SOCIAL SCIENCE REVIEW ARCHIVES
ISSN Online: 3006-4708
ISSN Print: 3006-4694
https://policyjournalofms.com

Feminization in STEM Fields in Higher Education in Pakistan: A Case of Female Acceptability and Resistance

[1] Muhammad Shoaib, [2] Rabia Ahmed, [3] Feroz Usmani

[1]Associate Professor, Department of Sociology, University of Gujrat, Gujrat, Pakistan Email: shoaibsoc@uog.edu.pk (Corresponding Author)
[2] M. Phil Student, Department of Sociology, University of Gujrat, Gujrat, Pakistan Email: rahmed0723@gmail.com
[3] District Probation Officer, District Courts Sialkot, Pakistan Email: feroz.usmani@yahoo.com

DOI: https://doi.org/10.70670/sra.v3i3.899

Abstract
This study attempts to evaluate the female acceptability in the science, technology, engineering, and mathematics (STEM) fields in higher education in Pakistan. It has been found that females have been less likely to participate in STEM education in the past as compared to males. The situation has been changing gradually, and females have been found entering STEM in developed and developing countries. A quantitative study has been conducted using a cross-sectional survey as a technique of data collection. A sample size of 417 female students has been sampled from the sciences discipline through the proportionate random sampling technique, and 409 female students have participated. A structured questionnaire has been used as a level of measurement, and pre-testing has been done on 25 randomly selected female students to check the reliability, i.e., .714 and above. An attitudinal scale has been developed to measure the response of female students. The tables have been used to show the trend of the data. Statistical techniques include univariate analysis, normality test, Kendall's tau_b, and the Chi-Square test. The study findings point out that gender expression, gender sensitivity, supportiveness, and cooperativeness are correlated and associated with female acceptability in STEM higher education. However, the results also assert that personal acceptability, parental acceptability, and peer-based acceptability have an association and correlation with female acceptability in STEM. The study findings also reveal that careerist femininity, job orientation, and family-oriented femininity have a positive correlation and an association with female acceptability in STEM higher education.

Keyword: STEM Education, Gender Sensitivity, Careerist Femininity, Individualized Femininity, Gender Identity

Introduction
A lot of studies have been conducted in the Global North and Global South on the feminization of science, technology, engineering, and mathematics (STEM) education (David, 2012). Likewise, it has been found that every single girl who chooses a STEM field has her own experience and different motivational level (Olutayo & Adebayo, 2021). It has been observed that females face different challenges in entering higher education in developing countries (Shoaib & Zaman, 2025). However, the number of females is increasing rapidly not only in developed countries but also in developing countries (Shoaib, Waris, & Iqbal, 2025c; Lingyu, Wenqin, & Chao, 2021). A considerable number of studies have been carried out on the issue of a smaller number of female students in different countries (Shoaib, Waris, & Iqbal, 2025b). Likewise, the female students belonging to science subjects have a better understanding of career decision making and more future

security (Shoaib, Waris, & Iqbal, 2025b). There were several difficulties faced by female students in terms of choosing STEM education at international universities (Shoaib, Waris, & Iqbal, 2025a). Similarly, a very small amount of work has also been done in Pakistan (Shoaib, Waris, & Iqbal, 2025a). Females face social, cultural, and economic barriers in Pakistan to enter higher education (Shoaib, Tariq, Rasool, & Iqbal, 2025). Parental support is necessary for female students to perform well in STEM subjects (Shoaib, Tariq, & Iqbal, 2025b). Several difficulties are faced by female students in choosing subjects (Shoaib, Tariq, & Iqbal, 2025a). Females need peer groups and societal support to continue their higher education in several countries (Shoaib, Shamsher, & Iqbal, 2025). Hence, this study has been designed to evaluate feminization of STEM in higher education, specifically referring to acceptability and resistance (Shoaib, Shamsher, & Iqbal, 2025).

Main Objective: This study attempts to evaluate the female acceptability in the STEM field in higher education in Pakistan.

