

# Less Than 10% Women In STEM In Pakistan: Gender Stereotypes Or Choice?

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Women all over the world have made tremendous progress in expanding their level of participation in the higher education and the workforce. However, there is a significant gender disparity that is persistent at all levels of science, technology, engineering and mathematics (STEM) fields all around the world. The same situation unfortunately persists in Pakistan too where women and girls are underrepresented in these disciplines. So why is it that there are fewer women in STEM fields despite a growing number which is seeking education and becoming part of the workforce? Research has proven how gender stereotypes create obstacles for attraction and progression of women in STEM fields.

According to the World Economic Forum, in order to reach global sustainability goals, it is essential to have science and gender equality. However, there already exists a dearth for technological skills, which will only become worse if women are not encouraged and given equal opportunities to take up professions in STEM. Gender inequality in these subjects is not just a violation of a basic human right, it is a lost opportunity not just for women but also for the society. There are several examples in history that prove how having a diverse workforce in science and technology helps to maximize creativity and competitiveness and how exclusion of female participation has proven harmful to innovation. An example of this is how limited involvement of female engineers during the production of first generation of airbags led to a fault in the design, costing lives of women and children. This is because the invention was predominantly led by male engineers who tailored the first generation of automotive airbags to adult male bodies. The casualties that took place due to the fault in the design could have been avoided only if women were given an opportunity to become

part of the innovation and design. Therefore, it is crucial to encourage gender inclusiveness in order to foster scientific and technological excellence.

It is also important to give women equal opportunities not only to pursue but also thrive in STEM disciplines to reduce the gender pay gap and ensure their economic security. In Pakistan, women make up less than 10 percent of the STEM professionals, the highest concentrations of women being in **natural and medical sciences**. While closing gender gaps and empowering women in the economy are central to the Sustainable Development of 2030 agenda, too many gaps persist, especially in the fields of science and technology.

In order to understand the factors behind this disparity, we must go beyond numbers and understand the qualitative reasons behind why women are underrepresented in such fields. Research has shown how there are certain stereotypes of women and girls regarding STEM-based education and jobs that creates a hindrance in their performance. Boys are often considered to be better at science and math, thus more likely to do better at technical jobs than women. According to a research, a girl's test performance is lowered when there are negative stereotypes of her performance in math. These negative stereotypes not only effect their performance in school, but it also leads to less girls aspiring to pursue a career in STEM fields. However, it has been seen that there is no difference in performance of girls and boys only if they are told that both genders are equally capable in math and science.

In Pakistan, however, where people's minds are plagued by gender biases, negative stereotypes cannot be avoided. The patriarchal values that are reinforced by families and teachers effect women's own perceptions of their abilities and aspirations. While there has been little research about underperformance of girls in these subjects in Pakistan, one research conducted in Khyber Pakhtunkhwa reveals how female students in elementary, secondary and higher school examinations actually **performed better** in every subject except math and science. The analysis states that girls would perform equally well if they are provided with a favorable and conducive environment. It was also stated in the research that one of the major reasons why girls do not perform as well as boys in STEM subjects is because of the poor quality of teaching in science subjects in girls' schools. When there is already a shortage of women in this field, it is difficult to find good, qualified female teachers to teach these subjects in girls' schools. Boys, however, do well in STEM subjects because they get qualified and skillful teachers at school level. Their foundations in such subjects are stronger, thus making them more competent to pursue higher education in STEM subjects, which eventually leads to them pursuing careers in relevant fields.

Another reason why less women pursue a career in science and technology is because of the continued attitude in some cultures that investing in a boy's education is more important than a girls. Women are expected to sacrifice their careers and stay home to look after the house and the kids. Especially in patriarchal cultures where a

man is seen as the breadwinner and woman as a homemaker, families are less interested in utilizing their money to educate their girls, especially when they expect them to eventually become stay-at-home moms. In Pakistan, the situation is no different. At the Oslo Summit on Education and Development in 2015, **Pakistan was described** as “among the world’s worst performing countries in education”. In a country where only 13% of the girls are still in school by the time they reach the ninth grade, it is not surprising that families do not focus on their education and career. Even for the ones who do manage to study, the same level of attention and priority is not given to their education and they are expected to take easy subjects.

