According to the last report of the Indian Ministry of Education (2022), in 2021 94,69,022 people were enrolled in STEM courses in the country, of which 56.8% are men and 43.2% are women (p.18) (comprising levels 5 to 8 of ISCED – from short technical education until PhD, the same perimeter used by the Gender Scan survey).

These good figures concerning gender balance hide some nuances. Women are more represented in some STEM areas than others. The last AISHE (2022, p. 126) shows that, at the undergraduate level, while women are 52% of student in science, they are 39% in IT & computer but only 29% in the aggregate of engineering and technology (hence, 71% are men). (see detailed proportions on the next pages)

In the category of studies “engineering & technology”, there are also remarkable differences between specific fields, as some engineering specializations are more gender-balanced than others. Computer engineering, for instance, at the undergraduate level, has 36% of women and 64% of men, whereas civil engineering has 23% of women and 77% of men (AISHE, 2022, p. 126).

This report aims to contribute to the understanding of these figures, producing new data on gender (im)balance(s) in STEM higher education in India, and analyzing and contextualizing them based on recent research.

One important observation: in India, caste, class and regional origin weigh heavily on the experiences and opportunities of people. However, the number of respondents of this survey is not enough for cross-regional comparisons. Additionally, the questionnaire did not ask about ethnicity, caste affiliations or social class. Thus, no analysis will be carried out on these issues.

→ Ministry of Education. (2022). All India survey on higher education 2020-21. (AISHE) Department of Higher Education, Government of India.

GENDERSCAN

Methodology note

Details of the survey

Method	**Online survey, dynamic display of questions according to respondents' profiles**
Timeframe	From October 2022 to February 2023 for India From March to August 2021 for developing countries
STEM definition	**Categorized according to the International Standard Classification of Education (ISCED-UNESCO) levels 5 to 8 in:** • Mathematics • Physics • Natural sciences, biology, chemistry • Engineering, transformation and production industry • Environment, sustainable development, ecology • Construction industry, civil engineering • Agriculture, agronomy, forestry, veterinary
ICT definition	**Categorized according to the International Standard Classification of Education (ISCED-UNESCO) levels 5 to 8 in:** • Computer sciences, ICT

2

Proportions of men and women enrolled at undergraduate level in STEM fields:

Engineering & technology	Men	Women
Architecture	47%	53%
Planning	54%	46%
Food Technology	54%	46%
Electronics Engineering	60%	40%
Urban Planning	61%	39%
Instrumentation Engineering	62%	38%
Computer Engineering	64%	36%
Agriculture Engineering	65%	35%
Other Engineering & Technology	69%	31%
Information Technology	69%	31%
Dairy Technology	71%	29%
Engineering & technology total	**71%**	**29%**
Electrical Engineering	73%	27%
Aeronautical Engineering	74%	26%
Chemical Engineering	75%	25%
Metallurgical Engineering	76%	24%
Civil engineering	77%	23%
Mining Engineering	93%	7%
Mechanical Engineering	93%	7%
Marine Engineering	94%	6%
Automotive Studies	95%	5%

Other STEM fields	Men	Women
Science	48%	52%
Fisheries Science	52%	48%
Veterinary & Animal Sciences	60%	40%
IT & Computer	61%	39%
Agriculture	70%	30%
Marine Science / Oceanography	83%	17%

Elaborated by Gender Scan based on data from the Indian Ministry of Education (2022).

GENDERSCAN

Methodology note

Profile of respondents

	Men	Women	Non-binary	Total	STEM female students	ICT female students	Margin of error	From
India	25*	116	4*	145	80	37*	8,1	31 – Maharashtra, 16 – Karnataka, <10 from others
Developing countries	355	736	23	1114	515	221	2,9	34 countries, 13 in Africa, 15 in Latin America, 6 in Asia, with LATAM more represented

***Very low basis for male, non-binary and ICT students.**
Thus, this report statistically exploits only results of female students.
The sample size for ICT is low, yet our review of existing literature on ICT students confirms that the results seem to be in line with overall observations of scholarship on the matter conducted in India.

3

Proportions of men and women enrolled at postgraduate level in STEM fields:

Engineering & technology	Men	Women
Food technology	41%	59%
Architecture	41%	59%
Planning	47%	53%
Urban Plannning	49%	51%
Electronics Engineering	52%	48%
Computer Engineering	52%	48%
Instrumentation Engineering	52%	48%
Agriculture Engineering	65%	35%
Engineering & technology total	**67%**	**33%**
Information Technology	67%	33%
Chemical Engineering	68%	32%
Electrical Engineering	68%	32%
Other Engineering	69%	31%
Civil Engineering	72%	28%
Dairy Technology	74%	26%
Marine Engineering	81%	19%
Metallurgical Engineering	83%	17%
Aeronautical Engineering	84%	16%
Mechanical Engineering	89%	11%
Mining Engineering	91%	9%
Automotive Studies	92%	8%

Other STEM fields	Men	Women
Marine Science / Oceanography	35%	65%
Science	39%	61%
IT & Computer	53%	47%
Fisheries Science	55%	45%
Veterinary & Animal Sciences	56%	44%
Agriculture	64%	36%

Elaborated by Gender Scan based on data from the Indian Ministry of Education (2023).

GENDERSCAN

Questions and contents

Part 1: Before joining higher education

- What external factors push women to choose STEM degrees – in terms of people, arguments and experiences?
- What external and personal factors discourage women from choosing STEM – people, arguments and experiences?
- What personal factors push women to choose STEM – in terms of motivations and aspirations?
- At what point in time do they get interested in STEM?

	Influencing factors	5
	Discouraging factors	11
	Motivating factors	18
	Interest in STEM: when	20

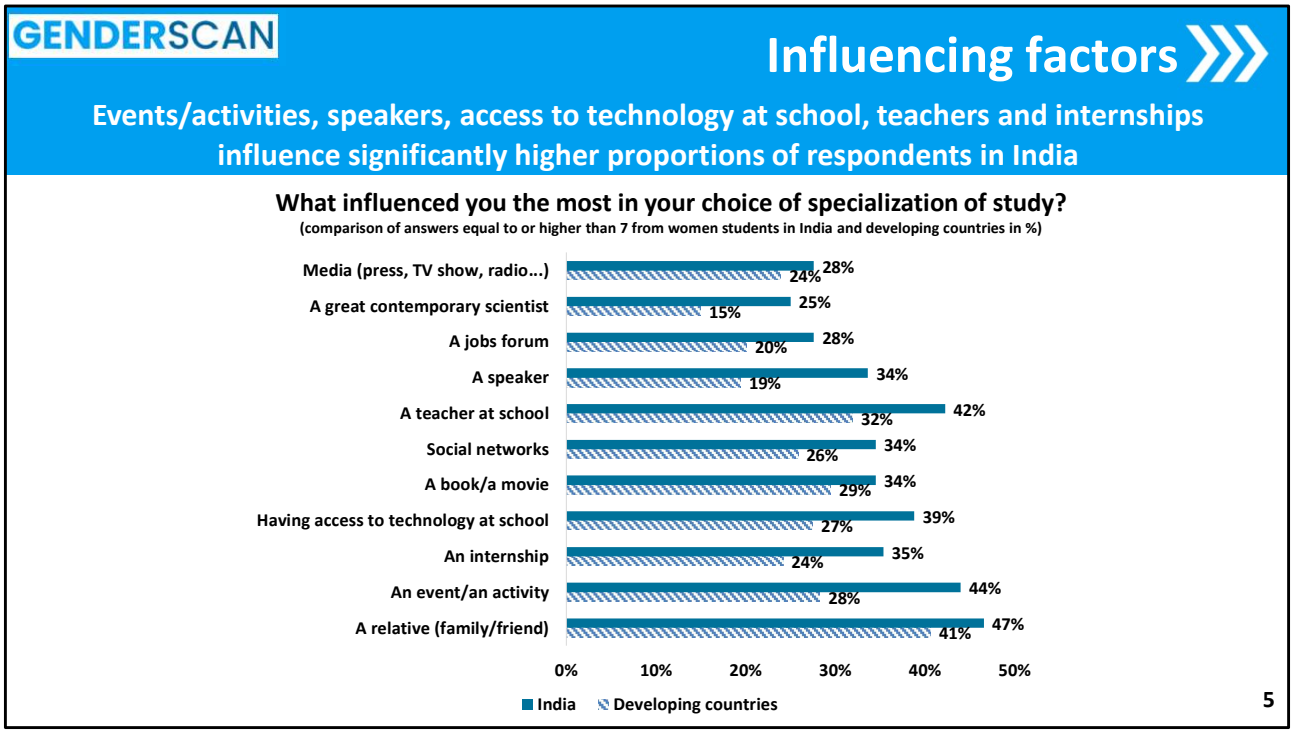
4

Proportions of men and women enrolled at PhD level in STEM fields:

Engineering & technology	Men	Women
Food technology	38%	62%
Planning	48%	52%
Architecture	48%	52%
Information Technology	55%	45%
Instrumentation Engineering	58%	42%
Computer Engineering	58%	42%
Other Engineering	60%	40%
Electronics Engineering	61%	39%
Dairy Technology	63%	38%
Agriculture Engineering	63%	37%
Chemical Engineering	64%	36%
Engineering & technology total	**67%**	**33%**
Electrical Engineering	73%	27%
Civil Engineering	73%	27%
Marine Engineering	74%	26%
Automotive Studies	76%	24%
Metallurgical Engineering	78%	22%
Aeronautical Engineering	87%	13%
Mechanical Engineering	91%	9%
Mining Engineering	92%	8%

Other STEM fields	Men	Women
Science	51%	49%
IT & Computer	46%	54%
Agriculture	56%	44%
Veterinary & Animal Sciences	52%	48%
Fisheries Science	58%	42%
Marine Science / Oceanography	46%	54%

Elaborated by Gender Scan based on data from the Indian Ministry of Education (2022).



The agents that influence a higher proportion of Indian students are family members (47%), events/activities (44%) and teachers at school (42%).

Access to technology at school (39%), internships (35%), speakers, social networks and books/movies (34%) each also influence a non-negligible proportion of respondents.

Proportions are generally slightly higher in India than in developing countries. More significant differences include a higher proportion of Indians influenced by:

- events/activities: 16% more (44% vs 28%)
- speakers: 15% more (34% vs 19%)
- internships: 11% more (35% vs 24%)
- access to tech at school: 12% more (39% vs 27%)
- teachers at school: 10% more (42% vs 32%)

The **high importance of relatives** seems in line with the findings of studies that point to the great weight that family preferences have in the career decision of a woman in India, where both sons and daughters are expected to push the family's socioeconomic conditions upwards and provide for parents in their old age.

→ Thakkar, D. Sambasivan, N. Kulkarni, P., Kalenahalli Sudarshan, P. & Toyama, K. (2018). The Unexpected Entry and Exodus of Women in Computing and HCI in India. *Paper presented at the Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems.*

→ Venkatesh, S. (2015). Forms of Social Asymmetry and Cultural Bias: Of Gender and Science in India and the World. *Transcience* (2015), 6(1).

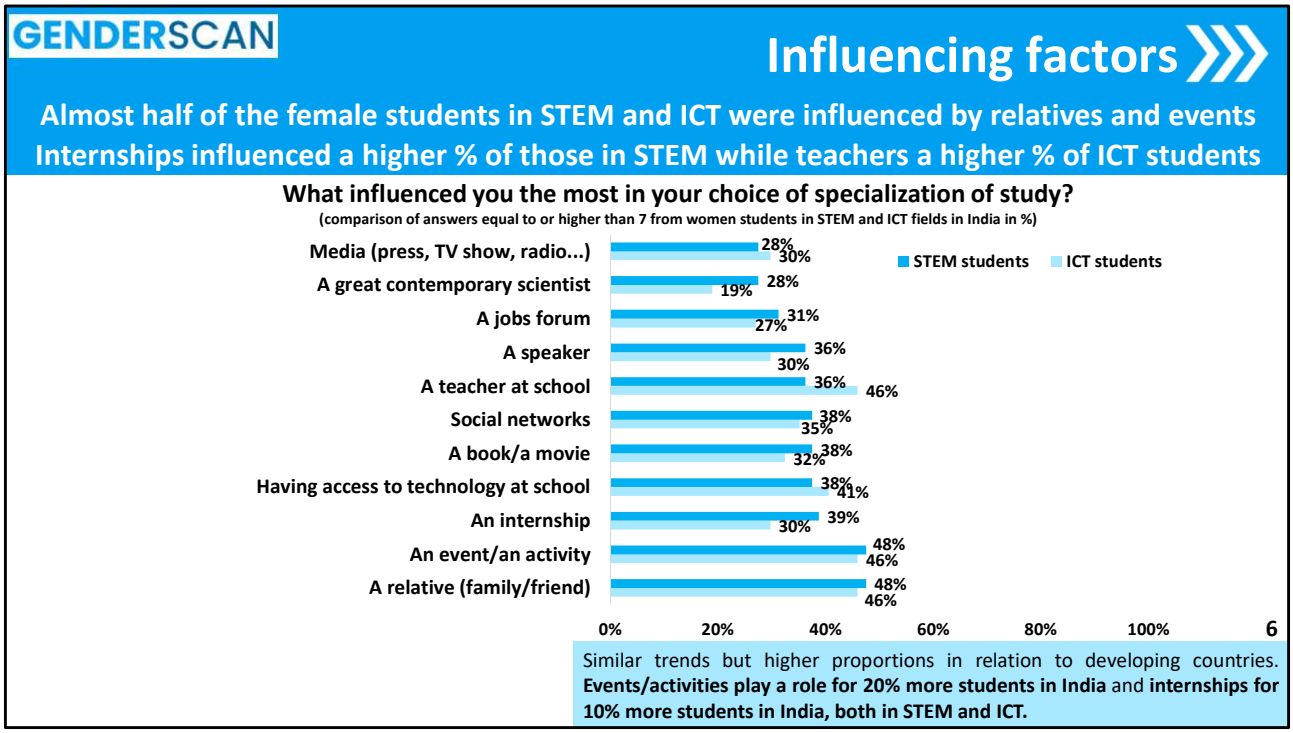
The **greater importance of teachers and access technology at school in India** comparatively seems to be coherent with the fact that, in India, unlike in many other developing countries, stream choice at the tertiary level is made before college admission.

Eligibility requirements for tertiary studies are highly determined by the stream studied at the higher secondary level (the last 2 years of high school) when students must choose one of the following streams: humanities, science, commerce, engineering/vocational and other (Sahoo & Klasem, 2021 p. 989).

→ Sahoo, S. & Klasen, S. (2021). Gender Segregation in Education: Evidence From Higher Secondary Stream Choice in India. *Demography*; 58 (3), 987–1010. https://doi.org/10.1215/00703370-9101042

The **greater importance of events/speakers/internships in India** may be related to the fact that the services sector, and especially the information technology industry, has led the country's growth in the last decades, more so than in most African and Latin American developing countries examined in this study in the perimeter developing countries. This generates a demand for STEM skills, above all ICT-related, which may have pushed STEM-providing HEI and companies to canvass school pupils more aggressively (Panagariya, 2004).

→ Panagariya, A. (2004). India's trade reform. In S. Bery, B. Bosworth, & A. Panagariya (Eds.), *The India policy forum* (Vol. 1, pp. 1–68). New Delhi, India: National Council of Applied Economic Research; Washington, DC: Brookings Institution.



The top influencing factors are:

- relatives (48% in STEM, 46% in ICT),
- events or activities (48% in STEM, 46% in ICT),

closely followed by internships and access are technology at school.

Similar results between STEM and ICT in general, the greatest differences involving, on the one hand, the factors that influence more STEM than ICT students:

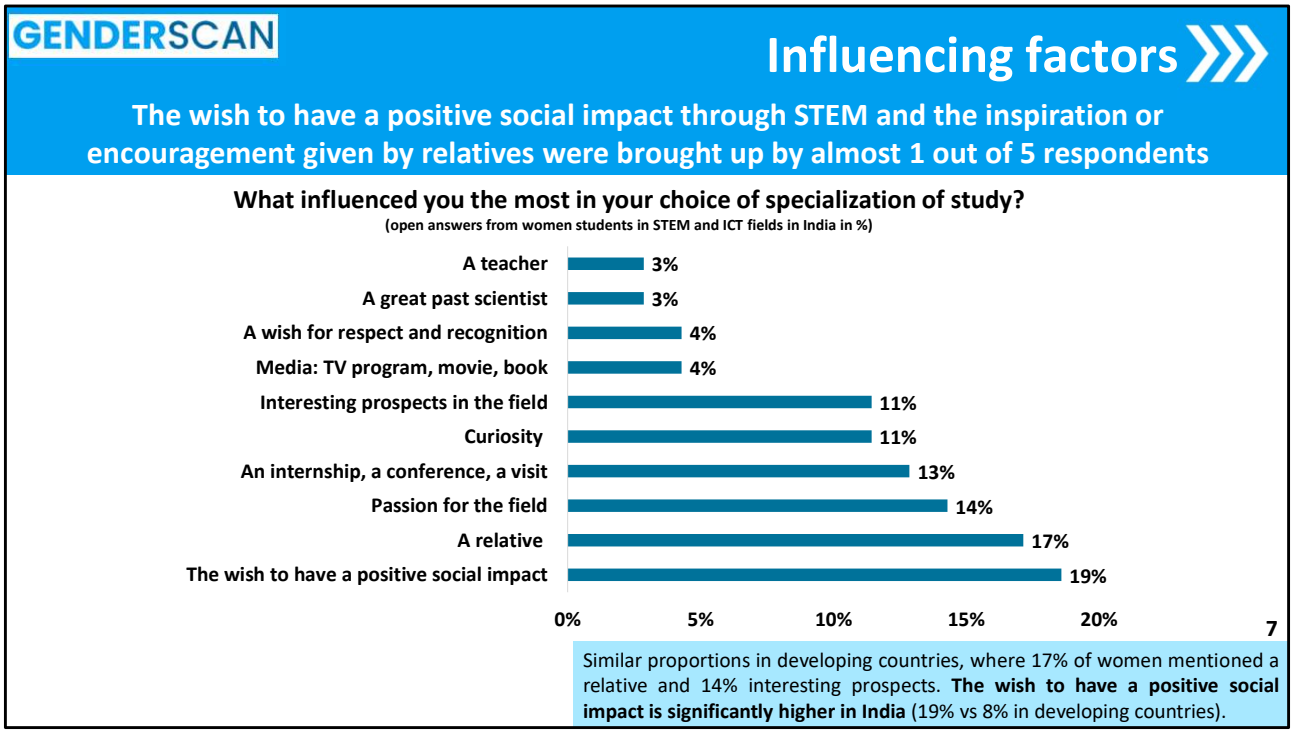
- internships: 9% more STEM (39%) vs ICT students (30%),
- contemporary scientists: 9% more STEM (28%) vs ICT students (19%),
- speakers: 6% more STEM (36%) vs ICT students (30%),
- books/movies: 6% more STEM (38%) vs ICT students (32%).