Review of Literature

The study findings outlined that now young females were more interested in choosing STEM fields and more career-oriented than males (Tandrayen-Ragoobur & Gokulsing, 2022). Similarly, the study findings examined that parental support impacts the decision-making abilities and confidence level of students (Shoaib, Abdullah, & Ali, 2020; García, Torío-López, García-Pérez, & Inda-Caro, 2019). Likewise, the argument of the study revealed that for increasing the females in the STEM field, parental socialization and parental education were important (Ahmad, Shoaib, & Shaukat, 2021; Šimunović & Babarović, 2020). Comparably, the study of Ikkatai et al. (2019) asserted that parental attitudes impact the girls' agreement with the STEM field in Japan. Correspondingly, the study findings showed that there are many situations in which parental income level decides the field of education of a student (Dokme, Acıksoz, & Koyunlu Unlu, 2022). Furthermore, the study of Huq (2021) indicated that in Bangladesh, females face different problems in education, during occupation, and also in politics; religious and cultural elements have an impact on their daily life. In addition, the study's findings concluded that students' belief that students who belong to the STEM field have more career opportunities and more future security (Ahmad, Ahmad, Shoaib, & Shaukat, 2021; Ananthram, Bawa, Bennett, & Gill, 2024).

The study findings outlined that females in the STEM field need more social support, and they face different mental health issues (Shoaib, Rasool, Kalsoom, & Ali, 2025). In the same vein, the study findings examined that girls have different experiences in the STEM field, and experiences depend on the environment and the policies of the institution (Shoaib, Kausar, Ali, & Abdullah, 2025). In addition, the argument of the study revealed that females' decision-making about whether to accept or reject (Shoaib, Iqbal, & Iftikhar, 2025). It depends on multiple factors and also depends on the society (Shoaib & Bashir, 2025). Furthermore, the study of Sáinz, Fàbregues, Romano, and Lopez (2022) asserted that in Western countries, there is an underrepresentation of females in science subjects. Correspondingly, the study findings showed that girls want to choose STEM fields, but due to their low socio-economic status, they do not choose them (Shoaib, Ali, & Kausar, 2025). Comparably, the study of Jones, Howe, and Rua (2000) indicated that female students show more interest in science subjects, and males think that science subjects are more difficult. Likewise, the study's findings concluded that girls who were engaged in the STEM field were facing different stigmas from society (Shoaib, Ali, Iqbal, & Abdullah, 2025).

The study findings outlined that females need family support to complete their education, and parents were role models for their children (Shoaib, 2025a). Similarly, the study findings examined that parents play an important role in building confidence and self-efficacy in girls and developing an interest in the STEM field (Shoaib, 2025b). Likewise, the argument of the study revealed that the education of parents and the gender of students depend on what subjects they choose (Ali, Shoaib, & Kausar, 2025). Comparably, the study of Shoaib,

Zaman, and Abbas (2024) asserted that most of the time, educated parents prefer girls' education to that of uneducated parents. Correspondingly, the study's findings showed that attitudes towards the girls' education have a strong and important relationship with traditional thinking (Shoaib, Shehzadi, & Abbas, 2024b). Furthermore, the study of Siani, Marley, Smith, and Donnelly (2020) indicated that females express less interest in science and business subjects. In addition, the study's findings concluded that students' STEM achievement has a relationship with parental pressure and personal interest (Shoaib, Shehzadi, & Abbas, 2024a).

The study findings outlined that for increasing the ratio of females in the STEM field, parental education matters a lot (Shoaib, Ali, & Abbas, 2024). In the same token, the study findings examined that it was important that parents not choose the subject for their children by gender (Shoaib, 2024e). In addition, the argument of the study revealed that parents with science-related occupations prefer that children go for STEM subjects compared to the parents with non-science-related occupations (Shoaib, 2024d). Furthermore, the study of Kirita and Mwantimwa (2021) asserted that knowledge and information help in career decision-making and help to choose better subjects. Correspondingly, the study findings showed that the decision about the subjects taken by the females depended on their peer group (Shoaib, 2024b). Comparably, the study of Mulyadi, Rahardjo, and Basuki (2016) indicated that parents play a vital role in building confidence and reducing academic stress among children. Likewise, the study's findings concluded that many females choose science subjects for their future security, so that they get better jobs in the future (Shoaib, 2024c).

