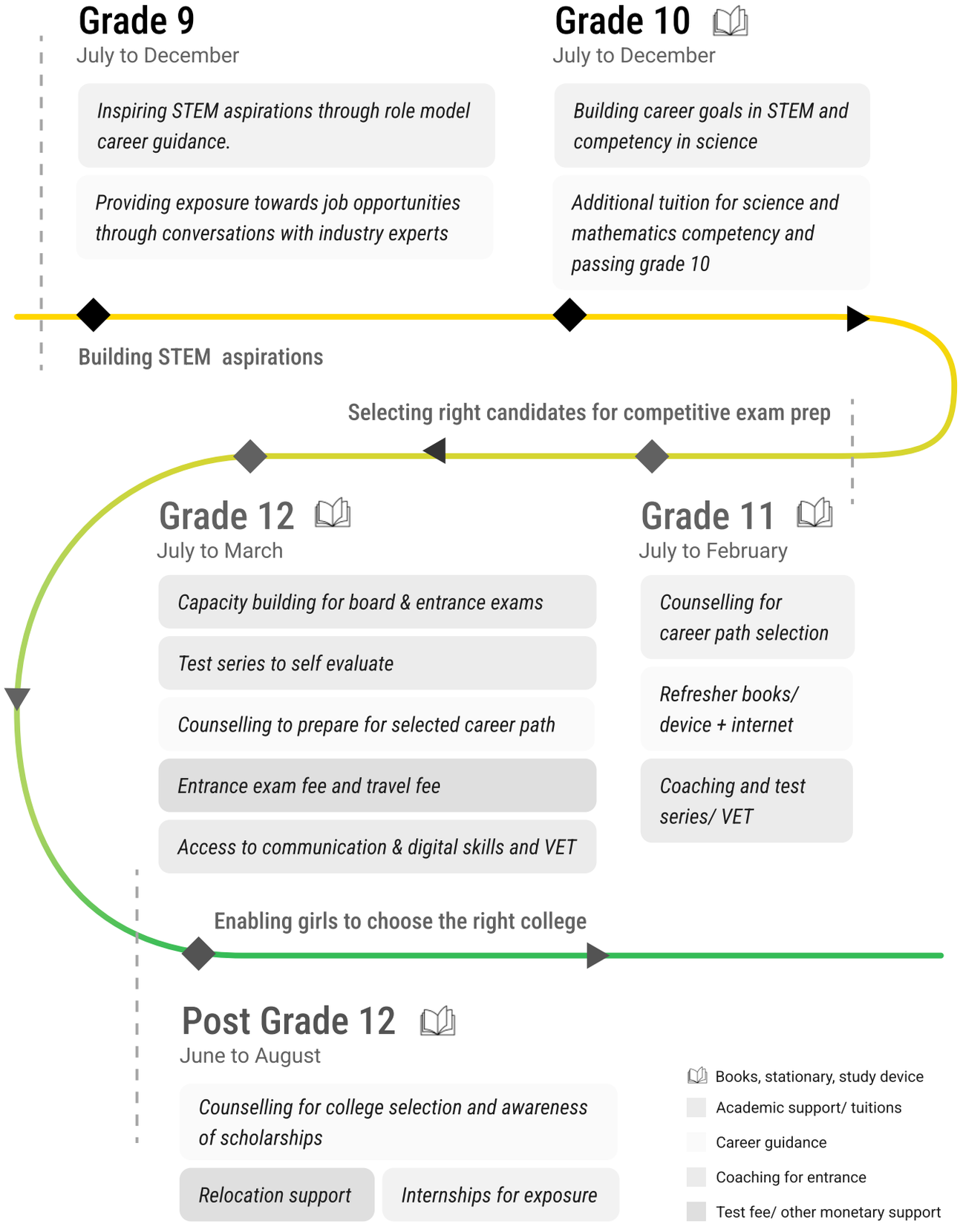
Grade 11
- *Tuition*
- *Refresher books*
- *Guidance*
- *Vocational training*

Grades 12
- *Board exam coaching*
- *Competitive exams coaching*
- *Entrance Exam & Travel fees*
- *Access to test series*

When tailored to their specific goalposts and needs, this support can significantly impact their journey in science and pave the way for successful STEM careers.



Evolving needs of girls across grades 9 to 12 to opt and stay in science stream

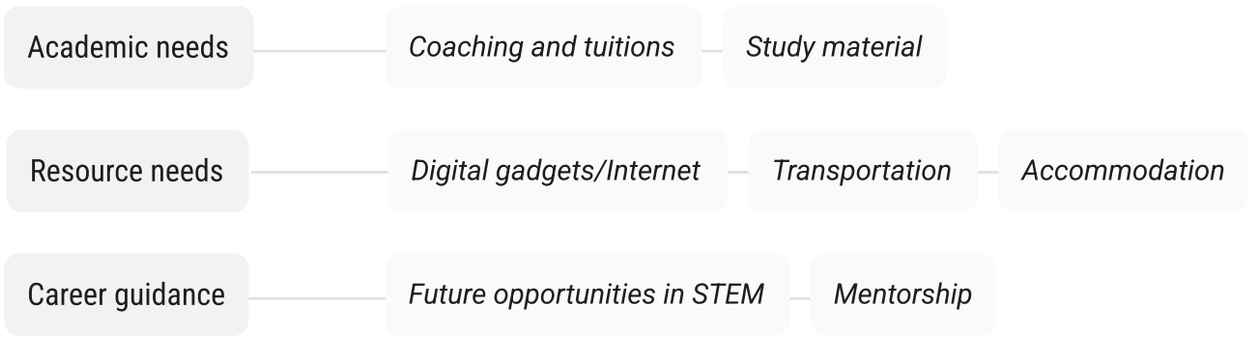


Building awareness of the diverse opportunities in science, and developing academic capabilities are crucial needs for girls across all grades and personas. A competency and financial need framework that combines the two can enable girls to make informed decisions and address the issue of educated unemployment by unlocking the potential for STEM careers.