On the other, the factors that influence more ICT than STEM students in proportion:

- teachers at school: 10% more ICT (46%) vs STEM students (36%).

Proportions are generally slightly higher in India than in developing countries, but more significant differences include a higher proportion of Indians influenced by:

- events/activities: 18% more STEM (48% vs 30%), 20% more ICT (46% vs 26%),
- internships: 11% more STEM (39% vs 28%), 6% more ICT (30% vs 24%),
- access to tech at school: 9% more STEM (38% vs 29%), 11% more ICT (41% vs 30%),
- social networks: 15% more STEM (38% vs 23%), 3% less ICT (35% vs 38%),
- a jobs forum: 10% more STEM (31% vs 21%), 8% more ICT (27% vs 19%).



N = 70, 44 women in STEM, 26 women in ICT

Brown et al (2018) confirm that university students from India are more likely to conceive STEM fields as providers of communal opportunities than US students. In India, students see in greater proportions than in the US that these fields allow them to help others, connect to others, and work with others. This greater communal perception in India does not apply to all fields, but rather specifically to STEM.

This higher proportion of respondents in India than in the developing world pointing to the **social utility value of STEM fields** as a motivation to pursue a career in them seems coherent with the Indian context, where there is more gender balance in tertiary level STEM-training, given the fact that:

- the perception of STEM-community orientation has been shown to positively correlate with interest in STEM fields, in different world countries, especially for girls, (Diekman &Steinberg, 2013; Sáinz et al., 2020; Eccles & Wang, 2016),
- Asian societies, such as the Indian(s), tend to emphasize societal interdependence and connection and hence to build the individual/self more anchored in the notion of being a part of the whole than in the West.

Thus, the importance of the individual to the surrounding community seems more likely to be a strong driver for a career choice in India than in other countries, as the findings above in the survey suggest. This may be one of the reasons why a higher proportion of girls in India than in many other developing and developed countries decide to enroll in STEM at the college level.

→ Brown, E. R., Steinberg, M., Lu, Y., & Diekman, A. B. (2018). Is the Lone Scientist an American Dream? Perceived Communal Opportunities in STEM Offer a Pathway to Closing U.S.–Asia Gaps in Interest and Positivity. *Social Psychological and Personality Science*, 9(1), 11–23. https://doi.org/10.1177/1948550617703173

→ Diekman, A.B. and Steinberg, M. (2013). Navigating Social Roles in Pursuit of

Important Goals: A Communal Goal Congruity Account of STEM Pursuits. *Social and Personality Psychology Compass*, 7, 487-501. https://doi.org/10.1111/spc3.12042

→ Sáinz, M., Fàbregues, S., Rodó-de-Zárate, M., Martínez-Cantos, J.-L., Arroyo, L., & Romano, M.-J. (2020). Gendered Motivations to Pursue Male-Dominated STEM Careers Among Spanish Young People: A Qualitative Study. *Journal of Career Development*, 47(4), 408–423. https://doi.org/10.1177/0894845318801101

→ Eccles, J. S., and Wang, M.-T. (2016). What motivates females and males to pursue careers in mathematics and science? *International Journal of Behavioral Development*. 40, 100–106. https://doi.org/10.1177/0165025415616201

GENDERSCAN

Influencing factors

What motivates women to pursue STEM degrees

The wish to have a positive social impact (mentioned by 19% of respondents)

"The possibility of working as a changer for society, updating the manual work with applications."
Woman, 20, student in computer science

"I like developing projects and coming up with imaginative solutions to everyday difficulties."
Woman, 22, engineering student

"I would like to do projects that help people, to make their lives easier." *Woman, 23, engineering student*

A relative (mentioned by 17% of respondents)

"My parents - as both of them have an engineering background and work on the technological field."
Woman, 18, student in computer science

"Seeing my mother working and coding. She used to ask me many logical questions."
Woman, 21, student in computer science

"My family gave me great support and encouragement, especially my father."
Woman, 22, student in natural sciences, biology, chemistry

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GENDERSCAN

Influencing factors

What motivates women to pursue STEM degrees

Passion for the field (mentioned by 14% of respondents)
"My love for coding." *Woman, 19, student in computer science*

"I was interested in technology from childhood." *Woman, 20, engineering student*

"I always liked logical stuff." *Woman, 23, student in natural sciences, biology, chemistry*

An internship, a conference, a visit (mentioned by 13% of respondents)
"Hackathons and internships." *Woman, 20, student in computer science*

"Caterpillar industry visit." *Woman, 20, engineering student*

"Canvassing by institutions." *Woman, 22, engineering student*

Curiosity (mentioned by 11% of respondents)
"I was curious, and I thought the field was interesting." *Woman, 20, student in computer science*

"I was always fascinated about how things work from an early age – be it the blender or the TV, anything really. That always motivated me to explore more and more." *Woman, 25, engineering student*

9

GENDERSCAN

Influencing factors

What motivates women to pursue STEM degrees

Interesting prospects in the field (mentioned by 11% of respondents

"My jee rank* and the current industry scenario." *Woman, 20, engineering student*

"Salary level, work environment." *Woman, 24, student in journalism and computer science*

"The job prospects were the most attractive factor." *Woman, 23, student in computer science*

Media: TV program, movie, book (mentioned by 4% of respondents)

"Movies in time travel." *Woman, 24, student in computer science*

"A science TV program that asked why things happen the way they do." *Woman, 31, engineering student*

"Space mission novels." *Woman, 34, engineering student*

A wish for respect and recognition (mentioned by 4% of respondents)

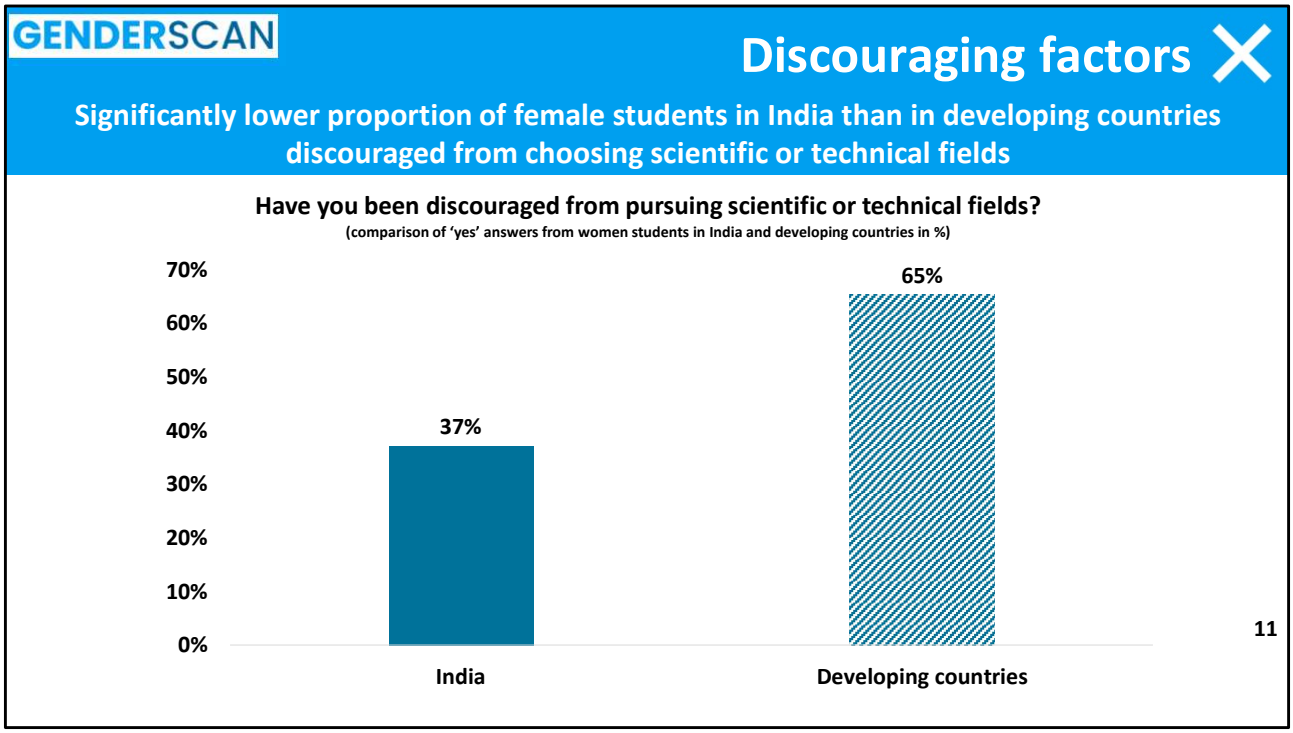
"I want to be in a position where everyone respects me." *Woman, 16, student in computer science*

"To add value to society and make my parents proud." *Woman, 25, environmental engineering student*

"The respect the profession earns in my society." *Woman, 40, engineering student*

10

*JEE Rank: The Joint Entrance Examination (JEE) is an engineering entrance assessment conducted for engineering college admission to in India. There are two different examination, the JEE-Main and the JEE-Advanced.



28% fewer STEM students in India than in developing countries have been discouraged from choosing scientific or technical fields.

The **mentality that STEM fields are not for women** is not as widespread in India as in the West and does not concern homogeneously all STEM fields. According to Amirtham & Kumar (2021: 1952-1960) physics and mathematics degrees are traditionally thought to be suited for male students, in contrast to natural and life sciences, suited for female candidates. In addition, some engineering degrees (mechanical, civil and electrical engineering especially) are considered unsuitable for women, as they are perceived as related to dirty and strength-based work. On the other hand, computing, programming, and computer-related engineering are seen as women-friendly in nature and have a rate of graduates of almost 50%-50% between genders. This seems coherent with the data presented on pages 2, 3 and 4, indicating that engineering courses more related to the heavy industry (mining, mechanical, civil, metallurgical engineering) have a significantly lower level of gender balance in enrollment than computer engineering, IT, food-related engineering and technology degrees.

→ Amirtham N. S. & Kumar A. (2021). Gender parity in STEM higher education in India: a trend analysis, *International Journal of Science Education*, 43:12, 1950-1964, http://doi.org/10.1080/09500693.2021.1946867

→ Gupta, N. (2012). Women Undergraduates in Engineering Education in India: A Study of Growing Participation. *Gender, Technology and Development*, 16(2), 153–176. https://doi.org/10.1177/097185241201600202

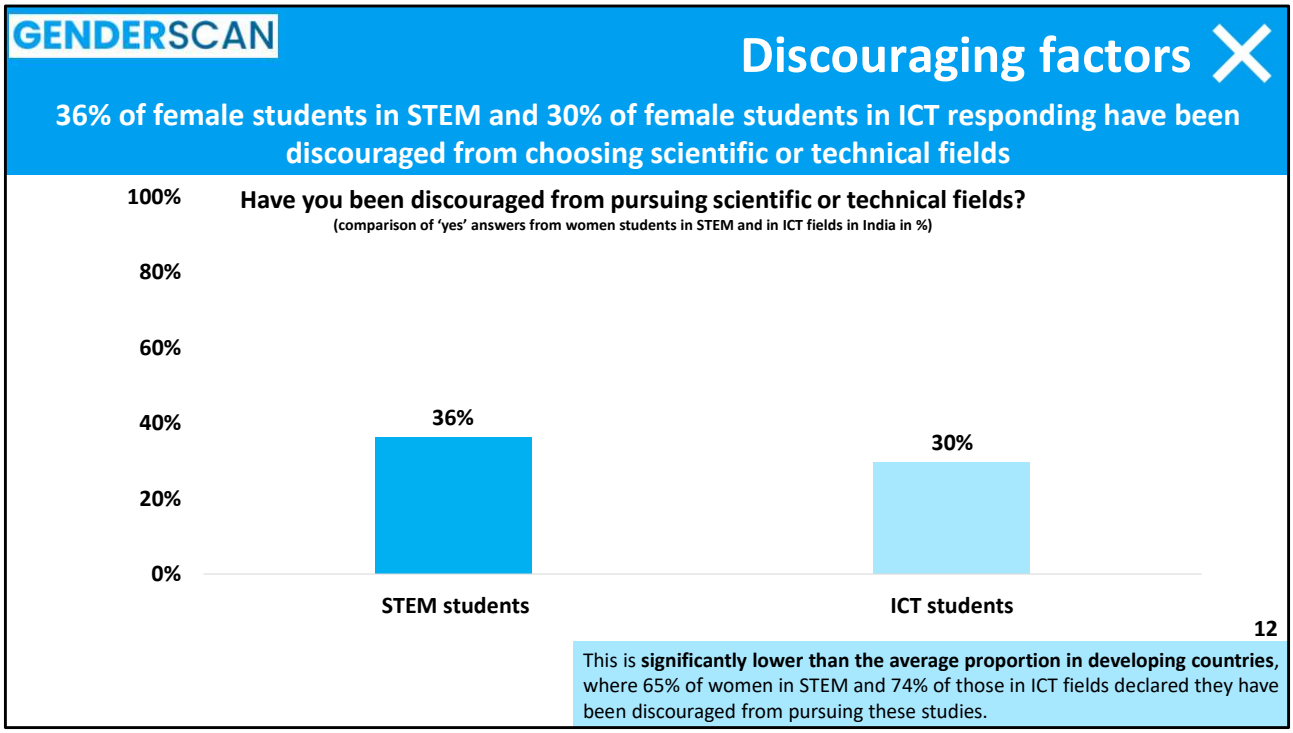
This can also be explained by the ICT-led expansion of the services sector, which has had a major role in Indian economic growth recently. This seems to have caused an **attitudinal change in parents**, key prescribers for teenagers, but more so for young

women than men – especially in societies of a strong patriarchal tradition, as in India. Today, the choice of an engineering subject is encouraged by many parents as it is synonymous with prospects of good employment and marriage, favoured by middle-class families (Gupta, 2015; Thakkar et al., 2018; Amirtham & Kumar, 2023).

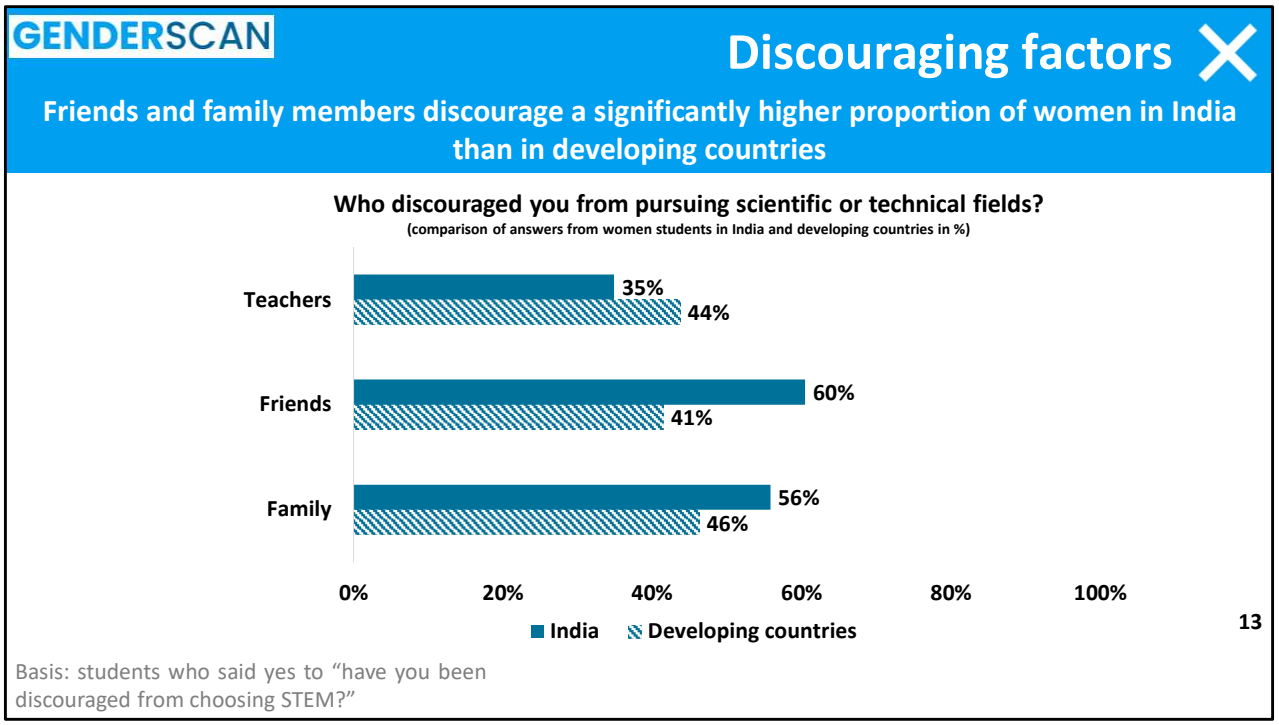
→ Gupta, N. (2015). Rethinking the relationship between gender and technology: A study of the Indian example. *Work, Employment and Society*, 29 (4), 661–672. https://doi.org/10.1177/0950017014556410

→ Thakkar, D., Sambasivan, N., Kulkarni, P., Kalenahalli Sudarshan, P., & Toyama, K. (2018). The Unexpected Entry and Exodus of Women in Computing and HCI in India. *Paper presented at the Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems.*

→ Amirtham N. S. & Kumar A. (2023). The underrepresentation of women in STEM disciplines in India: a secondary analysis, *International Journal of Science Education*, https://doi.org/10.1080/09500693.2023.2179901



This is **significantly lower than the average proportion in developing countries**, where 65% of women in STEM (29% more than in India) and 74% of those in ICT (44% more than in India) declared they have been discouraged from pursuing these studies.



In comparison to developing countries, a significantly higher proportion of students in India was discouraged by:

- friends: 19% more (60% vs 41%),
- family: 10% more (56% vs 46%).

And a lower proportion in India than in developing countries were discouraged by:

- teachers: 9% less (35% vs 44%).

Teachers: STEM has been a priority of the Indian education system since the 1950s to push the country's economic progress. Educational policies underline the importance of STEM and recognize the importance of student-centered, interactive learning approaches (Thomas & Watters, 2015). This could explain the result found by Escueta et al (2013), who affirmed that the atmosphere at school is perceived as positive by girls who want to study STEM and feel no biases in their teachers discouraging them from pursuing engineering studies.