The study findings outlined that social support and barriers faced by females in choosing the STEM field affect their future goals (Shoaib, Fatima, & Jamil, 2021; Lent et al., 2003). Similarly, the study findings examined that there were multiple critical barriers present for females while choosing a science field (Shoaib, Ali, & Akbar, 2021; Lawrence, Poole, & Diener, 2003). Likewise, the argument of the study revealed that people believe that boys are more skilled and technical in the engineering field (Shoaib, Ahmad, Ali, & Abdullah, 2021; McGuire et al., 2022). Comparably, the study of van der Vleuten, Steinmetz, and van de Werfhorst (2018) asserted that after secondary education, peer group has a strong impact on what to choose next. Correspondingly, the study findings showed that family, peer group, and media have a strong relationship with career decision making (Shoaib, Abdullah, & Ali, 2021; Yunusa, Jaafar, Ismail, & Othman, 2022). Furthermore, the study of Kaur (2020) indicated that sometimes females want to choose a STEM field, but due to peer pressure, they choose some other field. In addition, the study findings concluded that parental attitudes and their conflicts impact the career development of students (Shoaib, 2021; Dogan & Bacanli, 2012).

The study findings outlined that there were a large number of females in the education sector who got top positions, but in the job, only a few females (Shoaib, 2024a). In the same token, the study findings examined that many females are doing jobs and have a lack of support from their circle (Ali, Zaman, & Shoaib, 2024). In addition, the argument of the study revealed that, unfortunately, like the subject, people also divide jobs on the basis of gender (Shoaib, Usmani, & Abdullah, 2023). Furthermore, the study of Sullivan and Sullivan (1983) asserted that career counselling was important for females to learn how to tackle the barriers and develop their careers. Correspondingly, the study findings showed that girls want to choose technical careers, but society considered that computers and technology were a boys' club (Shoaib, Shehzadi, & Abbas, 2023). Comparably, the study of Mavriplis et al. (2010) indicated that girls take a break in their STEM careers due to the pressure of household responsibility, and after some time, they lose their confidence when they want to continue their career. Likewise, the study's findings concluded that males were also more dominant in job sectors and females felt a gender identity threat (Shoaib, 2023b).

The study findings outlined that in vocational choices, gender plays an important and complicated role (Shoaib, 2023a; Welsh, 2020). Similarly, the study findings examined that the distribution of power depended on the masculine and feminine (Shoaib, Tariq, Shahzadi,

& Ali, 2022; Paechter, 2006). Likewise, the argument of the study revealed that females were more emotional and sensitive than men (Shoaib & Ullah, 2021a; Chen, Yuan, Zheng, Chang, & Luo, 2018). Comparably, the study of Randell et al. (2021) asserted that females gender were more talented and responsible. Correspondingly, the study findings showed that female face stereotypes at different stages of life (Shoaib & Ullah, 2021b; Schein, 1975). Furthermore, the study of De las Cuevas, García-Arenas, and Rico (2022) indicated that gender was a factor that affected the choice of students about higher education. In addition, the study findings concluded that personality and self-efficacy were the reasons behind the choice of STEM as a major by females (Shoaib, Iqbal, & Tahira, 2021; McKinney, Chang, & Glassmeyer, 2021).

The Data and Methods

A quantitative study has been conducted using a cross-sectional survey as a technique of data collection. A sample size of 417 female students has been sampled from the sciences discipline through the proportionate random sampling technique. On the other hand, 409 female students have participated in the study. A structured questionnaire has been used as a level of measurement, and pre-testing has been done on 25 randomly selected female students to check the reliability, i.e., .714 and above. An attitudinal scale has been developed to measure the response of female students. Different software, including MS Excel and SPSS, has been used to analyze the data. The study findings are presented in detail along with the statistical analyses. The tables have been used to show the trend of the data. Statistical techniques include univariate analysis, normality test, Kendall's tau_b, and the Chi-Square test. This study has been based on the primary data collected from the female students enrolled in the Faculty of Science at a public sector university.