Identifying Financial Needs: A Three-Fold Framework

This chapter offers insights into creating a more equitable and inclusive science education landscape for girls, by analysing their specific financial needs and other essential needs, to enable them to continue in the Science stream and pursue gainful careers. Analysing primary data across the four states highlights the following financial needs:

Financial challenges impeding uptake of science education can be divided into 3 categories



Source: Analysis of primary survey

Access to career guidance is the most critical financial need for all personas, followed by digital devices (mobile phones, laptops) and study materials (refresher books, question banks). Aspirers and Trailblazers require the highest financial support, as they are motivated to pursue science and benefit the most from financial support. The Sustainers already receive some financial aid, resulting in minimal additional needs. In contrast, Disengaged girls show the least financial demand, owing to their their low interest in science education.

Heatmap illustrating the varying financial needs across the four categories

0% 100%

	Trailblazers	Sustainers	Aspirers	Disengaged
Coaching/ Tuitions				
Study Material				
Fees (Exam, College/ School)				
Digital Gadgets				
Transportation				
Career Guidance				
Mentorship				
English Language				

ACADEMIC SUPPORT NEEDS

The girls have highlighted the **need for study materials, coaching, and tuition** to build foundational knowledge and achieve grade-level proficiency.

Study Materials

35%

Girls who cannot buy books & study materials due to financial constraints

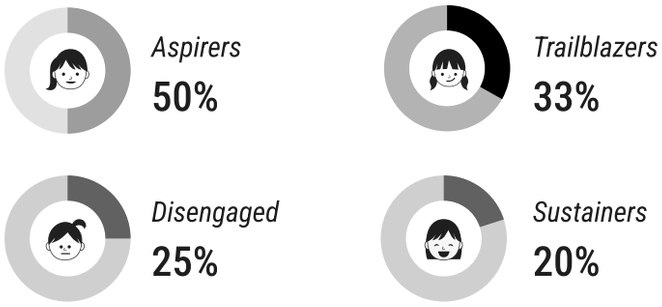
This issue is more prevalent in rural areas (80%), where 40% of girls come from families below the poverty line.

75%

Girls who are unaware of available scholarships

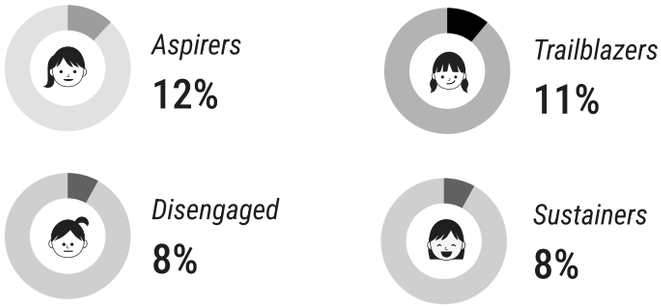
This lack of financial resources impedes girls from pursuing science and hinders them from accessing updated textbooks, reference materials, and online resources.

Need of textbooks and additional study materials for each persona



Coaching or tuition to build foundational knowledge

Need for tuitions and coaching for each persona

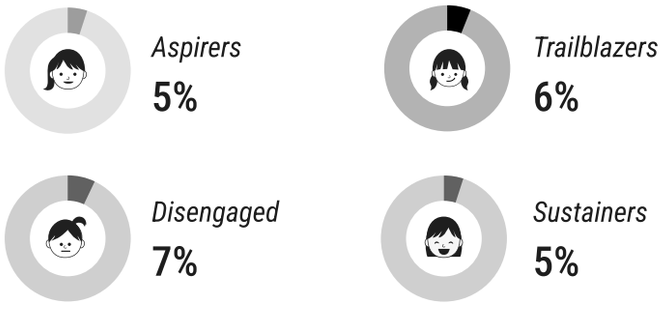


The need for financial support enabling girls to take up private tuitions was repeatedly expressed by parents.

> *Taking science after 10th means spending on 2-3 tuitions. Each subject needs a separate tutor. Coaching fees are a major expense*
>
> **Rizwana, A parent from Jharkhand**

Industry and coaching experts identified the need for English language coaching as an investment area for girls. Both acknowledged the importance of language skills in grasping the subjects well and communicating better. However, only 5% of the girls mentioned it as their need.

Need for English coaching for each persona



TECHNOLOGICAL AND RESOURCE NEEDS

Access to Digital Resouces

Access to devices such as laptops or mobile phones and internet connectivity remains a challenge, especially for girls from lower economic backgrounds. This issue is particularly prevalent in rural areas, where 80% of the girls who reported needing devices stated that they were unaffordable. 28% of all girls surveyed, lack devices and internet connectivity. Additionally, 19% of girls from lower economic backgrounds specifically mentioned a lack of access to devices and the internet.

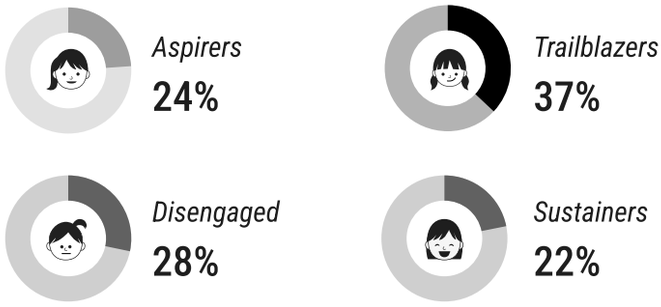
	Jharkhand	Madhya Pradesh	Rajasthan	Punjab
Need for gadgets	15%	24%	38%	63%

Source: Primary survey

> *Access to devices is a major barrier. Enabling girls with laptops through CSR initiatives could make a difference. Scholarships like the 'Masai-Sonu Sood Scholarship' provides deserving students with a free laptop to kickstart their careers in tech. However, the scale of this need is high. We need more effort here*
>
> **Yogesh Bhat, Founder, Masai School**

Multiple factors, including gender, influence access to and usage of devices and internet connectivity. Consequently, girls express a high need for devices due to this deprivation.