However, educational practices do not appear to have translated these principles into action. Both material conditions and pedagogical procedures represent barriers: many classrooms lack adequate basic infrastructure, not to speak of technological resources – which have been proven to increase students' interest in STEM and confidence in being able to perform STEM-related tasks (Gupta & Fisher, 2012). Teacher absenteeism seems to be a reality and prevalent dynamics in class are said to be based on a teacher-centered exposition of information (Tawbush et al. 2020).

There are also important differences between private and public schools, with students who attend the former tending to be more satisfied with the quality of STEM subjects teaching (Shukla, 2005).

- Mathematics: 68.9% satisfied in private and 61.2% in public schools,
- Physics: 62.3% satisfied in private and 57.7% in public schools,
- Chemistry: 59% satisfied in private and 54.2% in public schools,
- Biology: 56.4% satisfied in private and 53.2% in public schools,
- Computer science: 23% satisfied in private and 14.9% in public schools.

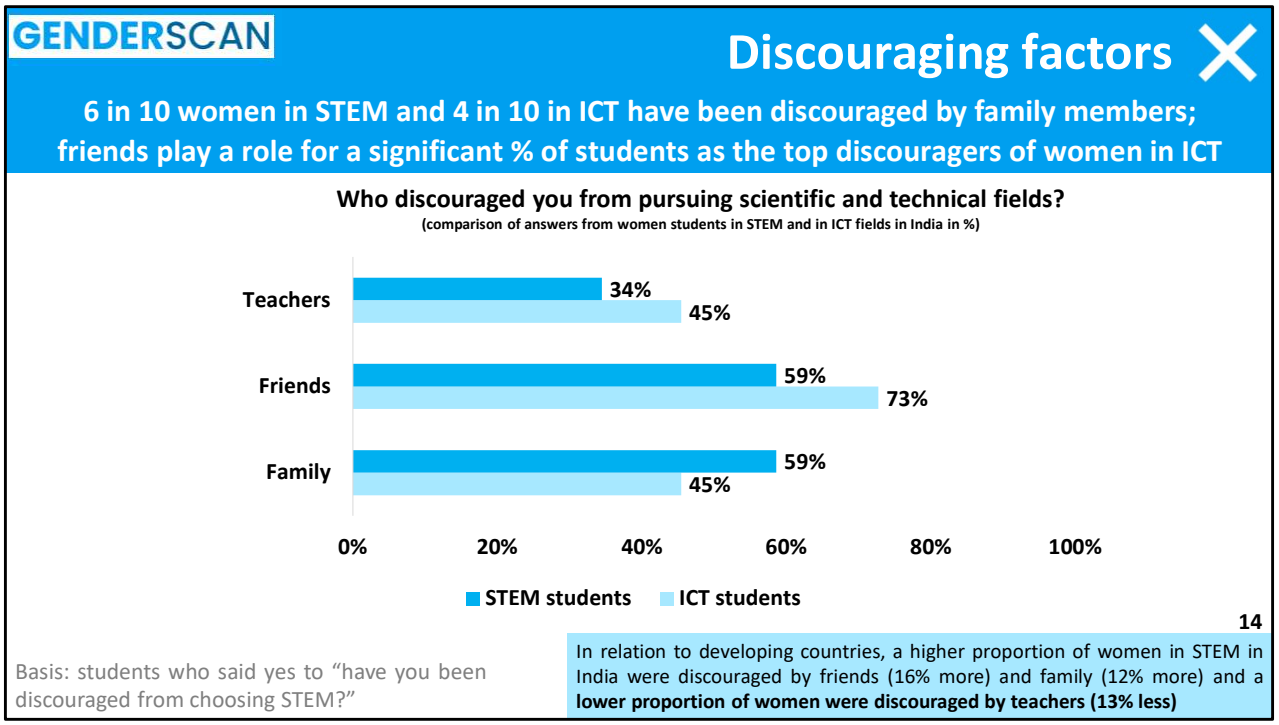
According to this rationale, the reason for the lesser proportion of pupils discouraged by teachers in India in relation to developing countries could be due to:

- the lesser importance of teachers in teenagers' life, especially given the counterbalance of a family who incentivizes students into STEM, the prospects these fields offer in terms of economic return and social capital (prestige);
- the priority that is given to STEM in official educational policies, which could make it a contradiction for teachers to dissuade students from following these streams.

Friends could discourage a higher proportion of women in India than in developing countries due to the level of competition faced by the youth to get into STEM training courses, which are highly selective and considered very prestigious.

For a discussion on family, see pages 5, 11 and 15.

→ Thomas, B., & Watters, J. J. (2015). Perspectives on Australian, Indian and Malaysian approaches to STEM education. International Journal of Educational Development, 45, 42-53.
→ Tawbush, R. L., Stanley, S. D., Campbell, T. G., & Webb, M. A. (2020). International comparison of K-12 STEM teaching practices. Journal of Research in Innovative Teaching & Learning, 13(1), 115-128.
→ Shukla, R. (2005). India science report: Science education, human resources and public attitude towards science and technology (No. 22137). East Asian Bureau of Economic Research.
→ Gupta, A., Fisher, D. (2012). Technology-supported learning environments in science classrooms in India. Learning Environments Research. 15, 195–216 https://doi.org/10.1007/s10984-012-9103-9
→ Escueta, M., Saxena, T., & Aggarwal, V. (2013). Women in Engineering: A comparative study of barriers across Nations. *Aspiring Minds.*



Very low basis of respondents: 29 women in STEM, 11 women in ICT.

Friends are the top discouragers of ICT students; whereas friends and family, the top discouragers of STEM students.
A higher proportion of ICT than STEM students are discouraged by:

- friends: 14% more (73% vs 59%),
- teachers: 11% more (45% vs 34%).

A higher proportion of STEM than ICT students are discouraged by:

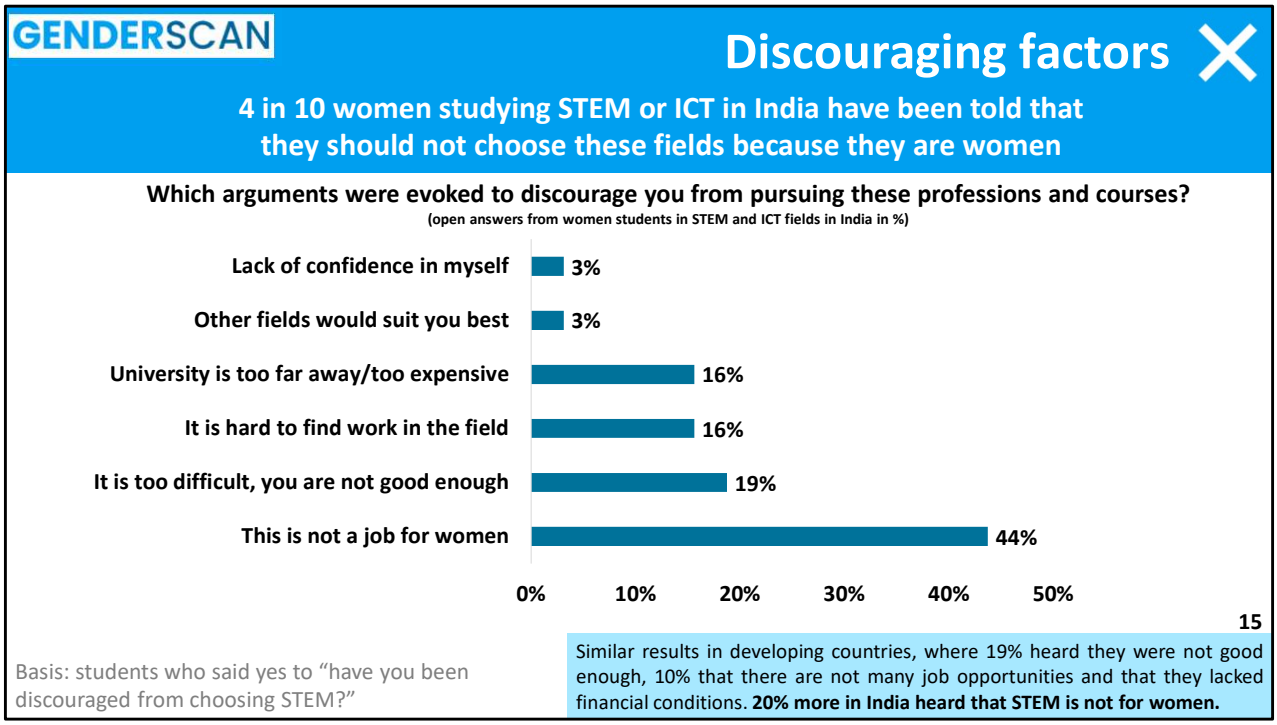
- family : 14% more (59% vs 45%).

In comparison to developing countries, a significantly higher proportion of students in India were discouraged by:

- friends: 16% more STEM (59% vs 43%), 32% more ICT (73% vs 41%),
- family: 12% more STEM (59% vs 47%), 5% less ICT (50% vs 45%).

And a lower proportion in India than in developing countries were discouraged by:

- teachers: 13% less STEM (34% vs 47%), 1% less ICT (44% vs 45%).



N = 32, 28 women in STEM, 4 women in ICT

"STEM fields are not for women", as discussed on page 11, is not as widespread in India as it is in other developing countries and in most developed ones. However, it is present in society, as the findings above suggest, alongside scholarship on the matter. Saxena (2021, p. 92) discusses that the stereotype that boys have better math skills than girls is held by some people in India, although this seems to represent a marginal belief. Alongside many studies, the same author affirms that none of the female STEM scholars interviewed declared to feel less capable in mathematics or computer science than men and that they could think of no situations at school or home that led them to have such a thought (p.101). Saxena further affirms that some families discourage women from choosing STEM based on the hard work such a choice entails and the unwillingness or impossibility to invest in their education to enable them to fulfill their wishes. Varma & Kapur (2015, p. 59) complement this argument, highlighting that many view STEM studies as inadequate for girls because of the difficulty these fields generate in successfully balancing professional and family life. As barriers, many students mention "societal gender perceptions that identified engineering as a male-oriented subject, that women were not supposed to study beyond 12th grade, and that women's role was as wives and raising children at home."

→ Saxena, P. (2021). Gender and Computer Science Debate at Indian Institutes of Technology. *Gender Technology and Development*. 13 (2). 88-109.

→ Varma, R., & Kapur, D. (2015). Decoding femininity in computer science in India. *Communications of the ACM*, 58(5), 56-62.

Distance seems an aspect that weighs in a family's decision to support a daughter to head for STEM studies. Sahoo & Klasem (2021 p. 1005) have shown that regions with a higher number of STEM-providing higher education institutions have a smaller gender gap in stream choice than those where there are not so many colleges offering scientific and technical education. Concerns about the safety of women in the family are a reason why families dissuade their daughters from studying far away. Varma & Kapur (2015, p. 59-60) further explore this, mentioning curfews imposed on girls by their student lodgings as well as the "lack of access to extra outside coaching, inability to stay late in labs and travel more freely, and limited computer exposure were some of the factors students cited as resulting in gender imbalance in CS."

→ Sahoo, S. & Klasen, S. (2021) Gender Segregation in Education: Evidence From Higher Secondary Stream Choice in India. *Demography*; 58 (3): 987–1010. https://doi.org/10.1215/00703370-9101042)

→ Varma, R., & Kapur, D. (2015). Decoding femininity in computer science in India. *Communications of the ACM*, 58(5), 56-62.

Expense is an issue often brought up by research as a factor that leads families to discourage their daughters from pursuing STEM, as STEM education is relatively more expensive than non-STEM education. Families that must choose between educating their sons and daughters mostly prioritize boys' education and concerns about being able to provide dowry also reduce resources available for girls' education (Tyagi and Kumar, 2023; Azam and Kingdon, 2013; Singh & Mukherjee, 2018).

→ Tyagi, M., Kumar, D and Hussain, M. A. (2023). STEMming the Dowry Tradition: *Empowering Girls in India*. http://dx.doi.org/10.2139/ssrn.4385778

→ Singh, R., & Mukherjee, P. (2018). Whatever she may study, she can't escape from washing dishes': Gender inequity in secondary education–evidence from a longitudinal study in India. Compare: A Journal of Comparative and International Education, 48(2), 262–280. https://doi.org/10.1080/03057925.2017.1306434

→ Azam, M., & Kingdon, G. G. (2013). Are girls the fairer sex in India? Revisiting intra-household allocation of education expenditure. *World Development*, 42, 143–164. https://doi.org/10.1016/j.worlddev.2012.09.003

GENDERSCAN

Discouraging factors

What women heard when being discouraged from choosing STEM

This is not a job for women (heard by 44% of respondents)

"I was told that engineering isn't a job I will be able to pursue in the long run as family and work are hard to manage. They suggested to work as a teacher as managing work and home is easy and women around are mostly working as teachers." *Woman, 22, engineering student*

"A doctor told me that I shouldn't be pursuing engineering which is supposed to be a boys' only field." *Woman, 22, student in natural sciences, biology, chemistry*

"I was told that I'm a girl and as such I won't be able to do it well" *Woman, 22, engineering student*

It is too difficult, you are not good enough (heard by 19% of respondents)

"Too difficult to break into these fields." *Woman, 19, biomedical engineering student*

"They said 'you're not capable to do it'." *Woman, 20, student in computer science*

"Teachers said I was not good/smart enough to do a STEM degree." *Woman, 22, engineering student*

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GENDERSCAN

Discouraging factors

What women heard when being discouraged from choosing STEM

It is hard to find a job in the field (heard by 16% of respondents)

"The career path is different, there are few jobs out there." *Woman, 21, student in computer science*

"There is not a lot of scope for jobs in Biomedical Engineering." *Woman, 29, engineering student*

"The biggest argument was that there are millions of jobless engineers." *Woman, 33, engineering student*

University is far away/too expensive (heard by 16% of respondents)

"I was told to study in my city and take teaching as a profession by my relatives, who were putting a lot of pressure on my direct family by stating it is not safe outside. 'She may get spoilt and suffer all kind of social pressures.' It was one biggest challenge that our city did not have any technology institute. But my elder brother who has seen my passion for tech stood for me." *Woman, 28, engineering student*

"Financial conditions were a major discouragement." *Woman, 33, student in computer science*

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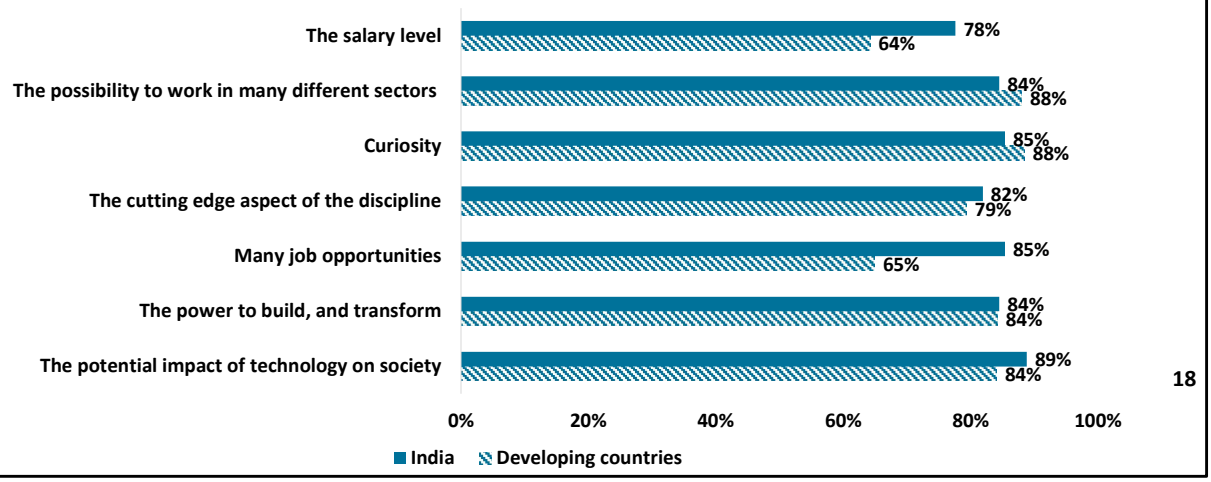
GENDERSCAN

Motivation factors

Job opportunities motivate 20% more in India than in developing countries and the salary level 14% more

What motivated you to pursue this course of study in terms of your personal aspirations?
(comparison of answers 'Yes, a little bit' and 'Yes, absolutely' from women students in India and developing countries in %)



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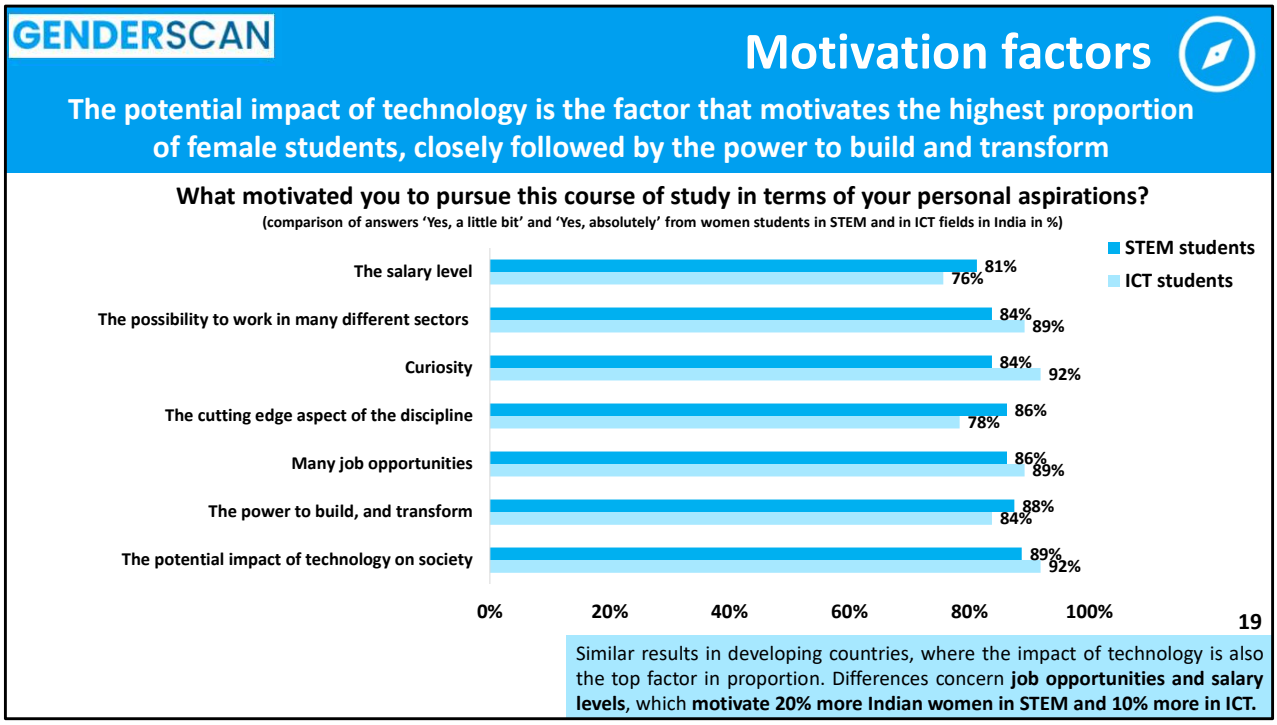
Proportions are generally similar in India in relation to developing countries. Two factors stand out as motivating a higher proportion of women in India:

- many job opportunities: 20% more (85% vs 65%),
- the salary level: 14% more (78% vs 64%).