Results and Discussions

The analysis revealed that the age of 50.1 percent of students was 19 to 20. Similarly, the analysis asserted that the age of 34.4 percent of students was 21 to 22. Likewise, the primary data showed that the age of 4.2 percent of students was 23 to 24. The analysis revealed that 39.7 percent of fathers' education was matriculation. Similarly, the analysis asserted that 20.0 percent of fathers' education was intermediate. Likewise, the primary data described that 2.9 percent of fathers' education was primary. The analysis revealed that 36.4 percent of mothers' education was matriculation. Similarly, the analysis asserted that 21.8 percent of mothers' education was intermediate. Likewise, the primary data showed that 4.2 percent of mothers' education was primary. The analysis revealed that the family occupation of 41.8 percent of families was business. Similarly, the analysis asserted that the family occupation of 20.0 percent of families was agriculture. Likewise, the primary data described that the family occupation of 6.8 percent of families was labor. The analysis revealed that the income of 63.3 percent of families was 80000 or above. Similarly, the analysis asserted that the income of 16.6 percent of families was 40001 to 50000. Likewise, the primary data showed that the income of 5.8 percent of families was up to 40000. The analysis revealed that 41.6 percent of students have 2 to 3 siblings. Similarly, the analysis asserted that 40.1 percent of students have 4 to 5 siblings. Likewise, the primary data showed that 1.7 percent of students have 8 or more siblings. The analysis revealed that the family size of 61.8 percent of students was 4 to 6. Similarly, the analysis asserted that the family size of 29.6 percent of students was 7 to 9. Likewise, the primary data showed that the family size of 3.4 percent of students was 10 or above. The analysis revealed that the family type of 73.6 percent of students was nuclear. Similarly, the analysis asserted that the family type of 21.3 percent of students was joint. Likewise, the primary data showed that the family type of 5.1 percent of students was extended. The analysis revealed that the residential area of 51.3 percent of students was rural. Similarly, the analysis asserted that the residential area of 48.7 percent of students was urban.

Table 1

Socio-demographic Characteristics of Female Students

Category	f	%	Category	f	%
Age (Years)			Family Size		
Up to 18	46	11.3	Up to 3	21	5.2
19 – 20	205	50.1	4-6	253	61.8
21 – 22	141	34.4	7-9	121	29.6
23 – 24	17	4.2	10 and above	14	3.4
Total	409	100	Total	409	100
Fathers' Education			Mothers' Education		
Illiterate	20	4.9	Illiterate	28	6.8
Primary	12	2.9	Primary	17	4.2
Middle	20	4.8	Middle	30	7.3
Matric	162	39.7	Matric	149	36.4
Inter	82	20.0	Inter	89	21.8
Bachelor	55	13.4	Bachelor	63	15.4
Master and above	58	14.3	Master and above	33	8.1
Total	409	100	Total	409	100
Family Monthly Income (PKR)			Number of Siblings		
Up to 40000	24	5.8	Up to 1	15	3.7
40001-50000	67	16.6	2 – 3	170	41.6
50001-60000	28	6.8	4 – 5	164	40.1
60001-70000	30	7.5	6 – 7	53	12.9
80000 and above	260	63.3	8 and above	7	1.7
Total	409	100	Total	409	100
Family Occupation			Family Type		
Private jobs	28	6.8	Nuclear	301	73.6
Government jobs	37	9.2	Joint	87	21.3
Abroad	32	7.8	Extended	21	5.1
Business	171	41.8	Total	409	100.0
Agriculture	82	20.0	Residential Area		
Teaching	31	7.6	Rural	210	51.3
Labor	28	6.8	Urban	199	48.7
Total	409	100	Total	409	100.0

Table 2 describes the test of normality of the variables. The analysis indicated that not all the variables were normally distributed and non-parametric. It has also been confirmed by the calculated value of the Kolmogorov-Smirnov and Shapiro-Wilk test, i.e., less than 0.05 p-value. Hence, non-parametric analysis has been made for further data analysis.

Table 2

Test of Normality

Variables	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Gender Expression	.136	409	.000	.925	409	.000
Gender Sensitivity	.145	409	.000	.934	409	.000
Supportiveness and cooperativeness	.158	409	.000	.898	409	.000
Careerist Femininity	.126	409	.000	.913	409	.000
Individualized Femininity	.149	409	.000	.924	409	.000
Family Oriented Femininity	.149	409	.000	.924	409	.000
Personal Acceptability	.136	409	.000	.958	409	.000
Parental Acceptability	.092	409	.000	.982	409	.000
Peer-Based Acceptability	.111	409	.000	.957	409	.000
Job Oriented	.111	409	.000	.956	409	.000
Historical Resistance	.131	409	.000	.940	409	.000
Cultural Resistance	.079	409	.000	.978	409	.000
Structural Resistance	.084	409	.000	.973	409	.000
Gender Identity	.120	409	.000	.877	409	.000
Female Acceptability in STEM	.059	409	.002	.978	409	.000