Need for devices and internet for each persona



Transportation to and from educational institutions

Transportation costs involving travelling long distances to reach school, emerged as a major need. Girls frequently travel long distances to attend schools offering science courses.

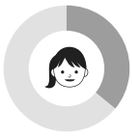
	Jharkhand	Madhya Pradesh	Rajasthan	Punjab
Need for travel support	52%	21%	55%	32%

Source: Primary survey

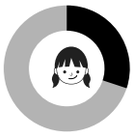
Parents also highlighted that regular commuting adds up to substantial expenses over time, adding to their already existing concerns of safety, particularly for evening travel. Hence monetary aid can help the girls navigate these issues, by enabling safer commuting modes with available financial support.

> *Transportation cost is a main thing for us. The distances are too much. If my daughter has to go for coaching, which costs ₹50,000-1,00,000, she must travel to Jaipur or Ajmer. We cannot afford that much. Currently, she is taking one class nearby, but that won't be enough.*
>
> **Noorti Devi, A parent from Rajasthan.**

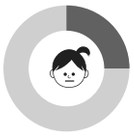
Percentage of girls needing support for travel costs



Aspirers
36%



Trailblazers
30%



Disengaged
25%

CAREER GUIDANCE AND MENTORSHIP NEEDS

Career guidance and mentorship are critical components for empowering girls pursuing science education as they provide direction, support and opportunities to achieve their career goals.

Structured mentorship programmes with STEM role models

43% **girls mentioned mentoring and guidance as significant needs**

Most of these students belong to the rural areas and fall under the BPL category

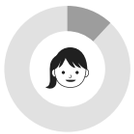
64% **influenced by their teachers to study science**

Source: Primary survey

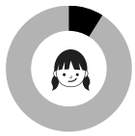
Students needing mentorship and guidance across states

	Jharkhand	Madhya Pradesh	Rajasthan	Punjab
Need for mentorship	42%	50%	42%	28%
Need for career guidance	71%	80%	74%	70%

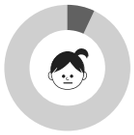
Need for mentoring according to each persona



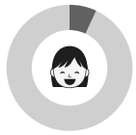
Aspirers
12%



Trailblazers
9%

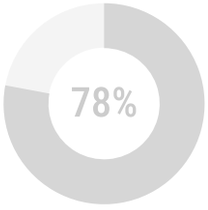


Disengaged
7%



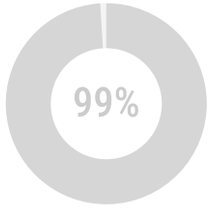
Sustainers
7%

Building awareness regarding career opportunities



Mentioned need for career guidance

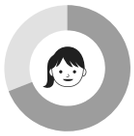
and information pertaining to Science courses, examinations and future prospects



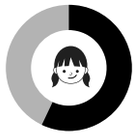
Girls want to take up science since STEM-related jobs are high paying

Teaching, medicine and engineering are the most common science-based careers known to the girls (57%).

Need for career guidance according to each persona

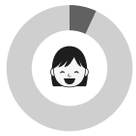


Aspirers
69%



Trailblazers
57%

Disengaged
46%



Sustainers
7%

Financial aid – in the form of targeted small-scale funding – is crucial for addressing the specific needs and challenges faced by young girls. This aid would significantly support their pursuit of science education, while fostering positive and supportive environments that encourage more students to enter science fields.

State-level overview of financial needs

Jharkhand

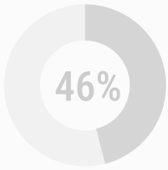
Academic needs

50% girls need help with study materials

33% girls need help with coaching fees

50% girls need help with learning English

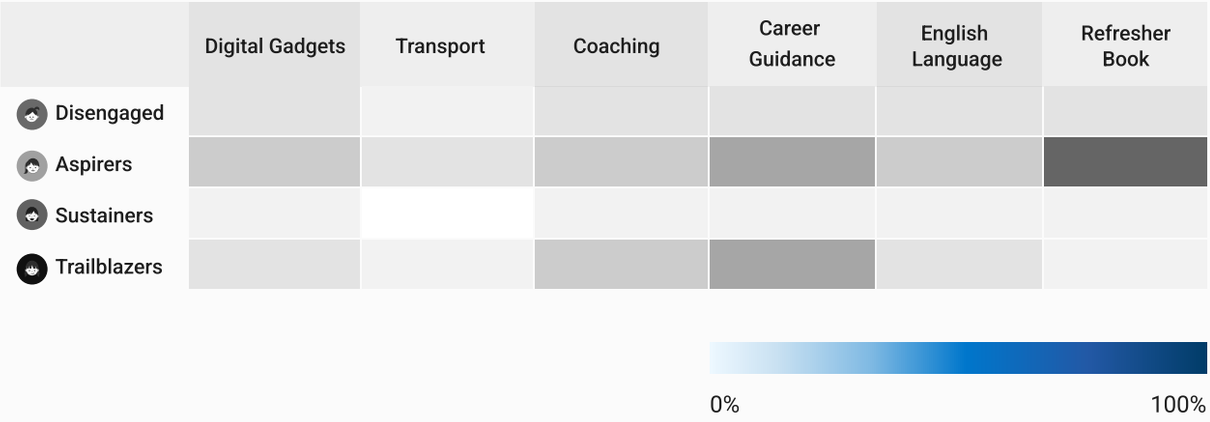
Technological needs



Need help with devices and internet connectivity

Mentoring needs

3/4 girls have expressed the need for career guidance



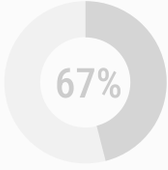
Aspirers show extremely high needs across all categories, especially in Refresher Books and Career Guidance, thus highlighting the aspiration to take up STEM careers inspite of low competency. A targeted financial support and encouragement can enable them enter the STEM fields through the alternate pathway of skilling and VET.