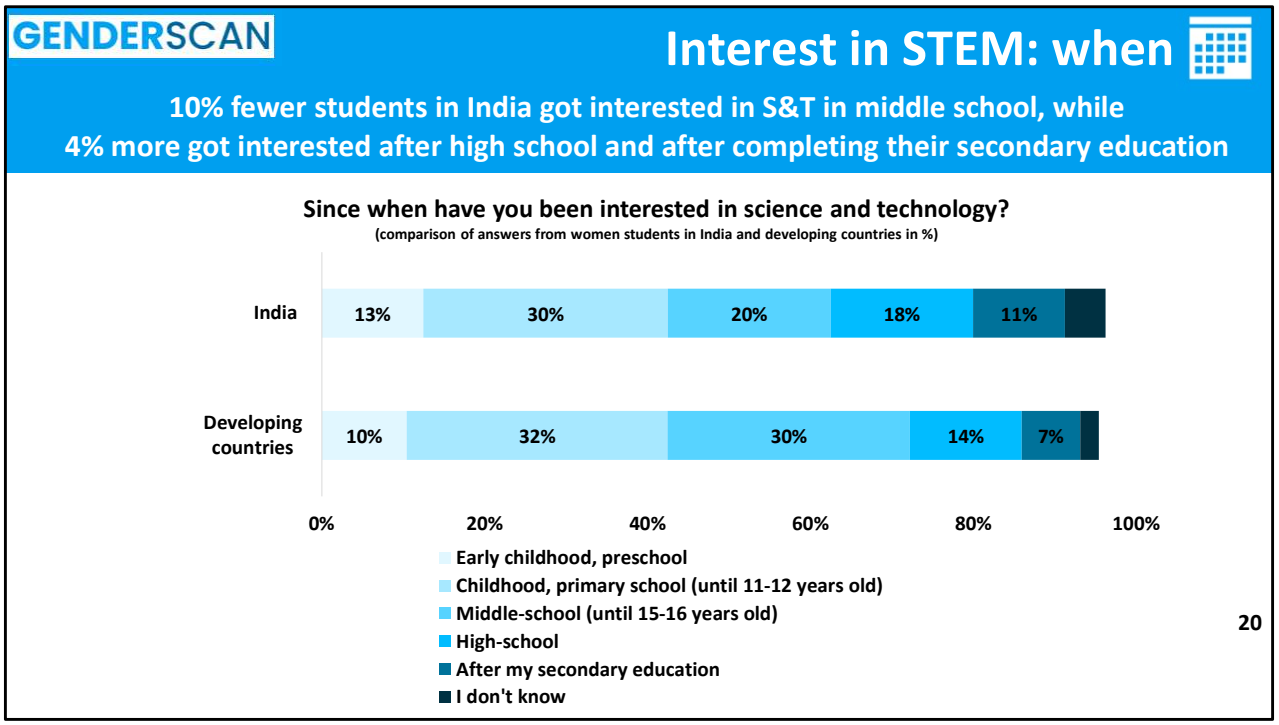


The top motivating factors are:
- the potential impact of technology on society (89% in STEM, 92% in ICT),
- the power to build, and transform (88% in STEM, 84% in ICT),
- many job opportunities (86% in STEM, 89% in ICT).

Similar results between STEM and ICT, the highest differences involving, on the one hand, factors that motivate a slightly higher proportion of STEM than ICT students:
- the cutting-edge aspect of the discipline: 8% more STEM (86%) than ICT (78%),
- the salary level: 5% more STEM (81%) vs ICT students (76%).

On the other, the factors that motivate more ICT than STEM students in proportion:
- curiosity: 8% more ICT (92%) than STEM students (84%),
- the possibility to work in different sectors: 5% more ICT (89%) than STEM (84%).

Proportions are generally similar in India in relation to developing countries, but more significant differences include a higher proportion of Indian women motivated by:
- the salary level: 19% more STEM (81% vs 62%), 2% more ICT (76% vs 74%),
- job opportunities: 15% more STEM (86% vs 61%), 10% more ICT (89% vs 79%).



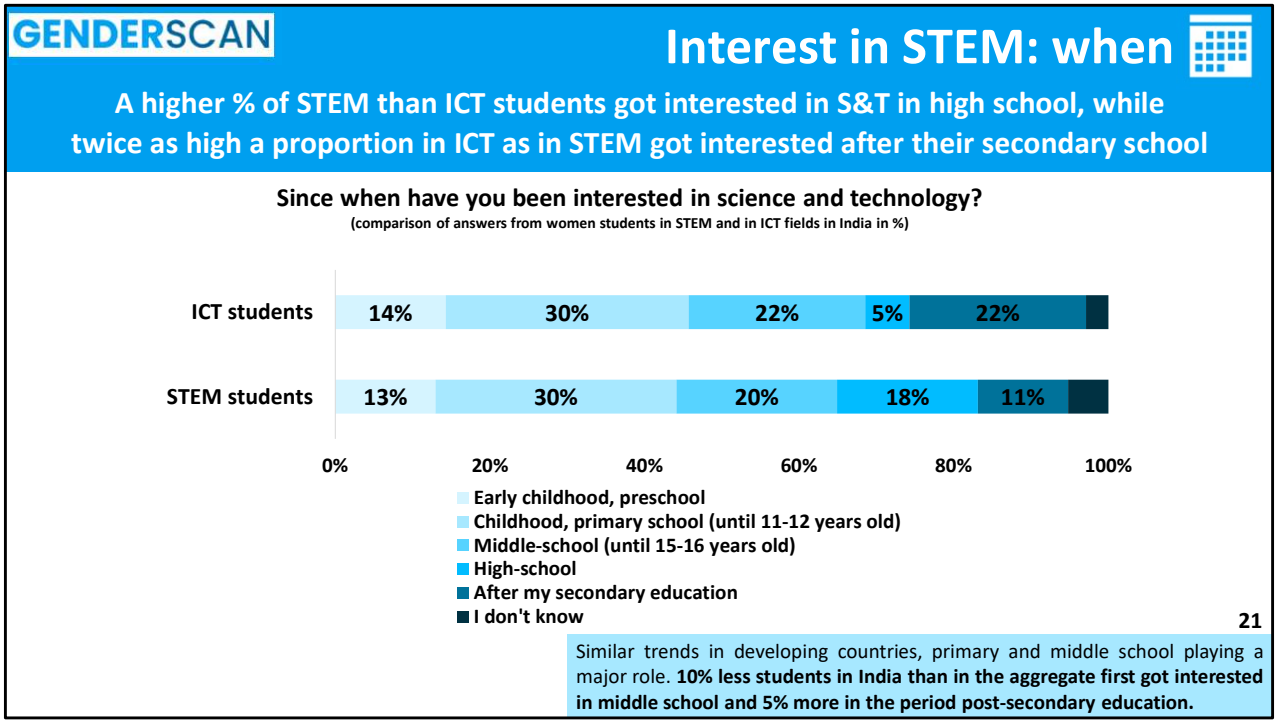
Quite similar proportions in India and in developing countries. Primary school seems to be a core moment, when almost a 1/3 of respondents first got interested in S&T. It is closely followed by middle school.

Remarkable differences between female students in STEM and ICT in India regard:

- 10% less women in India (20%) than in developing countries (30%) say they have been interested in science and technology since middle school,
- 4% more women in India (18%) than developing countries (14%) pinpointed middle school as a moment when they took an interest in science and technology,
- 4% more women in India (11%) than developing countries (7%) pinpointed the period after their secondary education.

According to Thakkar et al. (2018, p. 3) women report very little **gender bias in childhood in India** when compared to developed countries such as the US, above all **regarding cognitive abilities to do technical work**. In addition, computer science is a school discipline in India starting from the 6th grade. These two elements may explain the fact that a non-negligible proportion of respondents get interested in STEM early on.

→ Thakkar, D., Sambasivan, N., Kulkarni, P., Kalenahalli Sudarshan, P., & Toyama, K. (2018). The Unexpected Entry and Exodus of Women in Computing and HCI in India. *Paper presented at the Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems.*



Similar proportions between STEM and ICT, overall, pointing to the key importance of primary school, where almost a 1/3 of respondents first got interested in S&T, closely followed by middle school, where about 20% of them had their interest awaken.

A few notable differences between female students in STEM and ICT in India:

- 13% more female students in STEM (18%) than ICT (5%) say they have been interested in science and technology since high school,
- Conversely, 11% more women studying ICT (22%) than STEM (11%), or twice as high a proportion in ICT as in STEM, say the period after secondary education was when they took an interest in science and technology.

GENDERSCAN

Questions and contents

Part 2: In higher education

- What is the general feeling of women studying STEM degrees?
- How satisfied are women studying STEM? What are they satisfied with?
- What are women dissatisfied with? What improvements would they like to see in their STEM studies?
- How many women in STEM studies experience sexism? How does it impact their studies and how do they react?

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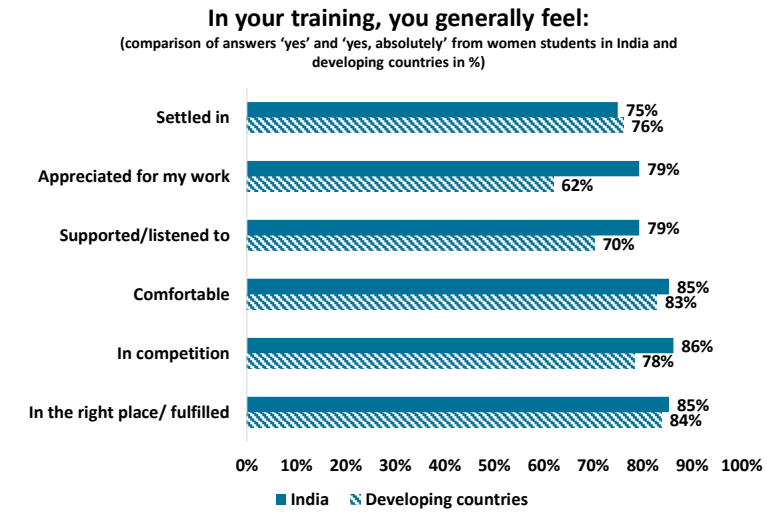
GENDERSCAN

General feeling

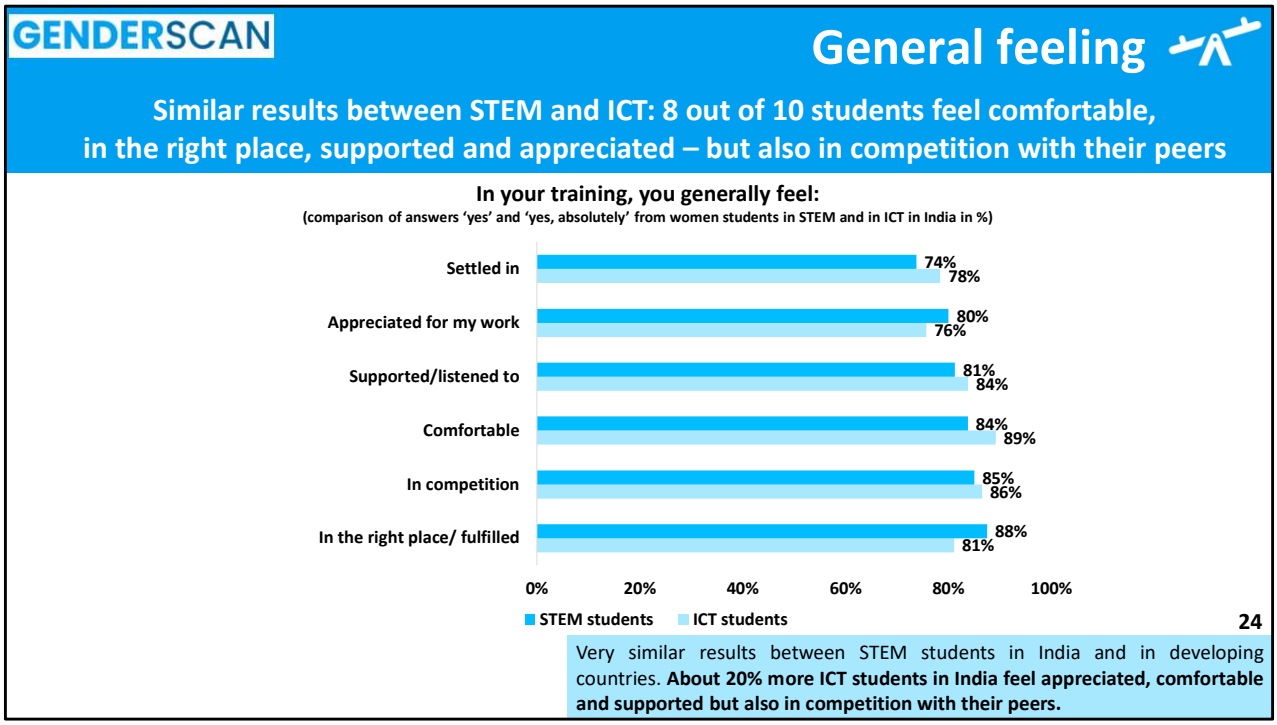
Higher proportions in India than in developing countries feel appreciated for their work(+17%), supported/ listened to (+9%) but also in competition (+8%)



23

Proportions are similar in India and developing countries, but a handful of differences stand out, pointing to a considerably higher proportion of Indian women who feel:

- appreciated for their work: 17% more (79% vs 62%),
- supported/listened to: 9% more (79% vs 70%),
- in competition: 8% more (86% vs 70%).



Similarly high level of proportions between STEM and ICT in India, with each general feeling chosen by about 8 out of 10 respondents and differences not exceeding 7%, thus not significant. On the one hand,

- 7% more of women in STEM (88%) vs ICT (81%) feel in their right place, fulfilled,
- 4% more in STEM (80%) than in ICT (76%) feel appreciated for their work.

On the other,

- 5% more women in ICT (89%) than in STEM (84%) feel comfortable in their studies,
- 4% more women in ICT (78%) than in STEM (74%) feel settled in their studies.

These differences underlining a slightly higher level of well-being in relation to others in ICT than in traditional STEM careers could perhaps be explained by the greater gender-balance in the former fields if compared to the latter, anchored in the social perception of their higher suitability for women.

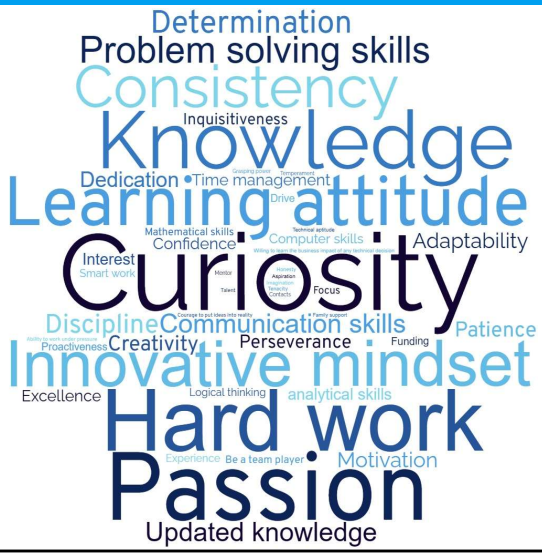
Proportions are similar in India and in developing countries, but a handful of differences stand out, pointing to a considerably a higher proportion of Indian women who feel:

- appreciated: 18% more STEM (80% vs 62%), 19% more ICT students (76% vs 57%),
- supported/listened to: 11% more STEM (81% vs 70%), 18% more ICT (84% vs 66%),
- in competition: identical proportion in STEM, 16% more ICT (86% vs 70%).

GENDERSCAN

General feeling

The necessary attributes to study and work in this sector, according to the students

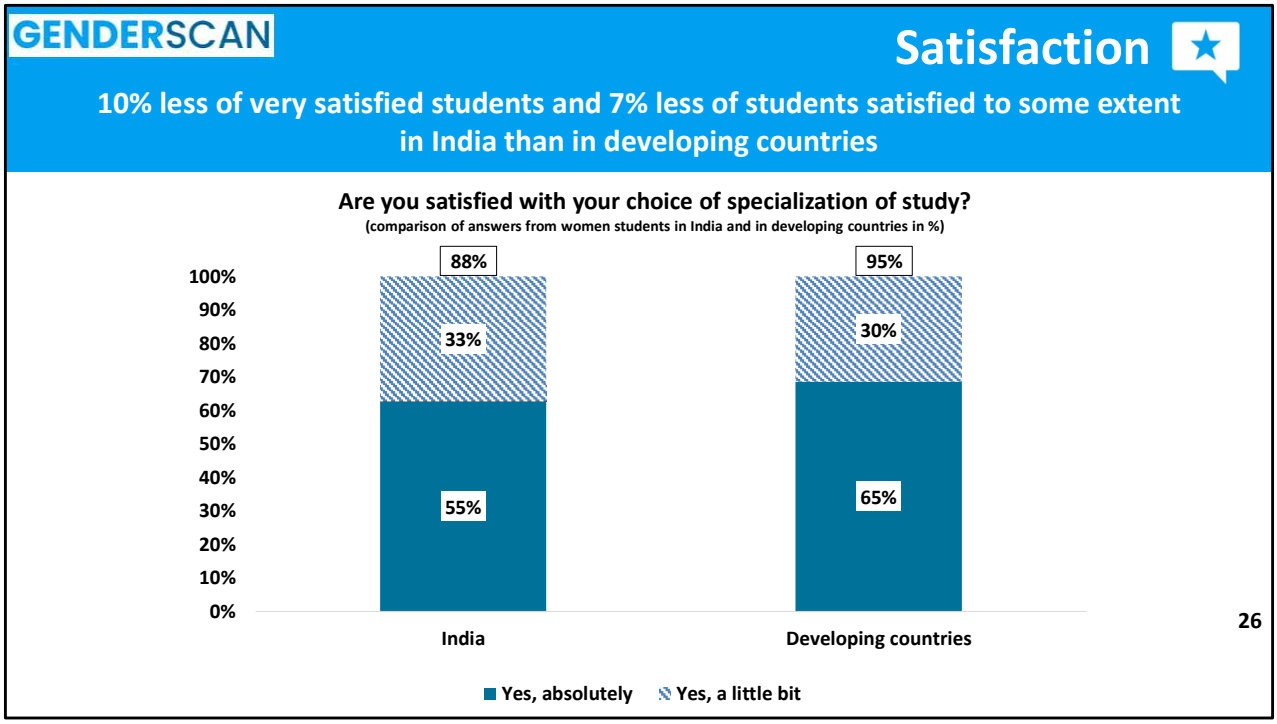


25

N = 103 women.