An interview was taken of Nida Khan\*, a woman belonging to an upper-middle class family in Lahore. She did her Masters in Counselling for Mental Health and Wellness from abroad and she is currently a therapist in Lahore. Everyone in her family is a doctor, except her. Talking about her dream of pursuing medicine as a child, she said:

“Since I was a lot into volunteer work, I knew I wanted to pursue a career where I could help people. My parents were doctors and my brothers were also told that they will pursue medicine ever since we were kids, so I automatically assumed that path would be open to me too. I was also good at science subjects. Much to my surprise, I was told that it is not practical for me to pursue this profession since none of the women in the family were able to continue their career as doctors, either because they could not manage after they were married or they were not given permission by their husbands. Instead, I was encouraged to do home economics which would help me especially when I get married.”

Even as children, a girl's career is decided for her, not based on her interests or aptitude but based on what career is considered 'feminine'. Despite many efforts, Nida was not allowed to take science subjects in her O Levels. She was adamant that she wants to be in a helping field, therefore, after a lot of research she decided to do psychology. “Even while deciding the university, my father told me to go to LUMS not because it has a better psychology department but because I would get better proposals for marriage once I graduate”, Nida complained. However, going to LUMS for undergraduate studies proved worrisome since she later found out that it is a requirement by the Higher Education Commission to have a bachelor's degree in psychology and LUMS only offered a minor in that subject. After secretly applying to Fulbright Scholarship for Master's in Psychology, she had to convince her father to let her go abroad for education, which her brothers never had to do because they were always encouraged to apply for internships outside of Pakistan. “I always had to prove myself. I felt like my education and achievements did not matter. I only recently realized how much that has taken a toll on me because I was always trying to prove to my family that I am worthy of their attention as well.”

This is just one case out of numerous that can be found in our society where men's education and career are prioritized over a woman's. They are unfortunately

discouraged from studying science subjects because they are stereotyped as “masculine” and instead, they are encouraged to pursue “softer” subjects during their education such as arts and humanities. Discouragement from families and the society influences girls’ interest in pursuing higher education and careers in STEM fields. While Nida managed to pursue a career in a STEM field regardless of various hurdles, many are unable to do it due to lack of motivation and/or resources.

These gender biases about women only being in certain professions and mainly focussing on household chores are also reinforced through school textbooks. A chapter on gender biases in school texts in a report called ‘The Subtle Subversion—The State of Curricula and Textbooks in Pakistan’, talks about preconceived notions of gender in the content of Punjab textbooks. According to the report, which analyzed the contents of the books from the 7<sup>th</sup> to the 10<sup>th</sup> grade, mentions that the state-sponsored textbooks unfortunately reinforce gender stereotypes through the language and pictures used. Women are seen as the subordinate citizens where the public life solely belongs to the men and the domestic life to the women. The report consistently emphasizes on the fact that the texts within the books portray gender stereotypes. For example, in the Social Studies textbook, it is told to respect mothers solely because they do the household chores such as cooking, cleaning and taking care of the family. It completely disregards the fact that women contribute in the nation building activities and the economy. Even among chapters where important historic figures are mentioned, women in history are completely ignored and their important contributions to the country. When students are only exposed to a one-dimensional world in textbooks, they will certainly absorb and learn these gender stereotypes and reinforce the same biases moving forward. From an early class, if women portrayed not just as nurturing and caring homemakers but also as doctors and engineers, it could help in redressing the problem of gender bias.

A former consultant who worked on the teaching and learning team of the DFID funded program, Punjab Education Sector Program II, was asked about the problematic content of the Punjab textbooks. While she agreed that there were problems where the content was discriminatory towards women, their team reviewed the textbooks and made sure to address taboos and challenged gender roles in the stories, as these biases and opinions are formulated at a very young age and school books are one of the sources. While this is the step in the right direction, much more needs to be done to ensure myths and stereotypes are addressed in a country like Pakistan before we can hope that more girls would pursue education and careers in STEM fields.

\*Name has been changed due to privacy concerns.