Madhya Pradesh

Academic needs

1/2 girls need help with study materials and books

Technological needs

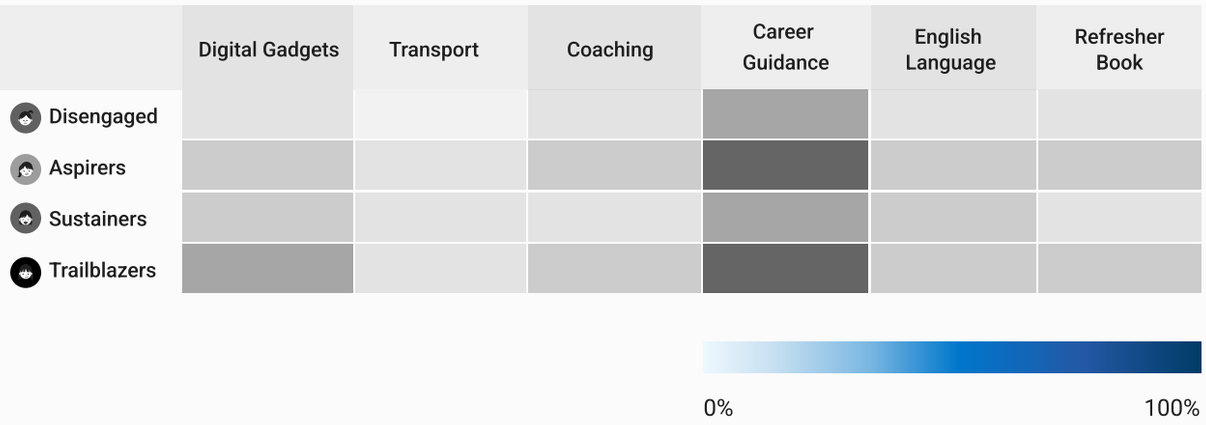


Need help with devices and internet connectivity

Mentoring needs

80% girls have expressed the need for career guidance

50% girls have expressed the need for mentorship



Career Guidance emerges as the most critical need across all personas — even the least engaged girls are looking for direction. Apart from this, the Aspirers and Trailblazers show high financial need for the refresher books and coaching. Gadgets is a constant need across all the personas, highlighting the importance the girls are giving to the tech enabled learning.

Punjab

Academic needs

17% girls need help with study materials

33% girls need help with coaching fees

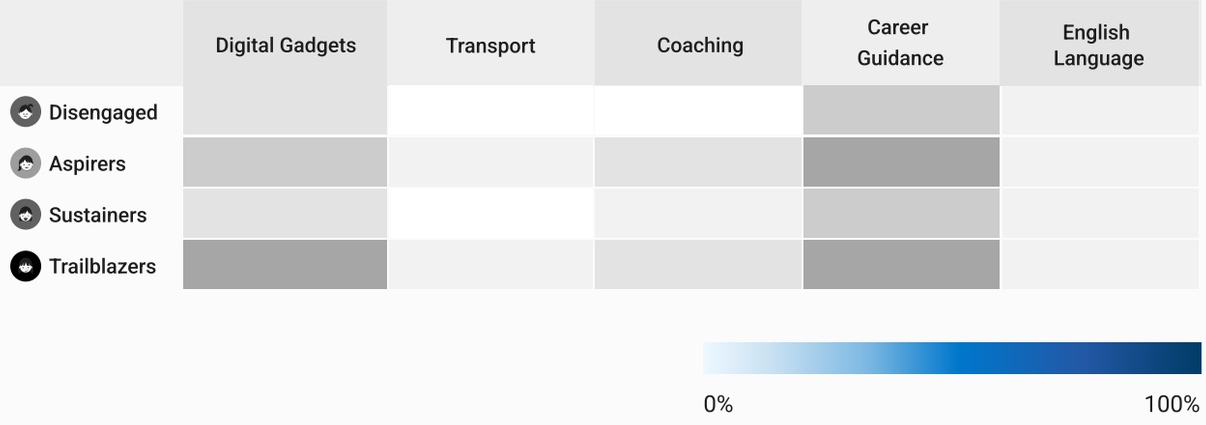
90% girls are unaware about scholarships

Technological needs

1/2 girls in rural area need help with devices and internet connectivity

Mentoring needs

75% girls have expressed the need for career guidance



Career guidance again emerge as the biggest need across all the personas. Disengaged students (32%) show far less interest towards gadget requirement and coaching (18%) reflecting lower academic motivation or lack of awareness. Transportation has low demand, possibly due to school proximity or lack of exposure to better commute options.