The top 5 words mentioned were:

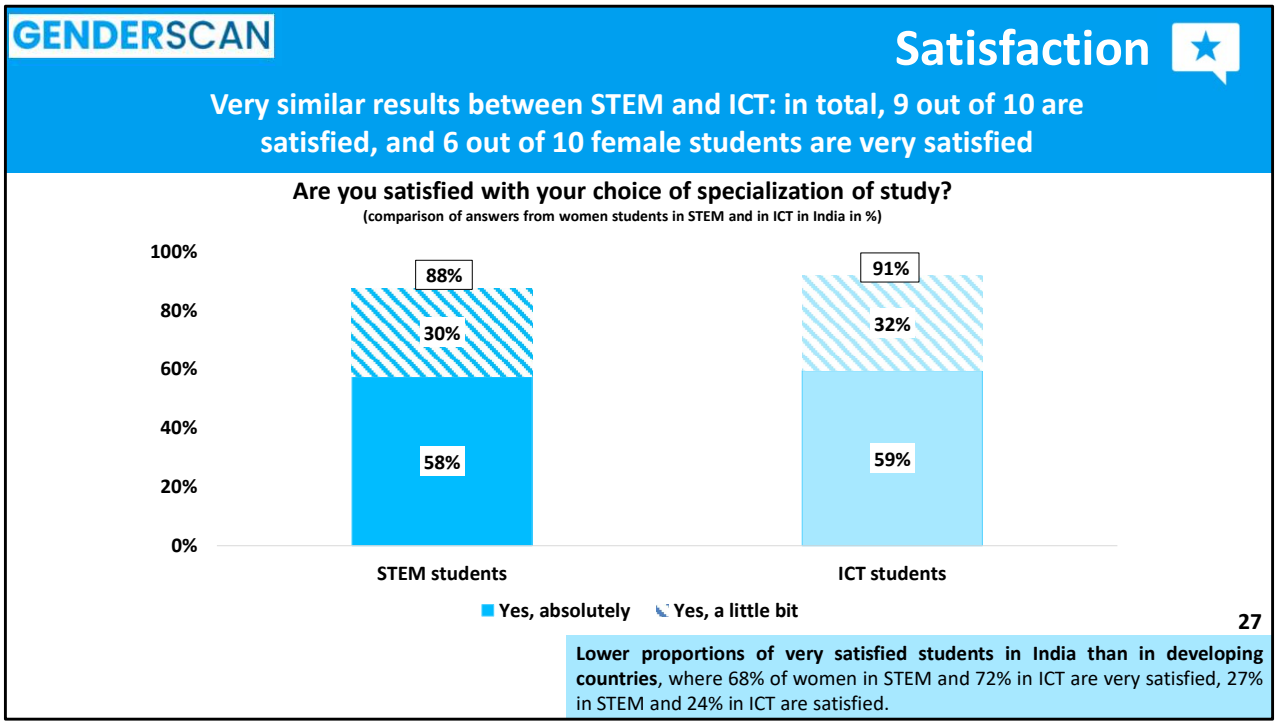
- Curiosity – 26 mentions
- Passion – 18
- Hard work – 16
- Knowledge – 14
- Learning attitude – 13



In relation to developing countries, a lower proportion of Indian women feel very satisfied with their choice of studies:

- 10% fewer students feel very satisfied (55% vs 65%),
- 7% fewer students feel satisfied to some extent (88% vs 95%).

Nonetheless, the proportion of students who affirm to be satisfied with their choice of studies remains very high In India (almost 9 out of 10 students).



Similarly high level of satisfaction in STEM and ICT in India. 9 out of 10 respondents are satisfied to some extent. Differences do not exceed 3% and hence are negligible.

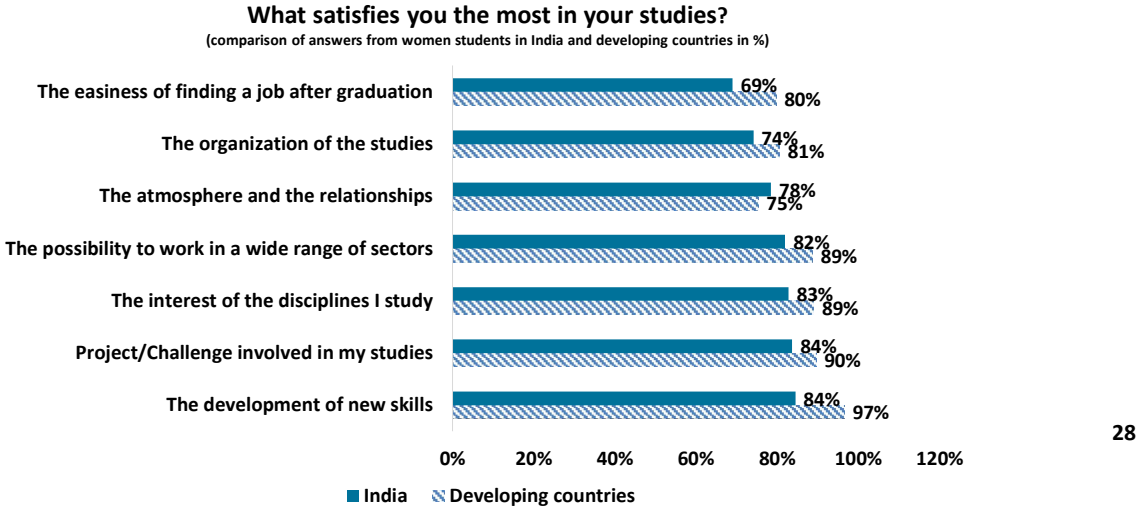
In relation to developing countries, a lower proportion of Indian women feel very satisfied with their choice of studies:

- 10% less feel very satisfied in STEM (58% vs 68%), 13% less in ICT (72% vs 59%).

GENDERSCAN

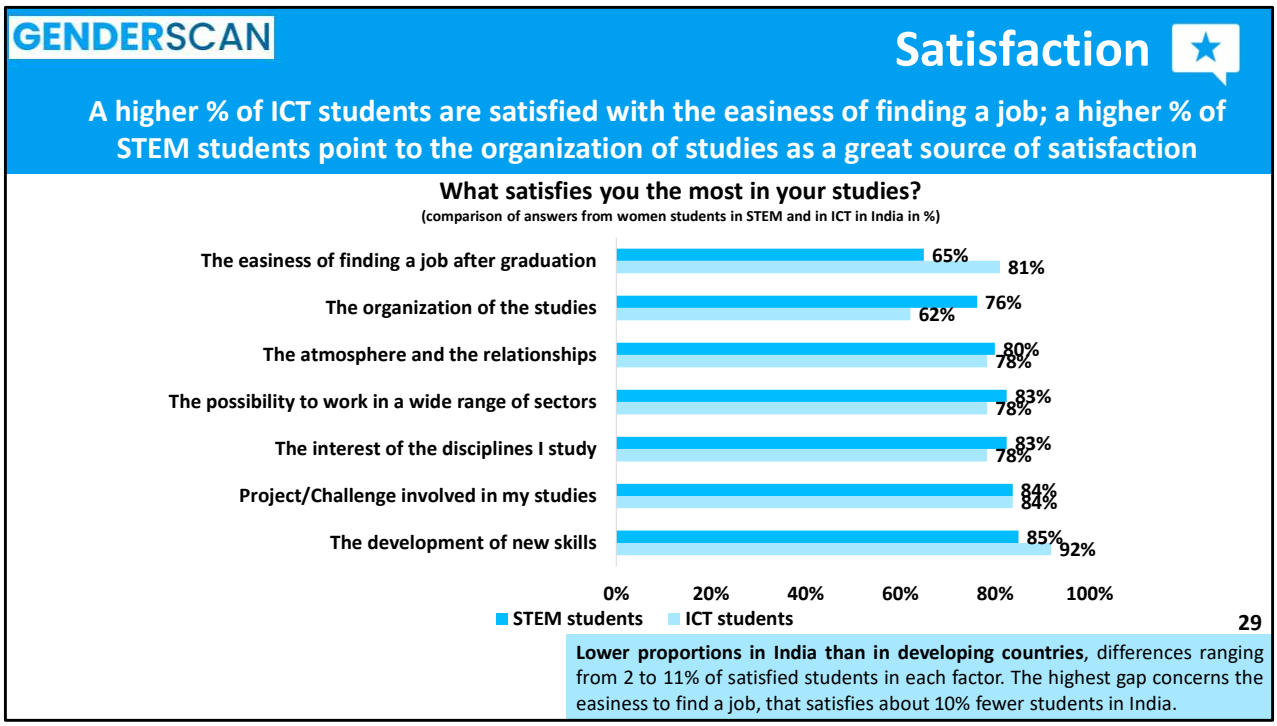
Satisfaction

A lower proportion of students in India are satisfied with most factors studied
14% fewer satisfied with the easiness of finding a job; 7% fewer with the organization of studies



With the exception of the atmosphere and relationships, which satisfy a slightly higher proportion of Indian students, all aspects examined are pointed as satisfaction factors by a lower proportion of students in India in relation to developing countries:

- the development of new skills: 13% fewer students satisfied (84% vs 97%),
- the project/challenge: 6% fewer (84% vs 90%),
- the interest of the disciplines studied: 6% fewer (83% vs 89%),
- the possibility to work in a wide range of sectors: 7% fewer (82% vs 89%),
- the organization of studies: 7% fewer satisfied students (74% vs 81%),
- the easiness of finding a job after graduation: 11% fewer (69% vs 80%).



The top 2 satisfaction factors are the development of new skills and the project /challenge involved in their studies. The proportion of satisfied students is, however, very high in all aspects examined, at about 8 in 10.

Differences between the % of STEM and ICT students satisfied, in favor of the latter:

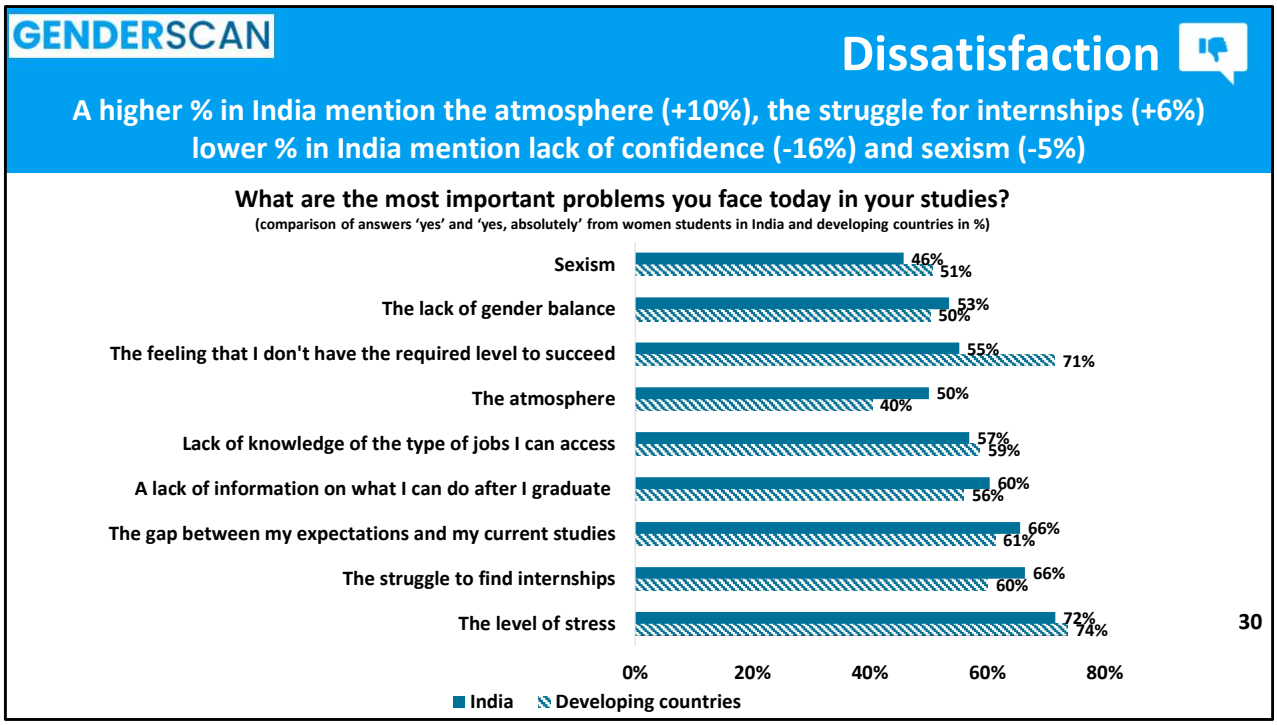
- 16% more women in ICT (81%) than in STEM (65%) are satisfied with the easiness of finding a job after their studies,
- 7% more women in ICT (92%) than in STEM (85%) are satisfied with the development of new skills.

And in favor of the former:

- 14% more women in STEM (76%) than in ICT (62%) are satisfied with the organization of their studies.

In relation to developing countries, except for the atmosphere and relationships, all aspects examined satisfy a lower proportion of students in India:

- the development of new skills: 11% fewer students satisfied in STEM (85% vs 96%) and 7% fewer in ICT (92% vs 99%),
- the project/challenge: 11% fewer students satisfied in STEM (85% vs 96%) and 7% fewer in ICT (92% vs 99%),
- the interest of the disciplines studied: 7% fewer students satisfied in STEM (83% vs 90%) and 9% fewer in ICT (78% vs 87%),
- the possibility to work in a wide range of sectors: 7% fewer satisfied in STEM (84% vs 91%) and 8% fewer in ICT (84% vs 92%),
- the organization of studies: 2% fewer satisfied in STEM (76% vs 78%) and 21% fewer in ICT (62% vs 83%),
- the easiness of finding a job after graduation: 10% fewer satisfied in STEM (65% vs 75%) and 11% fewer in ICT (78% vs 89%).



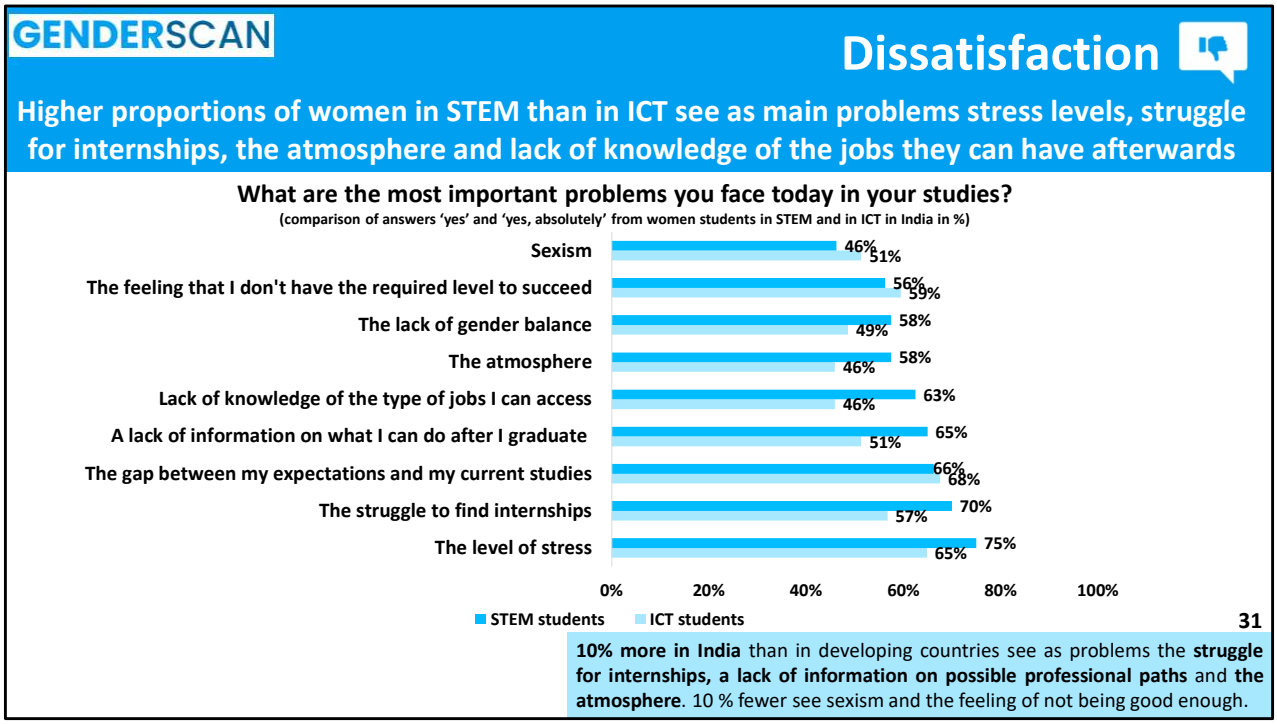
The **feeling of not being good enough to succeed** is pointed out as a challenge by a significantly lower proportion of women in India than in developing countries. Cultural differences regarding the construction of gender identities in relation to science can explain this gap. According to Venkatesh (2015), based on many studies of different methodologies, the idea that women are not as capable as men of performing well in science and mathematics is considerably less spread in India than in the West. In the West, greater dichotomies exist in the traditional characterization of "male" and "female" intelligence – the former being described as more logical, competitive, and problem-solving and the latter more people-oriented, sensitive/nurturing and literary. Rather, in India, objections to women pursuing STEM, if made, are grounded on the difficulties of conciliating professional and family life in these careers and on the excessive freedom of movement they give – which would characterize a rupture with traditional family roles, a loss of femineity or a failure in feminine duties. Cognitive abilities are not as gendered in Indian traditional thought, hence they are less questioned in women in STEM. (Saxena, 2021) That could be a reason why they do not cause as much psychological pressure on Indian women as in other countries.