a. Lilliefors Significance Correction

Table 3 outlines the result of Kendall's tau_b statistical test of the variables. The analysis asserted that there is a weak positive correlation (tau_b = .235) between gender expression and gender sensitivity. The analysis asserted that there is a weak positive correlation (tau_b = .291) between gender expression and supportiveness and cooperativeness. The analysis asserted that there is a weak positive correlation (tau_b = .257) between gender expression and careerist femininity. The analysis asserted that there is a weak positive correlation (tau_b = .285) between gender expression and individualized femininity. The analysis asserted that there is a weak positive correlation (tau_b = .275) between gender expression and family-oriented femininity. The analysis asserted that there is a weak positive correlation (tau_b = .182) between gender expression and female acceptability in STEM fields. The analysis asserted that there is a weak positive correlation (tau_b = .162) between gender sensitivity, supportiveness, and cooperativeness. The analysis asserted that there is a weak positive correlation (tau_b = .272) between gender sensitivity and careerist femininity.

The analysis asserted that there is a weak positive correlation (tau_b = .254) between gender sensitivity and individualized femininity. The analysis asserted that there is a weak positive correlation (tau_b = .244) between gender sensitivity and family-oriented femininity. The

analysis asserted that there is a weak positive correlation (tau_b = .231) between gender sensitivity and female acceptability in STEM fields. The analysis asserted that there is a moderate positive correlation (tau_b = .378) between supportiveness, cooperativeness, and careerist femininity. The analysis asserted that there is a moderate positive correlation (tau_b = .368) between supportiveness and cooperativeness, individualized femininity. The analysis asserted that there is a moderate positive correlation (tau_b = .366) between supportiveness, cooperativeness, and family-oriented femininity. The analysis asserted that there is a weak positive correlation (tau_b = .229) between supportiveness and cooperativeness and female acceptability in STEM fields. The analysis asserted that there is a moderate positive correlation (tau_b = .364) between careerist femininity and individualized femininity.

Table 3

Kendall's tau_b Statistical Test

Variable	GEEX	GESE	SUAC	CAFÉ	INFE	FAOF	ACCE
GEEX	1.000	.235**	.291**	.257**	.285**	.275**	.182**
GESE		1.000	.162**	.272**	.254**	.244**	.231**
SUAC			1.000	.378**	.368**	.365**	.229**
CAFÉ				1.000	.364**	.363**	.307**
INFE					1.000	1.000**	.277**
FAOF						1.000	.281**
ACCE							1.000

**. Correlation is significant at the 0.01 level (2-tailed).

The analysis asserted that there is a moderate positive correlation (tau_b = .363) between careerist femininity and family-oriented femininity. The analysis asserted that there is a weak positive correlation (tau_b = .307) between careerist femininity and female acceptability in STEM fields. The analysis asserted that there is a moderate positive correlation (tau_b = 1.000) between individualized femininity and family-oriented femininity. The analysis asserted that there is a weak positive correlation (tau_b = .277) between individualized femininity and female acceptability in STEM fields. The analysis asserted that there is a weak positive correlation (tau_b = .281) between family-oriented femininity and female acceptability in STEM fields. The analysis in Table 4 asserted that there is a weak positive correlation (tau_b = .217) between personal acceptability and parental acceptability. The analysis asserted that there is a weak positive correlation (tau_b = .299) between personal acceptability and peer-based acceptability. The analysis asserted that there is a weak positive correlation (tau_b = .276) between personal acceptability and job orientation. The analysis asserted that there is a moderate positive correlation (tau_b = .491) between personal acceptability and female acceptability in STEM. The analysis asserted that there is a moderate positive correlation (tau_b = .423) between parental acceptability and peer-based acceptability.