Rajasthan

Academic needs

25% girls need help with study materials

80% girls are unaware about scholarships

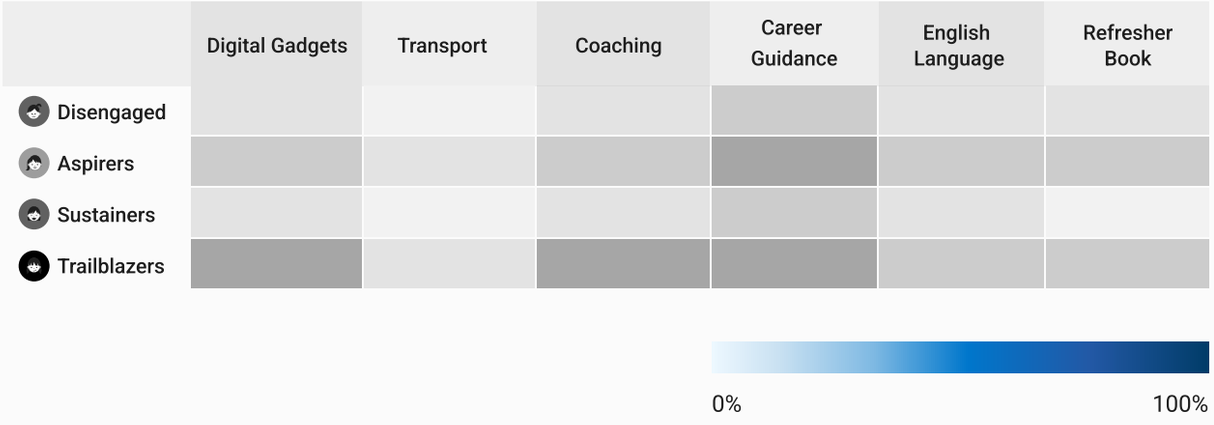
37% girls need help with learning English

Technological needs

Need help with devices and internet connectivity

Mentoring needs

3/4 girls have expressed the need for career guidance



Trailblazers and Aspirers show consistently high needs across all categories — especially for Coaching, Career Guidance, and Digital Gadgets. Career Guidance remains a top need across all personas, including Disengaged students, thus making it a key area for early interventions.

Conclusion

As girls embark on their educational journey from Grade 9 to 12, their needs and financial requirements evolve. For example, a girl in Grade 9 requires assistance for building foundational skills, hence participation in extracurricular activities and science fairs, access to textbooks, and tuitions to attain grade-appropriate skills. A girl in Grade 10 will require additional support in the form of supplementary study materials, lab equipment, and access to science clubs or extracurricular activities.

As girls embark on their educational journey from Grade 9 to 12, their needs and financial requirements evolve. For example, a girl in Grade 9 requires assistance for building foundational skills, hence participation in extracurricular activities and science fairs, access to textbooks, and tuitions to attain grade-appropriate skills. A girl in Grade 10 will require additional support in the form of supplementary study materials, lab equipment, and access to science clubs or extracurricular activities. The needs get specialised in Grade 11, wherein the girl needs coaching, refresher books, digital gadgets, internet connection. The Grade 12 is very critical as it forms the bridge between school education and STEM-related careers. The focus shifts to career guidance, coaching for competitive exams, and travel expenses to reach schools or institutions offering advanced science courses. These investments are crucial for shaping their future career paths. Recognising these evolving needs, it is imperative to establish tailored financial frameworks that provide continuous support at every stage.

The next chapter focusses on designing financial aid depending on the needs of the different personas of the girls, thus encouraging more and more girls in STEM careers.

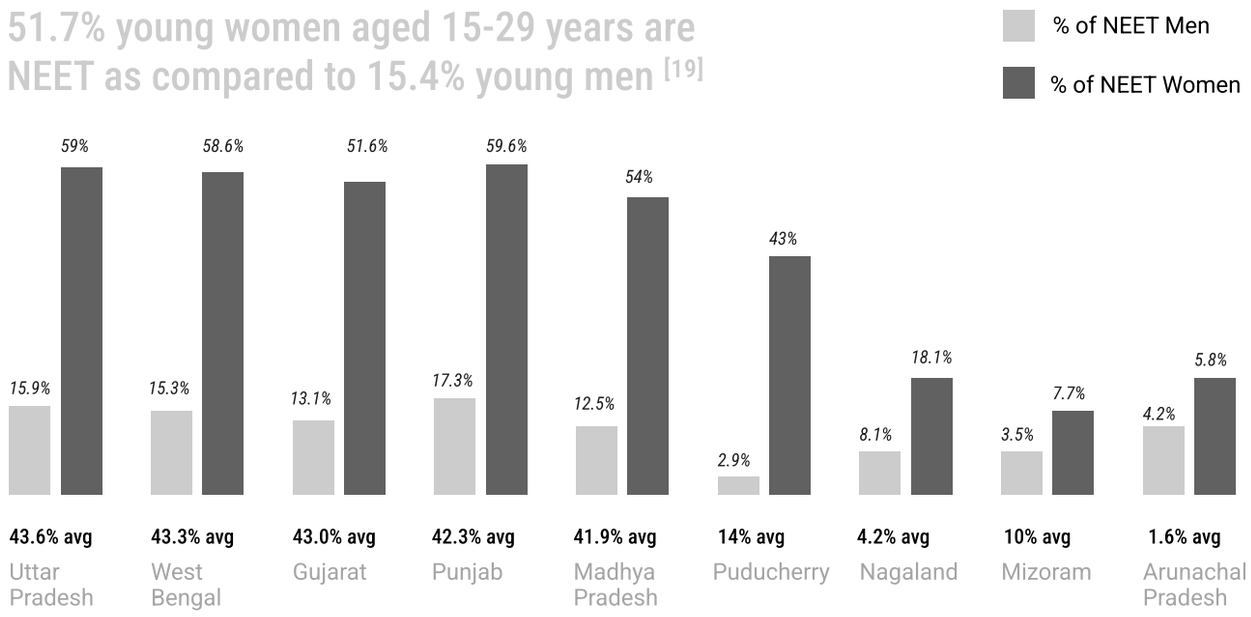
05

Emerging Career Pathways For Girls in STEM

Key Highlights

- Post Grade 12, three career pathways emerge for girls in the science stream:
  a. Direct Entry into STEM Jobs
  b. Skilling & Workforce Entry
  c. Higher Education & Workforce Entry

- A financial investment model tailored to different personas can support these pathways:
  - Sustainers (low financial need, high support): Require micro-financial aid (<₹55,000/year) to access higher education and STEM careers.
  - Trailblazers (high competency, high financial need): Need ₹1-1.5 lakh/year to enter technical colleges and pursue STEM careers.
  - Aspirers (low competency, high financial need): Require ₹22000-27,000/year to access skilling programmes or industry pathways, leading to STEM workforce participation.