→ Venkatesh, S. (2015). Forms of Social Asymmetry and Cultural Bias: Of Gender and Science in India and the World. *Transcience* 6(1).
→ Saxena, P. (2021). Gender and Computer Science Debate at Indian Institutes of Technology. *International Journal of Gender, Science and Technology*, *13*(2), 88–109.

Besides the 16% fewer students in India than in developing countries who struggle with the feeling of not having the required level to succeed, the main differences regard:

- sexism: mentioned by 5% fewer students in India (46% vs 51%),
- the atmosphere: 10% more students in India struggle (50% vs 40%),
- the struggle to find internships: 6% more in India (66% vs 60%).

On the atmosphere, the higher proportions of female students in India bothered by it may be related to the **competition** – also mentioned by 8% more respondents in India on page 23. This seems to be especially relevant since studies point to the fact that, as mentioned on page 20, doubts about the capacity of women to study and perform STEM activities are less present in India than in many countries worldwide.



The top 2 dissatisfaction factors are the level of stress and the struggle to find internships.

With the exceptions of sexism, the feeling of not being good enough to succeed and the gap between expectations and studies, the proportion of students who are dissatisfied about each factor is remarkably higher in STEM than in ICT:

- the stress level: 10% more (75% vs 65%),
- the struggle to find internships: 13% more (70% vs 57%),
- the lack of information on the paths they can take after graduation: 14% more (65% vs 51%),
- a lack of knowledge of the kind of jobs they can have: 17% more (63% vs 46%),
- the atmosphere: 12% more (58% vs 46%),
- the lack of gender balance: 9% more (58% vs 49%).

In relation to developing countries, apart from the atmosphere and relationships, all aspects examined satisfy a lower proportion of students in India:

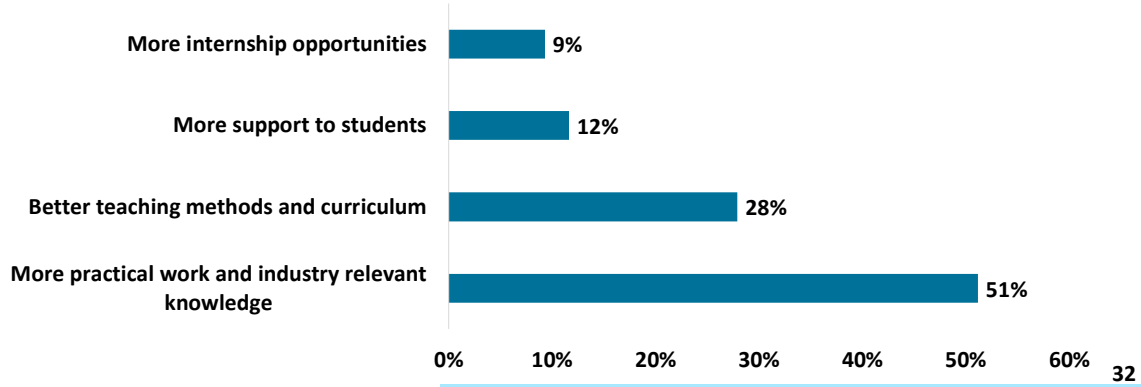
- the development of new skills: 11% fewer students satisfied in STEM (85% vs 96%) and 7% fewer in ICT (92% vs 99%),
- the project/challenge: 11% fewer students satisfied in STEM (85% vs 96%) and 7% fewer in ICT (92% vs 99%),
- the interest of the disciplines studied: 7% fewer students satisfied in STEM (83% vs 90%) and 9% fewer in ICT (78% vs 87%),
- the possibility to work in a wide range of sectors: 7% fewer satisfied in STEM (84% vs 91%) and 8% fewer in ICT (84% vs 92%),
- the organization of studies: 2% fewer satisfied in STEM (76% vs 78%) and 21% fewer in ICT (62% vs 83%),
- the easiness of finding a job after graduation: 10% fewer satisfied in STEM (65% vs 75%) and 11% fewer in ICT (78% vs 89%).

GENDERSCAN

Dissatisfaction

Opportunities to practice and industry-relevant knowledge are the main demands of students, followed by better teaching methods and curriculum

What improvement would you like to see in the training you are taking?
(open answers from women students in STEM and in ICT fields in India in %)



20% more in India than in developing countries would like more practical and industry-relevant work, 15% more would like better teaching methods and curriculum and a similar proportion asks for more support in their studies.

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N = 86, 51 Women in STEM, 35 Women in ICT

GENDERSCAN

Dissatisfaction

What women would like to see as improvements in their training

More practical work and industry-relevant knowledge (mentioned by 51% of respondents)

"Blending of real case studies with theoretical perspective." *Woman, 22, engineering student*

"More hands-on experience. Removing content from syllabus that are not helpful after studies. Concentrating on real time topics and creating subjects based on real time use case after studies."
Woman, 26, student in computer science/ agriculture, agronomy, forestry, veterinary

"Understanding the reality of the industry, industry relevant knowledge sharing session."
Woman, 36, computer engineering student

Better teaching methods and curriculum (mentioned by 28% of respondents)

"Lesser content and content with more quality rather than quantity."
Woman, 19, biomedical engineering student

"A more structured coursework that makes it less vague." *Woman, 20, student in computer science*

"An update of the curriculum, a shift to a project-based learning pedagogy, better mentors and teachers (the requirements of a good teacher should extend beyond their qualifications, and more focus should be given to how they actually teach)." *Woman, 21, environmental engineering student*

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GENDERSCAN

Dissatisfaction

What women would like to see as improvements in their training

More support to students (mentioned by 12% of respondents)

"Taking care of each and every student whether they are grasping the concepts or not."
Woman, 16, student in computer science

"More support, emotional and intellectual." *Woman, 24, engineering student*

More internship opportunities (mentioned by 9% of respondents)

"Internship should be mandatory for students." *Woman, 26, engineering student*

"More industry collaboration and internships." *Woman, 29, environmental engineering student*

"More internship opportunities." *Woman, 34, student in computer science*

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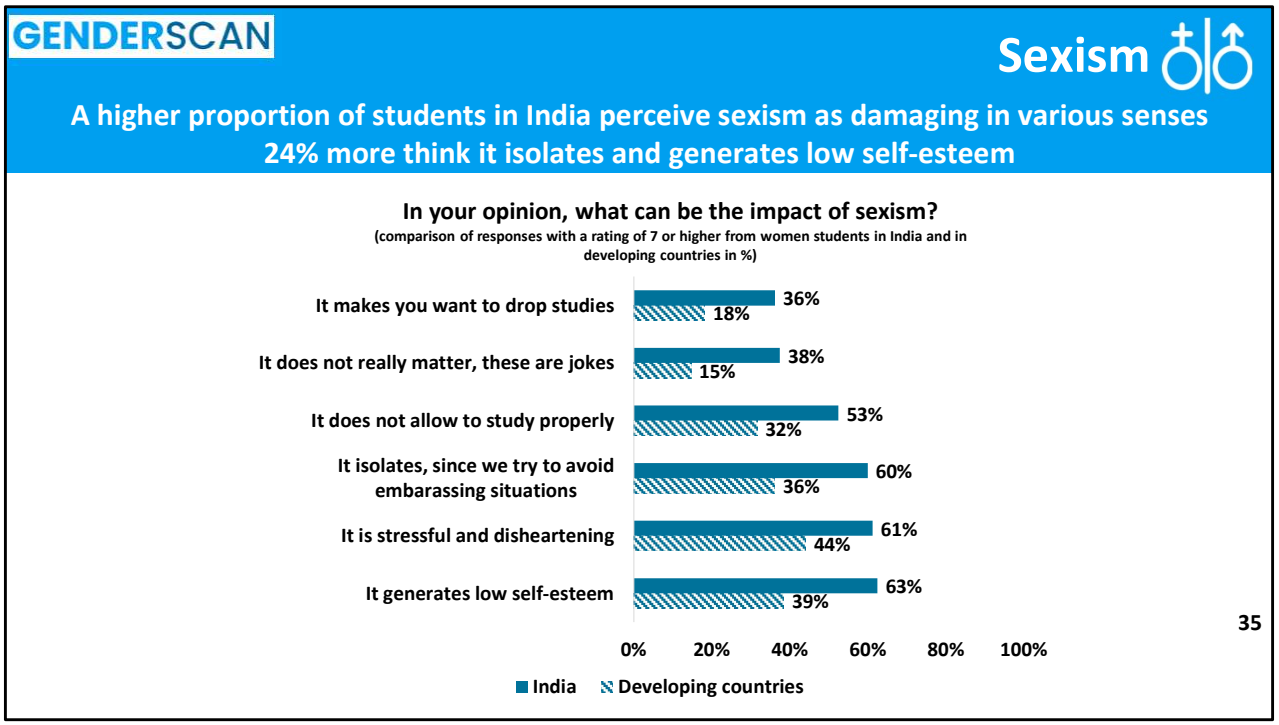
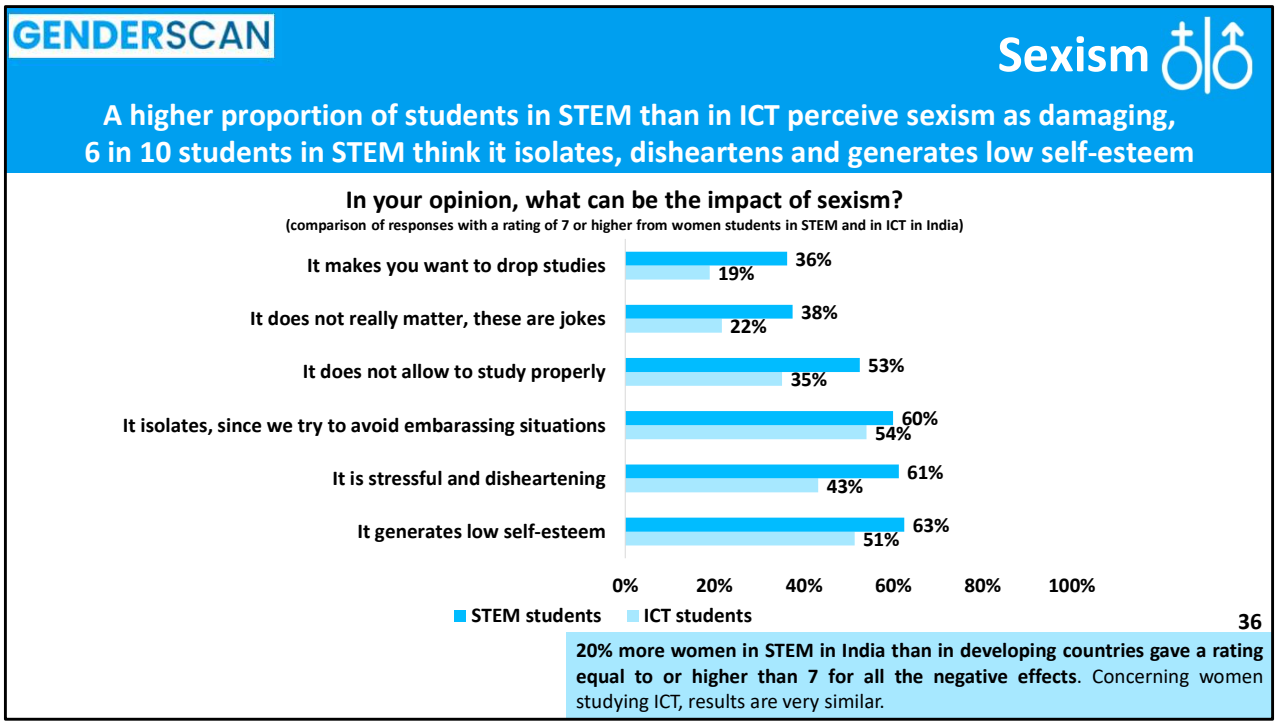


6 out of 10 students in India consider that sexism generates low self-esteem, is stressing and disheartening and that it isolates since victims try to avoid going through the same situations again.

Differences in relation to developing countries are high in all possible effects examined:

- low self-esteem: 24% more in India (63% vs 39%),
- stress and disheartenment: 17% more in India (61% vs 44%),
- isolation: 24% more in India (60% vs 36%),
- impacts on studies: 21% more in India (53% vs 32%),
- will to drop studies: 18% more or twice as high in India (36% vs 18%),
- no serious impact: 23% more or more than twice as high in India (38% vs 15%).

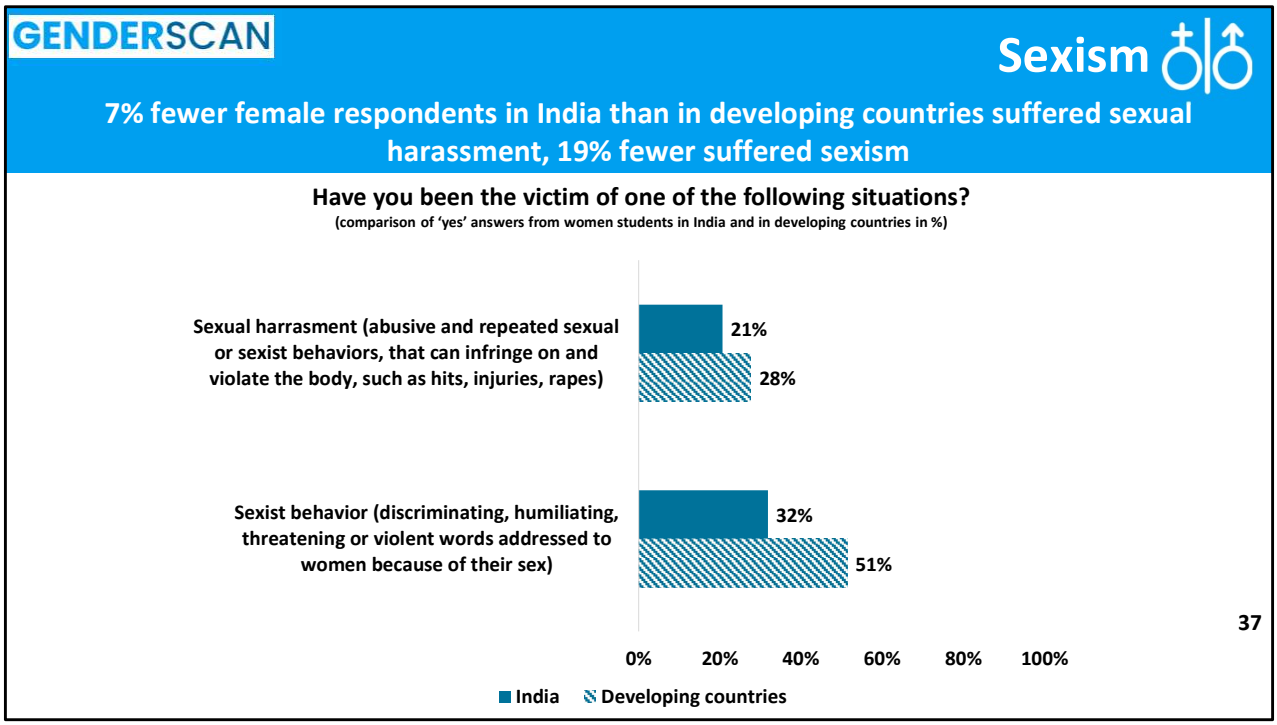


Higher proportions of STEM than ICT students in India consider that sexism is damaging in distinct ways. Differences amount to:

- low self-esteem: 12% (63% vs 51%),
- stress and disheartenment: 18% (61% vs 43%),
- isolation: 6% (60% vs 36%),
- impacts on studies: 18% (53% vs 35%),
- will to drop studies: 17% more or almost 2x high in STEM as in ICT (36% vs 19%),
- no serious impact: 16% (38% vs 22%).

In relation to developing countries, the proportions of women perceiving negative impacts of sexism are considerably more widespread among India between STEM students responding. However, they are similar among ICT students:

- low self-esteem: 24% more Indian STEM students (63% vs 39%) and 4% more Indian ICT students (51% vs 47%),
- stress and disheartenment: 17% more Indian STEM students (61% vs 44%) and 11% fewer Indian ICT students (43% vs 54%),
- isolation: 24% more Indian STEM students (60% vs 36%) and 9% more Indian ICT students (54% vs 43%),
- impacts on studies: 21% more Indian STEM students (53% vs 32%) and 3% fewer Indian ICT students (35% vs 38%),
- will to drop studies: 18% more Indian STEM students (36% vs 18%) and 4% fewer Indian ICT students (19% vs 23%),
- no serious impact: 18% more Indian STEM students (38% vs 20%) and 3% fewer Indian ICT students (22% vs 19%).



Lower proportions of women in India than in developing countries reported having suffered sexual harassment and sexism during their studies. This finding corresponds to those brought by Aina & Kulsrestha (2018) who posit that the **lack of awareness on what constitutes sexism and sexual harassment** opens the door for them not being recognized by female students in higher education institutions in India. In addition, the normalization of some behaviors, especially of subtle sexism, could lead to them not being reported. This hypothesis is further suggested by Barak et al. (1992) who indicate that even female university students who had suffered episodes legally defined as sexual harassment did not say they had been harassed. Instead, they felt safe in their respective campuses.

Furthermore, the findings above do not differ significantly from those of Mukherjee & Dasgupta (2022) on **sexual harassment.** They found that 1 in 10 women who are or have been students in college and universities in India have been sexually harassed in their educational institutions (difference which is still in the margin of error of this study). One factor which could explain this slight difference is that their survey was applied to present and former female higher education students across all disciplines, while Gender Scan was directed to STEM students only. Sexual harassment could be more present in STEM fields than in all fields, although further research would be needed to confirm this hypothesis.

Aditi et al (2016 a,b) examined the level of awareness of sexual harassment in colleges in the Udupi district, Karnataka, India. Awaremess is not the same as experience but can play a role in the proportion of victims who identify their experience of sexual harassment as such. They pointed that level of awareness differs with the students' age, gender and course of the study. Students in technical disciplines, in comparison with those in health sciences, were less likely to have good knowledge of what constitutes sexual harassment.