Table 4

Kendall's tau_b Statistical Test

Variable	PEAC	PAAC	PEBA	JOOR	ACCE
PEAC	1.000	.217**	.299**	.276**	.491**
PAAC		1.000	.423**	.269**	.602**

PEBA	1.000	.282**	.659**
JOOR		1.000	.494**
ACCE			1.000

**. Correlation is significant at the 0.01 level (2-tailed).

The analysis asserted that there is a weak positive correlation (tau_b = .269) between parental acceptability and job orientation. The analysis asserted that there is a moderate positive correlation (tau_b = .602) between parental acceptability and female acceptability in STEM fields. The analysis asserted that there is a weak positive correlation (tau_b = .282) between peer-based acceptability and job-oriented. The analysis asserted that there is a moderate positive correlation (tau_b = .659) between peer-based acceptability and female acceptability in STEM fields. The analysis asserted that there is a weak positive correlation (tau_b = .494) between job-oriented and female acceptability in STEM fields. Further, the analysis in Table 5 asserted that there is a moderate positive correlation (tau_b = .324) between gender identity and female acceptability in STEM fields.

Table 5

Kendall's tau_b Statistical Test between Gender Identity and Female Acceptability in STEM fields

Variables			Gender Identity	Female acceptability in STEM fields
Kendall's tau_b	Gender Identity	Correlation Coefficient	1.000	.324**
		Sig. (2-tailed)	.	.000
		N	409	409
	Female acceptability in STEM fields	Correlation Coefficient	.324**	1.000
		Sig. (2-tailed)	.000	.
		N	409	409

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6 pointed out the Chi-Square results of the variable. The primary data analysis indicated that there is an association (value = 2024.498) between gender expression and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 1709.242) between gender sensitivity and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 2114.819) between supportiveness and cooperativeness and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 2117.674) between careerist femininity and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 2042.265) between individualized femininity and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 2033.245) between family-oriented femininity and female acceptability in STEM fields.

Table 6
Chi-Square Statistics Test (Female acceptability in STEM fields=Dependent Variable)

Independent Variables	Chi-Square Value	df	Asymptotic Significance (2-sided)
Gender Expression	2024.498[a]	1276	.000
Gender Sensitivity	1709.242[a]	1160	.000
Supportiveness and cooperativeness	2114.819[a]	1102	.000
Careerist Femininity	2117.674[a]	1218	.000
Individualized Femininity	2042.265[a]	1218	.000
Family Oriented Femininity	2033.245[a]	1118	.000
Personal Acceptability	2702.077[a]	1218	.000
Parental Acceptability	3159.869[a]	1334	.000
Peer-Based Acceptability	3309.382[a]	1334	.000
Job Oriented	2578.782[a]	1218	.000
Historical Resistance	2428.621[a]	1276	.000
Cultural Resistance	2582.302[a]	1334	.000
Structural Resistance	2817.292[a]	1334	.000
Gender Identity	7074.773[a]	4292	.000

The primary data analysis indicated that there is an association (value = 2702.077) between personal acceptability and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 3159.869) between parental acceptability and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 3309.382) between peer-based acceptability and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 2578.782) between job-oriented and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 2428.621) between historical resistance and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 2582.302) between cultural resistance and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 2817.292) between structural resistance and female acceptability in STEM fields. The primary data analysis indicated that there is an association (value = 7074.773) between gender identity and female acceptability in STEM fields.

Conclusion

The study findings point out that gender expression, gender sensitivity, supportiveness, and cooperativeness are correlated and associated with female acceptability in STEM higher education. However, the results also assert that personal acceptability, parental acceptability, and peer-based acceptability have an association and correlation with female acceptability in STEM. The study findings also reveal that careerist femininity, job orientation, and family-oriented femininity have a positive correlation and an association with female acceptability in

STEM higher education. The study findings outline that females faced different challenges in entering higher education in developing countries. However, the number of females has increased rapidly not only in developed countries but also in developing countries, and Pakistan is no exception. However, females face social, cultural, structural, economic, familial, and other interlinked barriers in Pakistan to enter higher education in the past, and this notion has also been changing gradually in the country.

References

Ahmad, J., Ahmad, A., Shoaib, M., & Shaukat, B. (2021). Public Library Online Information Resources to Library Patrons during COVID-19 Pandemic: A Case of Higher Education Institutions. Library Philosophy and Practice, 1-14.

Ahmad, J., Shoaib, M., & Shaukat, B. (2021). Academic Library Resources and Services at Higher Education Institutions during COVID-19 Pandemic: A Case of Students' Satisfaction. Library Philosophy and Practice, 1-17.