The proportion of India's working age population will reach its highest at 68.9% by 2030. But with 33% of India's population aged between 15-29 being classified as NEET, the opportunity of reaping the demographic dividend is at risk.

Despite the growing female participation in education, low financial support for STEM pathways limits girls' transition into technical colleges and vocational careers. This pushes a high proportion of women in NEET (Not in Employment, Education, or Training), or informal jobs, eventually leading to low female workforce participation despite academic potential.

Career Pathways for Girls Based on the Financial need and competency Framework

DISENGAGED (LOW COMPETENCY, LOW FINANCIAL NEED)

Since these girls exhibit low academic competency, initially, they may not be influenced by career guidance interventions. However, targeted interventions with community and school teachers to shift their gender biases and building agency towards negotiating with prevailing gender biases can enable them to enter the workforce.

These girls can be equipped with practical knowledge by investing in career guidance and life skills programmes, increasing their aspirations towards jobs and financial independence.

Disengaged girls' potential career pathways

- *Vocational and skill-based employment (e.g., technicians, data entry, customer service)*
- *Gig economy roles (e.g., digital freelancing, retail, hospitality)*
- *Entrepreneurship (small-scale business or self-employment)*

Potential funding needed

Investing in organisations working with girls or the community, rather than the girls themselves.

- Partnering with the organisations that are working towards building life skills and agency in girls in middle and high schools would enable decision making skills and enable them in negotiating with the prevailing gender norms
- Funding support to organisations working with the community to bring mindset shifts in their gendered approach to the roles and responsibilities, will bring change in their expectations from the girls, thus instilling aspiration in girls towards STEM careers.

ASPIRERS (LOW COMPETENCY, HIGH FINANCIAL NEED)

These girls are aware of career opportunities in science but lack the academic competency to pursue them. They can develop the necessary skills to transition into STEM careers, if provided with adequate financial support to build competency. However the results can be questionable and may or may not result in the desired outcome of entering technical higher education through the same process that will enable trailblazers and sustainers.

To retain them into science streams leading to desired STEM careers, it is advised to provide **financial support for grade-appropriate competency-building interventions and vocational education and training (VET)** for one or two years. Enhancing **English communication and digital skills** will further strengthen their ability to succeed in higher education and technical roles. They will have the opportunity to get into fresher roles immediately after completing school.

Aspirers' potential career pathways

- *Entry into formal workforce after school in industry offering STEM jobs*
- *Diploma and certification programmes in STEM-related fields*
- *Vocational education leading to employment in healthcare, IT support, or technical roles*
- *Alternative STEM career pathways via lateral entry to technical institutions after a vocational diploma/certification.*

Potential funding needed

Three areas need to be funded to create a holistic intervention to encourage Aspirer girls to choose science education and careers.

Remedial Tutoring

- *Monthly tuition sessions for science and Math subjects.*
- *Cost per girl:* ***₹10,000– ₹15,000 annually*** *(depending on rural/urban regions)*

Mentorship and Counselling

- *Academic counselling and motivation to stay engaged in STEM learning.*
- *Cost per girl:* ***₹2,000 annually***

Vocational Education

200 hours spread across 4 months

- *Thematic: 150 hours =* ***₹7500 annually***
- *Employability Skills = Digital skills + Communication skills: 50 hours total =* ***₹2500 annually***

Total Cost Per Girl: ₹22,000– ₹27,000 annually

(support needed for a minimum of 2 years)

The research suggests an alternative pathway, through vocational education and skilling to enter the STEM fields and thus follow their aspiration to be in STEM careers. The skill needs to capture both thematic expertise and employability skills (communication and digital skills) in grades 11 and 12 so that the girls can enter the formal workforce immediately after school.

STEM careers through the skilling pathway will cost around ₹22,000-27,000/year for skilling programmes or industry pathways that lead to STEM workforce participation.

OUTCOME: Improved pass rates and foundational readiness for future STEM opportunities.

Life cycle approach to enable Aspirers' uptake of STEM careers

(Cost per child)

Grade 9

Exposure to career pathways in varied fields for women in science

Grade 10

₹ 10,250- 17,000

Building capability through tuitions

Career awareness

Grade 11

₹ 22,750- 27,500

Psychometric and academic testing to validate STEM interest

Enabling preparation to attain grade-appropriate learning levels

200 hours of vocational training

Grade 12

₹ 20,750- 27,500

Counselling and guidance

Enabling tuition to attain grade-appropriate learn levels

200 hours of vocational training

(Thematic skill/150 hrs + Digital skill/50 hrs + Communication Skill /50 hrs)

Job/College

BVoc course and apprenticeship

1/2 year diploma

Fresher job with career pathway clarity

TRAILBLAZERS (HIGH COMPETENCY, HIGH FINANCIAL NEED)

These academically strong girls have the potential to excel in technical and professional fields, but require sustained **long-term financial and academic support (2-4 years)** to transition into higher education successfully. They can secure placements in STEM degrees and technical professions with **strong academic coaching, mentorship, additional aid, and career guidance.**

Trailblazers' potential career pathways

- *Higher education in science and other technical higher education programmes*
- *Research, data science, and innovation-driven careers*
- *Competitive exam pathways (e.g., JEE, NEET, or other STEM-specific scholarships)*

Preparation for competitive technical entrance examinations and enrollment in STEM degree programmes require varied financial support. The cost components include coaching for entrance exams, refresher books, devices and an internet connection, career guidance fee, entrance exam fee, and travel to exam centre fees. The cost model is outlined below

Potential funding needed

Three areas need to be funded to create a holistic intervention to encourage Aspirer girls to choose science education and careers.