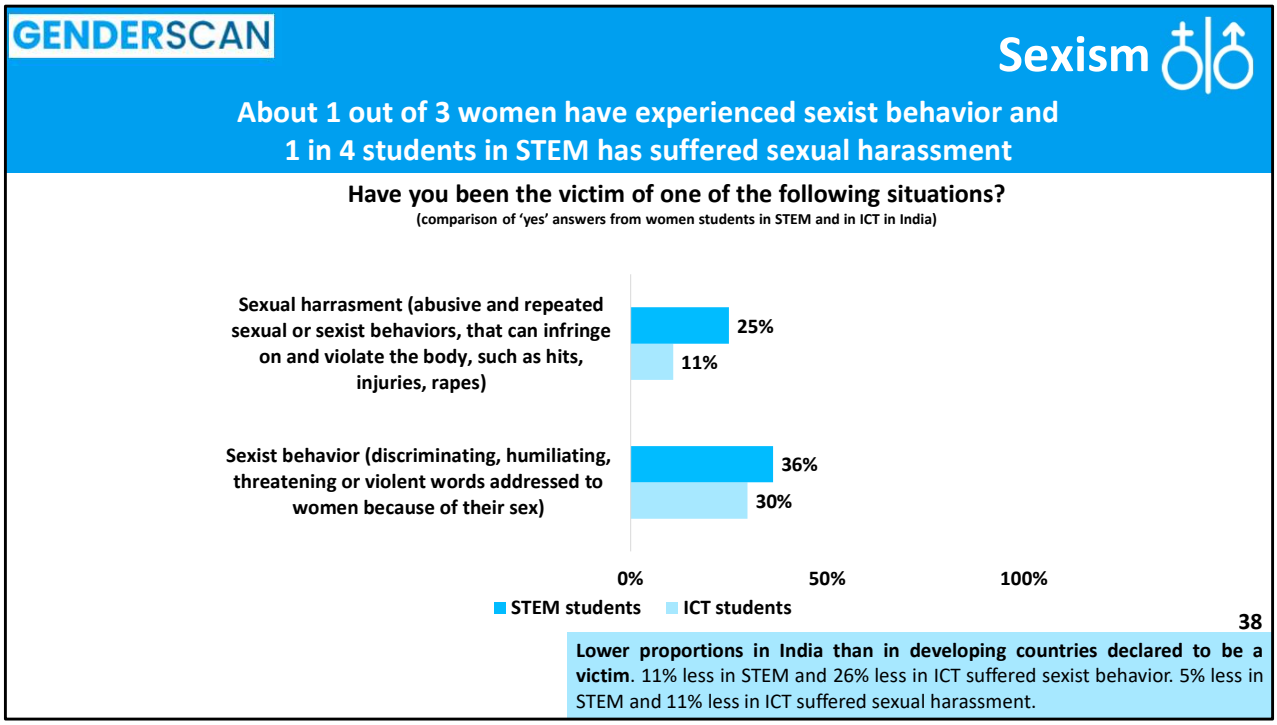
Similarly, the findings above are just slightly lower from the findings of Mukherjee & Dasgupta (2022) on **sexism in higher education in India**, since they found that "about 40% of female students have faced casual forms of sexism at university from both by male faculty members and male students" (p. 410) (difference which is still in the margin of error of this study) and 48% have encountered instances of explicit sexism from them.

These differences could be due to their more specific formulation of the questions on sexism, mentioning about 10 concrete types of subtle sexism (mansplaining, attributing mood/behavior to menstrual cycles, etc) and 10 forms of explicit sexism (slut shaming, cat-calling). Specifying the situations in the options could lead to more respondents who have lived these sexist behaviors ticking the case than the Gender Scan's general option on the experience of sexism. The general formulation demands prior knowledge of the respondent about what constitutes sexism, which situations could be comprised in this category – knowledge that, as discussed above, is not yet widespread. Another indication in this direction is the higher proportions found on slide 40.

Another point made by Mukherjee & Dasgupta (2022), from a survey on 578 female higher education students in India is that 88% of respondents who have been sexually harassed at university were victims of male students, 12% by faculty members and 11% by staff members. These numbers suggest that, although unequal institutional power dynamics do come to play between female students and male professors/staff, more general social norms and sexist culture that allow young men to harass their female colleagues seem to be prevalent when it comes to the underlying reasons for sexual harassment in tertiary level education, and this must be tackled with systemic approaches.

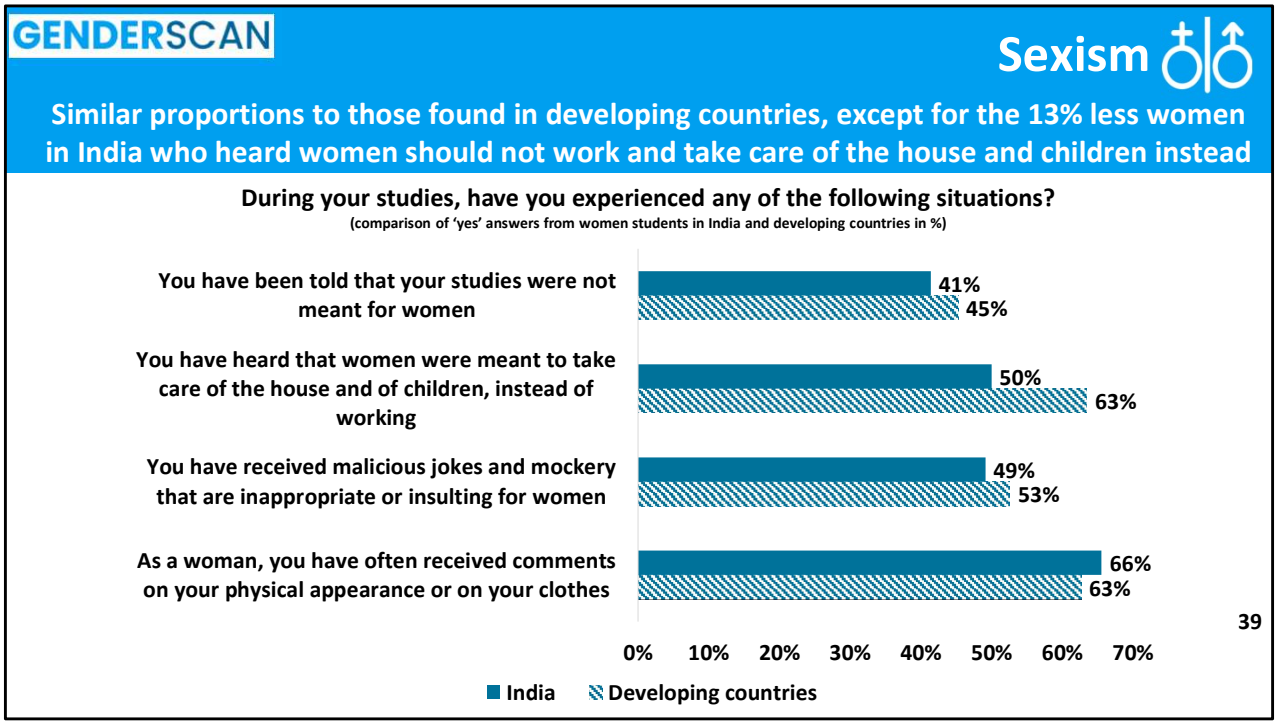
→ Barak, A., Fisher, W. A., & Houston, S. (1992). Individual Difference Correlates of the Experience of Sexual Harassment Among Female University Students" *Journal of Applied Social Psychology* 22 (1): 17–37
→ Aditi, G., Priyadarshini, S., & Binu, M. E. (2016a). Perception of sexual harassment among the undergraduate students. *Manipal Journal of Nursing and Health Science*, 2(1), 46–51.
→ Aditi, G., Priyadarshini, S., & Binu, M. E. (2016b). Knowledge of sexual harassment among the undergraduate students in Udupi district. *Nitte University Journal of Health Science*, 6(2), 4–9.
→ Aina, A D, & Kulshrestha. P (2018). Sexual Harassment in Educational Institutions in Delhi'NCR (India): Level of Awareness, Perception and Experience. *Sexuality & Culture* 22 (1): 106–126
→ Mukherjee, A & Dasgupta, S (2022). "He Says, She Says": Sexism and Sexual

Harassment in Higher Educational Institutions of India, *Journal of Economic Issues*, 56:2, 408-415, https://doi.org/10.1080/00213624.2022.2057169



Developing countries:

- 47% of women in STEM and 56% in ICT declared to have suffered sexist behavior,
- 22% of women in STEM and 30% in ICT declared to have suffered sexual harassment during their studies.



Lower proportions of women in India who heard that women should not work but rather look after the children and the house (13% less). Similarly, the lower proportions of women in India who heard that their studies are not for women seem coherent with the findings discussed in pages 11, 15 and 30, that STEM is less likely to be seen as inappropriate for women in India than in many countries in the West. Thus, lesser percentages of respondents in India have heard that they are not capable of doing good STEM work or that STEM is not for women.

The proportions found by Mukherjee & Dasgupta (2022) are an interesting element for comparison, despite not allowing for direct correspondence with the Gender Scan findings:

"Types of Subtle Sexism Faced from Male Students in % of female respondents:

- Sexist jokes - 78.6
- Gender stereotypes - 65.32
- Attributing academic performance to looks, attitude, behavior - 47.75
- Attributing mood/behavior to menstrual cycles - 40.32
- Yelling often than his male friends - 11.71
- Mansplaining - 51.35
- Dismissing opinions as 'too emotional', 'irrational' - 39.41
- Smile more often - 19.82
- Other such instances - 27.7

Types of Subtle Sexism Faced from male faculty members in% of female respondents:

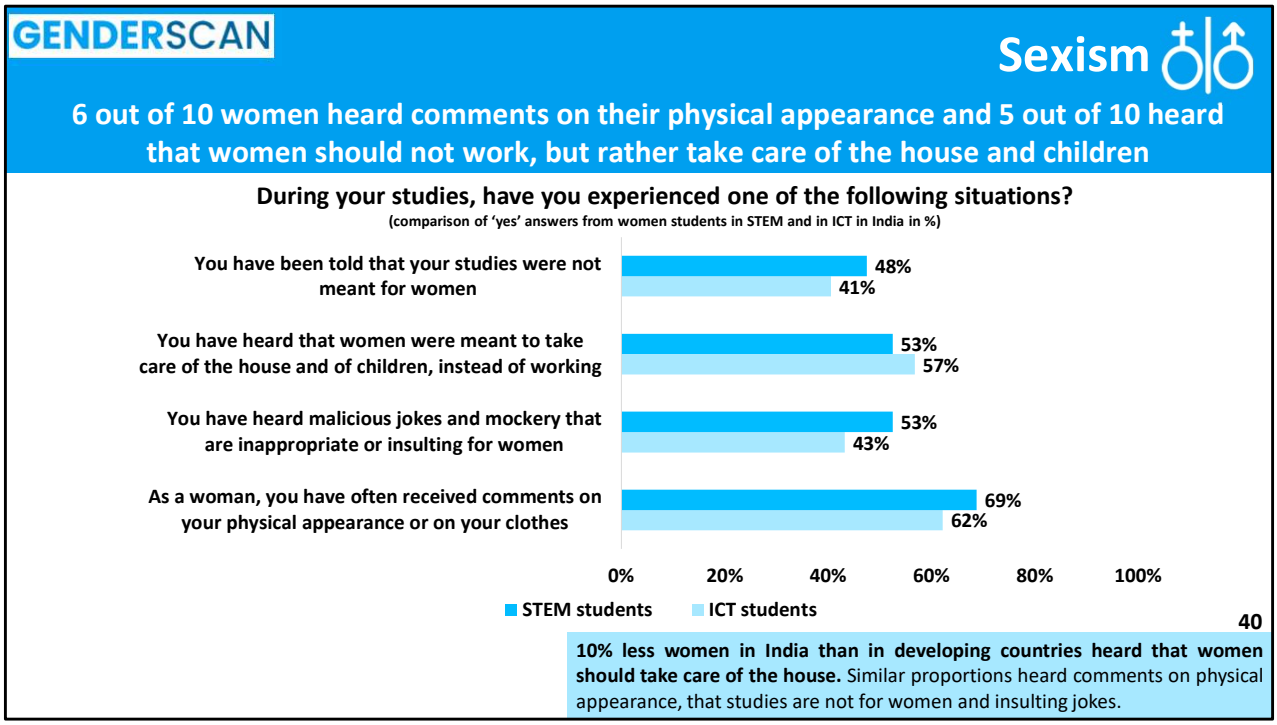
- Gender Stereotyping - 72.41
- Interrupted while you were speaking - 27.16
- Ignored your academic ideas, suggestions, etc - 40.95

- Other such instances - 30.172

Types of Explicit Sexism Faced from Male Students in % of female respondents:
- Insisting on communication against your will - 48.62
- Asking uncomfortable personal questions - 14.79
- Inviting to meet them alone in a personal space - 17.54
- Slut shaming – 32.58
- Insisting on reciprocating their romantic gestures - 33.08
- Unsolicited gifts - 12.03
- Unsolicited calls/texts - 39.85
- Touching inappropriately - 27.568
- Cat-calling - 66.66
- Staring inappropriately - 78.7
- Other such instances - 19.55

Types of Explicit Sexism Faced from Male Faculty members
- Other such instances - 11.15
- Staring inappropriately - 78.06
- Complimenting your looks, dress, etc. - 37.05
- Inviting you alone to his office - 13.67
- Inviting you alone to his home - 7.91
- Unsolicited phone calls/texts - 14.75
- Romantic gestures - 15.11
- Asking about your personal relationships - 20.14
- Expressing non-academic concerns - 30.21
- Discussing about his personal romantic relationships - 17.26
- Constantly poking/pinging on social media - 11.15
- Touching inappropriately - 17.63”

→ Mukherjee, A & Dasgupta, S (2022) “He Says, She Says”: Sexism and Sexual Harassment in Higher Educational Institutions of India, *Journal of Economic Issues*, 56:2, 408-415, https://doi.org/10.1080/00213624.2022.2057169



Differences between ICT and STEM students indicate higher proportions of ICT than STEM students who have heard :

- that women are made to take care of children and not to work: 4% (57% vs 54%).

On the other hand, higher proportions of STEM than ICT students have heard:

- remarks on physical appearance or clothing: 7% (69% vs 62%),
- mockery or malicious jokes: 10% (53% vs 43%),
- that these studies were not for women: 7% (48% vs 41%).

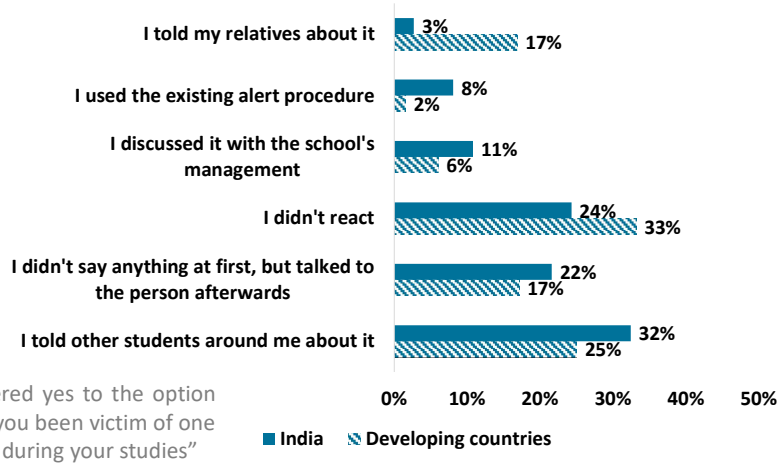
This non-negligible difference between STEM and ICT students who have heard that their studies are not for women seems coherent with the issues discussed on pages 11 and 12, highlighting the perception of all disciplines related to computer science as more women-friendly than more traditional engineering fields.

GENDERSCAN

Sexism

Higher proportions in India told their colleagues (+7%) and the school's management (+5%), lower proportions told their relatives (-14%) and did nothing (-9%)

What was your reaction? (to sexist behavior)
(comparison of answers from women students in India and in developing countries in %)



Basis: women who answered yes to the option 'sexist behavior' in "Have you been victim of one of the following situations during your studies"

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Higher proportions of students in India than in other developing countries who suffered sexism:

- told other students around them about the episode: 7% more (32% vs 25%),
- used the existing alert procedure: 6% more (8% vs 2%),
- talked to the person afterwards: 5% more (22% vs 17%),
- discussed the episode with the school's management: 5% more (11% vs 6%).

Lower proportions of students in India than in other developing countries who suffered sexism:

- told their relatives what happened: 14% less (3% vs 17%),
- did not react at all: 9% less (24% vs 33%).

The higher proportion of Indian students who responded they used the school's alert procedure could be explained by the **obligation of Indian academic institutions to set up an Internal Complaint Committee (ICC)** to tackle cases of sexual harassment and assault, following the Sexual Harassment of Women at the Workplace Act (2013) (Mukherjee & Dasgupta, 2022) that became mandatory to educational institutions in 2016 (Aina & Kulsrestha, 2018).

Even though higher than in developing countries, the proportion of students who used their institutions' procedure remains very low (less than 1 out of 10 victims), which correlates with the findings of Mukherjee & Dasgupta (2022) and Aina & Kulsrestha (2018), who found that institutions failed to offer in their ICC a safe space for victims to report what they had gone through.

Mukherjee & Dasgupta (2022), surveying students across all disciplines, found that 15,7% of survivors of sexual harassment filed a complaint with the ICC (a difference which is still in the margin of error of this study concerning the found proportion of 8%). Aina & Kulsrestha (2018), surveying law students in Delhi found that 24.7% of victims in private institutions and 17.6% of victims in State institutions "reported to their university authority", numbers which are not so different to those found in this study, if we sum the results of the options "I used the existing alert procedure" and "I discussed it with the school's management".