Academic Coaching for Grade 12 and Entrance Exams

- *Specialised coaching for competitive exams like JEE, NEET, etc.*
- *Cost per girl:* ***₹45,000–₹50,000 annually***

Competitive Exam Fee and Travel Costs

- *Entrance exam form fees and travel to the exam centres*
- *Cost per girl:* ***₹6,000–₹8,000 (for 12th grade)***

Refresher course material and gadgets needed

- *Cost per girl-refresher books:* ***₹10,000 - ₹14,000***
- *Cost per girl for the gadget:* ***₹20,000 - ₹25,000*** *(to be provided either in11th or 12th grade only)*
- *Internet access:* ***₹4,000***

Career Counselling Support

- *Cost per girl:* ***₹2000/year***

Total Cost Per Girl in Grade 11: ₹81,000– ₹95,000 annually
(inclusive of gadget)

Total Cost Per Girl in Grade 12: ₹87,000– ₹1,03,000 annually
(inclusive of gadget)

OUTCOME: Increased representation of women in STEM careers, contributing to economic growth.

Life cycle approach to enable Trailblazers' uptake of STEM careers

(Cost per child)

Grade 9
₹ 250- 2,500

Exposure to career pathways in varied fields for women in science

Grade 10
₹ 10,250- 17,000

Building capability through tuitions

Career awareness

Grade 11
₹ 1,06,000- 1,42,000

Psychometric and academic testing to validate STEM interest

Enabling preparation to attain grade- appropriate learning levels (coaching + test series + ancillary support)

Grade 12
₹ 1,10,000- 1,50,000

Academic and career support focused on entrance exams for technical colleges

Entrance exam fee and travel costs

Counselling support

Job/College
₹ 1,30,000- 12,08,000

Career guidance to choose the right college

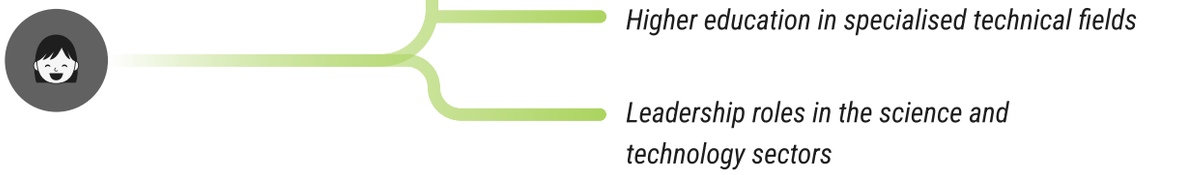
Enabling access to scholarships/ additional support for admission in college

Internships and hand holding

SUSTAINERS (HIGH COMPETENCY, LOW FINANCIAL NEED)

These girls are already on the right trajectory toward successful STEM careers, and require minimal, targeted micro-financial support to ensure their continued success. Micro-interventions such as mentorship, digital gadgets, refresher material and career counselling can help them maximise their potential.

Sustainers' potential career pathways



Professional STEM careers (engineering, medicine, data science, biotechnology and research)

Higher education in specialised technical fields

Leadership roles in the science and technology sectors

Potential funding needed

Three areas need to be funded to create a holistic intervention to encourage Sustainer girls to choose Science education and STEM careers.

Competitive Exam Fee and Travel Costs

- *Entrance exam form fees and travel to the exam centres*
- *Cost per girl: **₹6,000–₹8,000** (only for Grade 12)*

Refresher course material and gadgets needed

- *Cost per girl-refresher books: **₹10,000 - ₹14,000***
- *Cost per girl for the gadget: **₹20,000 - ₹25,000** (either in Grade 11 or 12)*
- *Internet access: **₹4,000***

Counselling support

- *Cost per girl- counselling/ mentorship: **₹2,000***

Total Cost Per Girl in Grade 11: ₹36,000– ₹45,000 annually
(inclusive of gadgets)

Total Cost Per Girl in Grade 12: ₹42000– ₹53,000 annually
(inclusive of gadgets)

OUTCOME: Increased representation of women in STEM careers, contributing to economic growth.

Life cycle approach to enable Sustainers' uptake of STEM careers

(Cost per child)

Grade 9
₹ 250- 25,000

Exposure to career pathways in varied fields for women in science

Grade 10
₹ 10,250- 17,000

Building capability through tuitions

Career awareness

Grade 11
₹ 36,000- 40,000

Psychometric and academic testing to validate STEM interest

Enabling preparation to attain grade- appropriate learning levels (coaching + test series + ancillary support)

Grade 12
₹ 40,000- 50,000

Academic and career support focused on entrance exams for technical colleges

Entrance exam fee and travel costs

Counselling support

Technical College
₹ 1,30,000- 12,08,000

Career guidance to choose the right college

Enabling access to scholarships/ additional support for admission in college

Internships and hand holding

Conclusion

The exploration of career pathways in Science fields highlights the critical role of timely financial support in enabling adolescent girls to make informed career choices. Whether transitioning directly from school to employment, pursuing vocational education and training (VET), or enrolling in technical and non-technical degrees, the financial investment required varies significantly across different personas-

Aspirers
₹22,000–27,000

Trailblazers
₹81,000- ₹1,03,000

Sustainers
₹36,000–53,000

Access to structured funding at key transition points can prevent girls from becoming part of the NEET (Not in Education, Employment, or Training) population by ensuring they are aware of and equipped to pursue STEM careers. Early financial aid can broaden their aspirations, support skill-building, and enhance their readiness for a dynamic job market, increasing their chances of securing sustainable employment.

Investing in girls' science education is not just an economic imperative but also a step toward gender equity. By addressing financial barriers, more young women will enter and thrive in science fields, gradually closing the gender gap, and fostering a more inclusive and diverse workforce. Strategic financial interventions today can transform the trajectory of girls in STEM, benefiting both individual aspirations and the broader economy in the long run.

Way Forward

The Way Forward

Interplay of higher cost of science education, patriarchal social norms, poor academic competency, and lack of career aspirations leads to low uptake of science by girls in higher secondary grades. Financial aid can catalyse girls to take up science in schools and traverse STEM careers. Although the Government and CSR/philanthropy initiatives offer scholarships and financial aid, these programs often lack a nuanced understanding of girls' financial needs and challenges in accessing financial support. Furthermore, there is a need for targeted interventions that prioritise **'result-based financial support'**, ensuring the outcome of increased uptake of science by girls and, ultimately, their transition into careers in science fields.

Designing long term financial support keeping the needs of girls at the centre

1. FOR FUNDERS

Design financial support programmes keeping in mind-

- Increased funding at the school level for girls in science
- Long term commitment of 2-4 years
- Financial needs of the girls across different grades spread across the year
- Career pathways imagined for the girls as a tangible outcome of the financial support

2. FOR THE GOVERNMENT

Play a bigger role for creating the public infrastructure

- Create Digital Public Infrastructure to bring transparency in disbursement of scholarships
- Review financial aid by making it inclusive and design it as per the need of the girls
- Engage with the industry to create policy level interventions to create opportunities for girls' entry into formal workforce

Given the urgency and significance of the issue, the study strongly recommends a range of interventions to be undertaken by the private funders and the Government to facilitate this transition.

For Funders: Rethinking Financial Aid Design & Disbursement

To ensure more girls from marginalised backgrounds opt for science in grade 11th and 12th and aspire to pursue STEM careers, funders must align financial aid to actual student needs, prioritise high-impact regions, and embed funding within a broader support system.

i/ Designing the financial aid based on the needs of the students

- **Shift from merit-based to need-based aid:** Many marginalised and average-performing girls are excluded from scholarships despite their potential. Aid should support them in entering and persisting in STEM fields.

- **Align funding with career pathways:** Scholarships should be structured to support girls through higher education, skilling, or direct job entry.
- **Increase focus on higher secondary students:** Current models primarily support girls who have already secured technical college admissions. A dedicated percentage of funding must support grades 9-12, strengthening the pipeline for STEM higher education.

ii/ Strategic Investments in High-Impact Regions & Groups

- **Target high-need regions and personas:** Prioritise funding for Trailblazers and Sustainers to facilitate their entry to the technical education and for Aspirers to enable their entry into higher education, skilling, or industry.
- **Cover beyond tuition:** Include transport, study materials, coaching, digital access, and, where necessary, accommodation costs.
- **Ensure multi-year commitment:** Science education requires a minimum of two years of continuous support. Structured commitments of 2, 4, or 6 years prevent dropouts due to financial barriers.
- **Synchronise funding with academic calendars:** Disburse funds at key academic junctures rather than as one-time scholarships.

iii/ Strengthening Career Pathways Through Financial Aid

- **Career-aligned financial support:** Provide additional aid for NEET/JEE preparation, ITI courses, and apprenticeships to improve career outcomes.
- **Extend scholarships for technical higher education:** Technical college fee is a deterant for girls to choose science, ensure long term commitment for funding from grade 11th to technical college completion fee.

iv/ Embedding Financial Support with Technology

- **Leverage tech-enabled solutions:** Use ONEST (Digital Public Infrastructure) and other platforms to enhance transparency, efficiency, and accountability in fund disbursement.

v/ Partnering with On-Ground NGOs for Demand-Driven Funding

- **Holistic support beyond financial aid:** Scholarships should be linked with mentoring, career counselling, and academic support to ensure long-term retention.
- **Bridge the gap between budget allocation and actual scholarship disbursement:** NGOs should be supported to embrace technology in identifying eligible students, create awareness, and support application processes, ensuring funds reach those who need them.

By restructuring financial aid with a **student-centered, multi-year, and career-aligned approach**, funders can play a crucial role in **building a stronger pipeline of girls in STEM** and ensuring long-term economic mobility.

For the Government

i/ Solutions directly impacting the girl students

- **Strengthen science infrastructure:** Improve infrastructure and opportunities for students to experience practical applicability of science like labs, science fairs and industry visits.
- **Innovative approaches to bridge the gap of science teachers:** To improve availability of role models for girls, using technology to provide exposure to relatable role models from different career streams in STEM. Providing
- To provide for female science teachers in rural regions, it is important to **hand-pick good teachers** from high school and middle school, and through targeted training mechanisms, enable them to facilitate girls' science learning.
- **Scale up technology-enabled solutions** like that of 'Sampurna Shiksha Kavach' experimented in Dumka district, to enable access to female science teachers.
- To build academic competency of government school girls, it is important to identify the sustainers and trailblazer girls and **provide coaching to empower them to enter technical colleges.**
- **Ensuring access to VET** along with digital and English communication skills in school is critical to mainstream the alternate career pathways for STEM.
- **Increase targeted financial aid:** Expand government scholarships for girls pursuing science in Grades 11-12, and focus on marginalisation, beyond merit.
- **Building career guidance capabilities of teachers:** Provide career guidance and mentoring training to teachers so they can help students identify their aspirations and develop relevant skills.

ii/ Solutions encouraging industry accountability

- Incentivise the industry and develop a strategy to **integrate women from marginalised backgrounds** into STEM careers through internships, starting immediately after completion of Grade 12.
- Involve industry experts in **designing teacher training models** on VET and career guidance

iii/ Ecosystem solutions

- **Data-driven policy making:** Use data on dropout rates and financial barriers to design evidence-based interventions.
- **Awareness and career guidance:** Integrate structured, industry-driven, gender-specific career guidance programmes in STEM for girls to sustain aspirations. Ensure that every state has published information on available scholarships on display in school for parents and students to be aware of the financial support available.
- **Invest in digital public infrastructures** like ONEST to increase transparency, efficiency and effectiveness of financial support for girls in STEM.

End Notes

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