→ Aina, A. D., & Kulshrestha. P. (2018) Sexual Harassment in Educational Institutions in Delhi'NCR (India): Level of Awareness, Perception and Experience. *Sexuality & Culture* 22 (1): 106–126
→ Mukherjee, A & Dasgupta, S. (2022). "He Says, She Says": Sexism and Sexual Harassment in Higher Educational Institutions of India, *Journal of Economic Issues*, 56:2, 408-415, https://doi.org/10.1080/00213624.2022.2057169

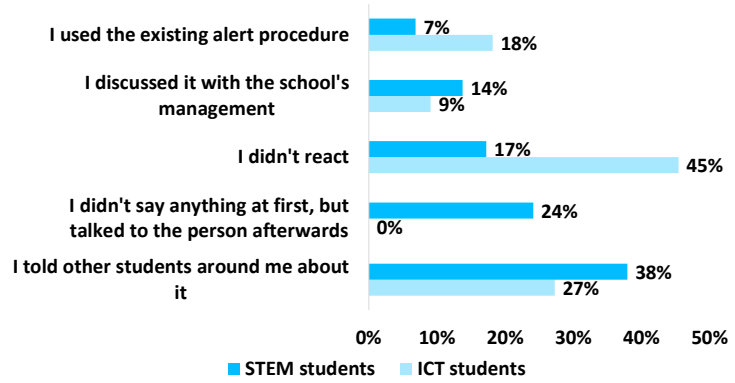
GENDERSCAN

Sexism

Higher % of women in ICT did not react, higher % in STEM went to the person directly
A significant percentage of victims count on university colleagues

What was your reaction? (to sexist behavior)

(comparison of answers from women students in STEM and in ICT in India in %)

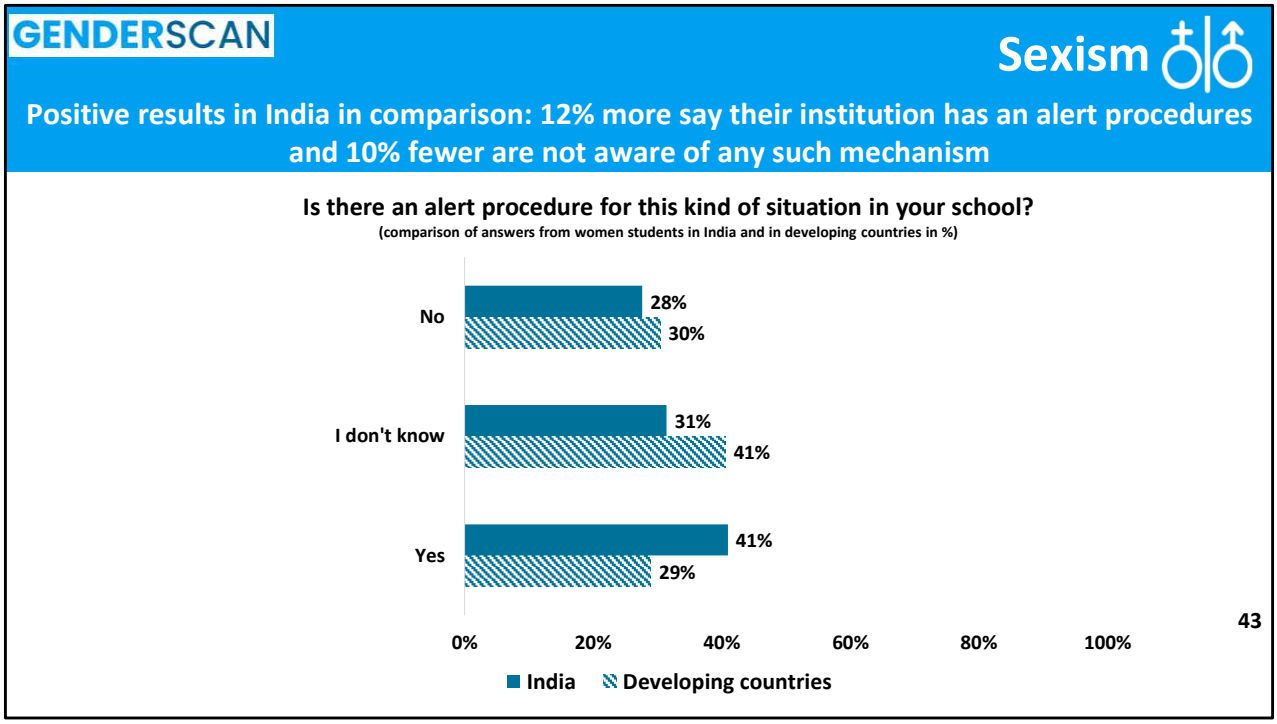


Basis: women who answered yes to the option 'sexist behavior' in "Have you been victim of one of the following situations during your studies"

Different results in developing countries. 10% more **women in STEM in India went to the school and went to the person,** 15% less in India did not react and 18% less told their relatives about the episode (0% India, 18% aggregate).

42

Very low basis of respondents = 29 Women in STEM, 11 Women in ICT.



As discussed on page 41, the higher proportion of Indian students who responded there is an alert procedure in their institution could be explained by the **obligation of Indian academic institutions to set up an Internal Complaint Committee (ICC)** to tackle cases of sexual harassment and assault, following the Sexual Harassment of Women at the Workplace Act (2013) (Mukherjee & Dasgupta, 2022) that became mandatory to educational institutions in 2016 (Aina & Kulsrestha, 2018).

Our findings correlate with those of Aina & Kulsrestha (2018), who surveyed law students in Delhi and found that 46.5% of students in private higher education institutions and 47% in State institutions were "aware of an Internal Compliant Committee or any policy to the effect in their institution" (p. 114), differences within the margin of error of this study.

→ Aina, A. D., & Kulshrestha. P. (2018). Sexual Harassment in Educational Institutions in Delhi'NCR (India): Level of Awareness, Perception and Experience. *Sexuality & Culture* 22 (1): 106–126

→ Mukherjee, A. & Dasgupta, S. (2022). "He Says, She Says": Sexism and Sexual Harassment in Higher Educational Institutions of India, *Journal of Economic Issues*, 56:2, 408-415, https://doi.org/10.1080/00213624.2022.2057169

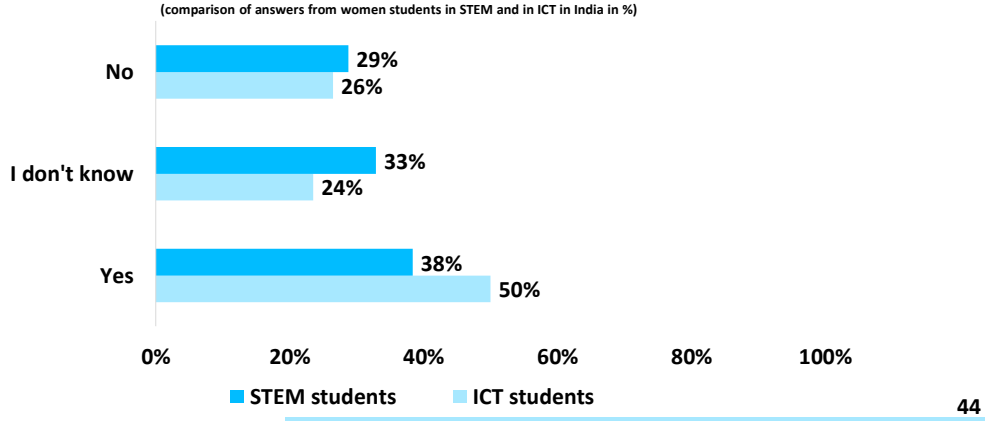
GENDERSCAN

Sexism

1/3 of students in STEM and ¼ in ICT do not know if their institution has an alert procedure
38% of those in STEM and half of those in ICT know it has

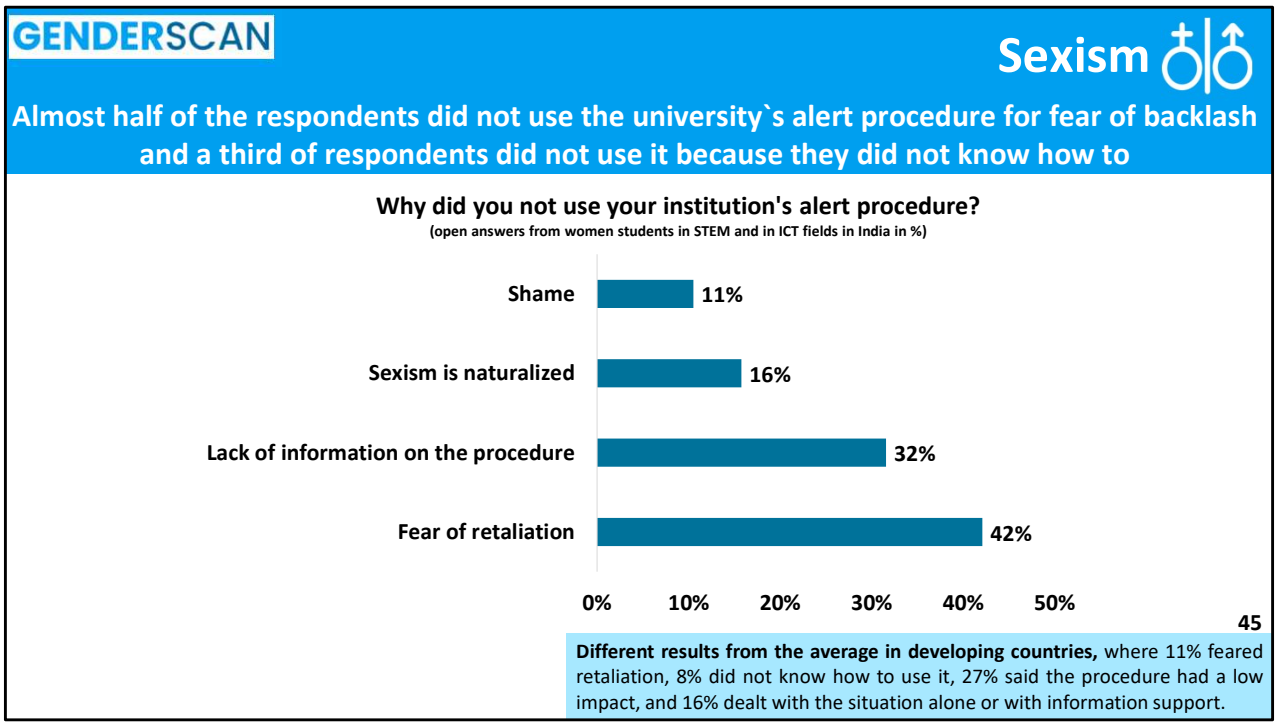
Is there an alert procedure for this kind of situation in your school?

(comparison of answers from women students in STEM and in ICT in India in %)



44

Similar results between women in STEM India and developing countries. But different in ICT, where **31% more in India say there is an alert procedure and 23% less say they do not know.**



Very low basis of respondents. N = 19, 14 Women in STEM, 5 Women in ICT

Our findings resonate with those of the scarce literature on the topic in India. Mukherjee & Dasgupta (2022, p. 411) found that 56.14% of survivors cited fear of character assassination as the reason for not alerting their institution and 36.84 cited **fear of backlash from institutions** (difference within the margin of error of this study concerning the proportion of 42% shown above). The research pieces set these fears against the backdrop of hierarchy and competition in universities, which generate fear that the institution might protect their male students and faculty members to protect their status/career and that a potential complaint undermines the chances of a victim of receiving institutional funding.

Aina & Kulsrestha (2018) and Aditi et al. (2016a, b) also mention that most of their respondents **were not aware of how to use their institution's procedure** that tackles sexual harassment.

→ Aina, A. D., & Kulshrestha. P. (2018) Sexual Harassment in Educational Institutions in Delhi'NCR (India): Level of Awareness, Perception and Experience. *Sexuality & Culture* 22 (1): 106–126
→ Mukherjee, A & Dasgupta, S. (2022) "He Says, She Says": Sexism and Sexual Harassment in Higher Educational Institutions of India, *Journal of Economic Issues*, 56:2, 408-415, https://doi.org/10.1080/00213624.2022.2057169
→ Aditi, G., Priyadarshini, S., & Binu, M. E. (2016a). Perception of sexual harassment among the undergraduate students. Manipal Journal of Nursing and Health Science, 2(1), 46–51.
→ Aditi, G., Priyadarshini, S., & Binu, M. E. (2016b). Knowledge of sexual harassment among the undergraduate students in Udupi district. Nitte University Journal of Health Science, 6(2), 4–9.

GENDERSCAN

Sexism

Why students did not use their university's alert procedure

Fear of retaliation (mentioned by 42% of respondents)
"I was rather afraid and thought it could damage my reputation later." *Woman, 26, student in computer science/ agriculture, agronomy, forestry, veterinary*

"It may impact my studies and create bad name to me." *Woman, 29, engineering student*

Lack of information on the procedure (mentioned by 32% of respondents)
"I was not sure if it was appropriate." *Woman, 24, engineering student*

"I do not know much about it." *Woman, 29, student in computer science*

Sexism is naturalized (mentioned by 16% of respondents)
*"*People do not realize they are being sexist.*"* *Woman, 19, student in computer science*

"It is useless, society accepts sexism." *Woman, 24, engineering student*

Shame (mentioned by 11% of respondents)
"Societal embarrassment." *Woman, 29, environmental engineering student*

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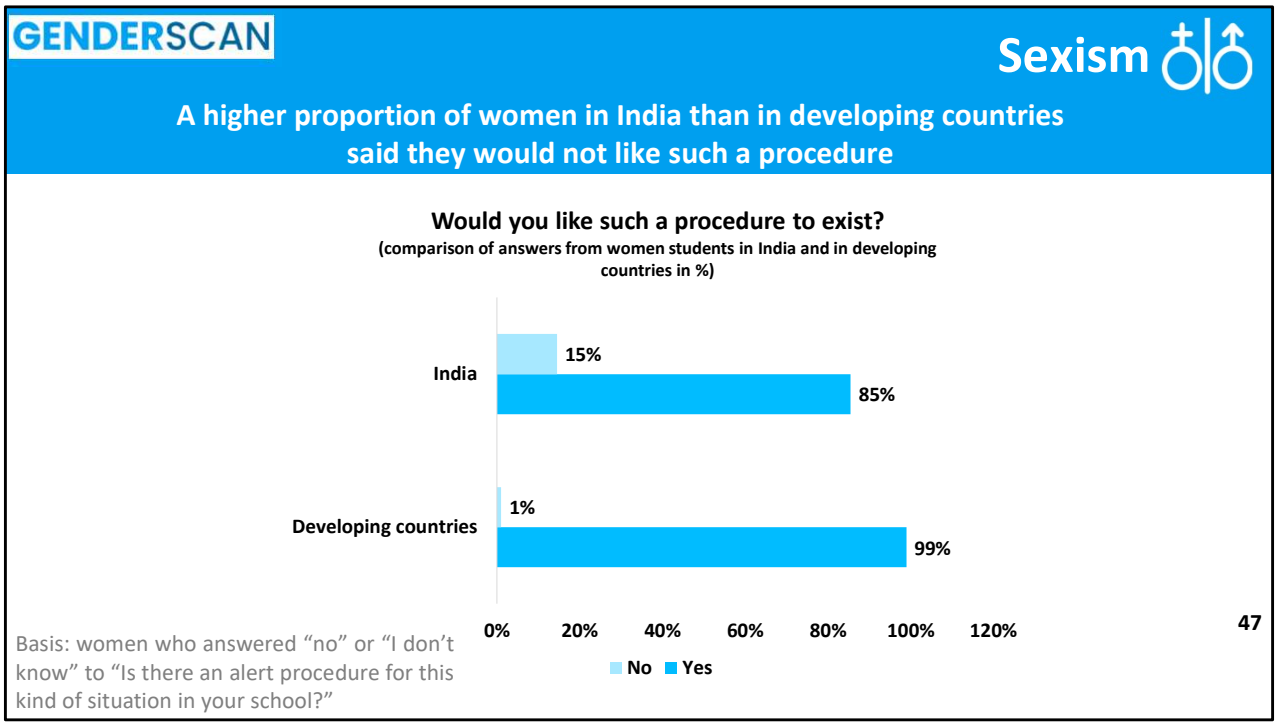


A significantly high proportion of respondents, both in India and in developing countries, would like their institution to have a committee to tackle sexism and sexual harassment.

The higher proportion of Indian women who said they would not like such a procedure to exist may relate to the mistrust in their capacity to effectively address the issues in question, with a minimum social/institutional cost for the victim, without generating backlashes for them, as discussed in pages 41 and 45.

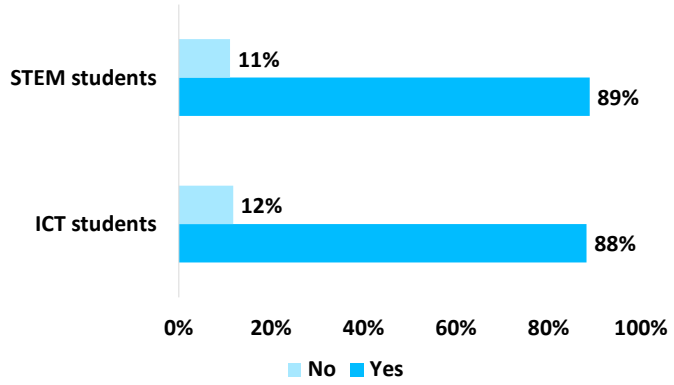
GENDERSCAN

Sexism

Very similar results between STEM and ICT students: 9 out of 10 would like their institution to have a procedure against sexism

Would you like such a procedure to exist?

(comparison of answers from women students in STEM and in ICT in India in %)



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Basis: women who answered “no” or “I don’t know” to “Is there an alert procedure for this kind of situation in your school?”

In the aggregate, **higher proportions in developing countries than in India would like such a procedure to exist** (99%) and lower proportions would not like it to exist (1% only).

N = 45 Women in STEM, 17 Women in ICT.

GENDERSCAN

Summary – key findings

Part 1: Before joining higher education

	Influencing factors	• Almost 50% of women in STEM & ICT are influenced by relatives and events. • Events/activities, speakers, access to tech at school, teachers and internships influence a higher % of female students in India than in developing countries.
	Discouraging factors	• Lower % of women in India (37%) than in developing countries (65%) have been discouraged from choosing STEM fields, key in India`s economy.
	Motivating factors	• Job opportunities, salary level and a positive impact on society stand out as motivation factors to pursue STEM in India compared to developing countries.
	Interest in STEM: when	• About 60% of STEM students got interested in S&T before high school. • Childhood gender bias is less present in India than in developing countries.

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GENDERSCAN

Summary – key findings

Part 2: In higher education

	General feeling	• 8 out of 10 students feel generally well in their studies in India. • Higher % of students in India than in developing countries feel appreciated for their work, supported/ listened to but also in competition.
	Satisfaction	• 6 out of 9 STEM female students in India are very satisfied, 88% satisfied in total. • Lower % of satisfied female students in India than in developing countries.
	Dissatisfaction	• Stress levels (72%), internships (66%) and not knowing what to do after graduation (60%) are the main struggles faced by female students in India. • 15% less women in India than in developing countries don`t feel good enough.
	Sexism	• 2 out of 10 respondents suffered sexual harassment, 3 out of 10 sexism. • Higher % of female students in India aware of university procedure to tackle offenses, but fear of backlash remains a barrier to using it and generates mistrust.

50