Ali, R., Zaman, M. A., & Shoaib, M. (2024). Trends of Research Visualization of Gender Inequality, Equality, and Equity: A Bibliometric Analysis from 1981 to 2020. Pakistan Journal of Law, Analysis and Wisdom, 3(8), 237–252.

Ali, S. R., Shoaib, M., & Kausar, N. (2025). Gender Disparity in Enrolment, Classroom, Learning Environment, and Learning Achievements of the Students in Higher Education in Pakistan. Journal of Media Horizons, 6(3), 330-342.

Almukhambetova, A., & Kuzhabekova, A. (2021). Negotiating conflicting discourses. Female students' experiences in STEM majors in an international university in Central Asia. International Journal of Science Education, 43(4), 570-593. doi:10.1080/09500693.2021.1875150

Ananthram, S., Bawa, S., Bennett, D., & Gill, C. (2024). Perceived employability and career readiness among STEM students: does gender matter? Higher Education Research & Development, 43(2), 267-283. doi:10.1080/07294360.2023.2240710

Anaya, L., Stafford, F., & Zamarro, G. (2022). Gender gaps in math performance, perceived mathematical ability and college STEM education: the role of parental occupation. Education Economics, 30(2), 113-128. doi:10.1080/09645292.2021.1974344

Bennett, D., Knight, E., Bawa, S., & Dockery, A. M. (2021). Understanding the career decision making of university students enrolled in STEM disciplines. Australian Journal of Career Development, 30(2), 95-105.

Burušić, J., Šimunović, M., & Šakić, M. (2021). Technology-based activities at home and STEM school achievement: the moderating effects of student gender and parental education. Research in Science & Technological Education, 39(1), 1-22. doi:10.1080/02635143.2019.1646717

Charles, Q. W., Sospeter, N. G., Kikwasi, G., & Chileshe, N. (2024). Attraction and Retention Factors for Female Students into Construction-Related Programs in Developing Countries: The Case of Tanzania. International Journal of Construction Education and Research, 20(3), 263-283. doi:10.1080/15578771.2023.2294195

Chen, X., Yuan, H., Zheng, T., Chang, Y., & Luo, Y. (2018). Females are more sensitive to opponent's emotional feedback: evidence from event-related potentials. Frontiers in Human Neuroscience, 12, 275.

Daniels, D. (2020). Female Preparedness in STEM Education: A Case Study. University of Phoenix,

David, M. E. (2012). Feminism, gender and global higher education: women's learning lives. Higher Education Research & Development, 31(5), 679-687. doi:10.1080/07294360.2012.691465

De las Cuevas, P., García-Arenas, M., & Rico, N. (2022). Why not STEM? A study case on the influence of gender factors on students' higher education choice. Mathematics, 10(2), 239.

Dogan, H., & Bacanli, F. (2012). The effect of a career decision-making group guidance program on career decision-making difficulties. Energy Education Science and Technology Part B: Social and Educational Studies, Issues, 912-916.

Dökme, İ., Açıksöz, A., & Koyunlu Ünlü, Z. (2022). Investigation of STEM fields motivation among female students in science education colleges. International Journal of STEM Education, 9(1), 8.

Friedman, M. (1990). The Social Construction of Gender: Historically Changing Meanings of (White) Feminity and Masculinity 1910–1980. Critical Arts, 5(2), 67-111. doi:10.1080/02560049008537638

García, C. M. F., Torío-López, S., García-Pérez, O., & Inda-Caro, M. (2019). Parental support, self-efficacy beliefs, outcome expectations and interests in science, technology, engineering and mathematics (STEM). Universitas Psychologica, 18(2), 1-15.

Grenby, M., Kasinger, M., Patching, R., & Pearson, M. (2009). Girls, girls, girls: a study of the popularity of journalism as a career among female teenagers and its corresponding lack of appeal to young males: Centre for Public Culture and Ideas, Griffith University Brisbane.

Hoferichter, F., & Raufelder, D. (2019). Mothers and fathers—Who matters for STEM performance? Gender-specific associations between STEM performance, parental pressure, and support during adolescence. Paper presented at the Frontiers in Education.

Hu, B., & Wu, W. (2020). Parental support in education and social integration of migrant children in urban public schools in China. Cities, 106, 102870.

Huq, S. (2021). Seeking certainty, security and spirituality: religious conditioning and everyday aspirations amongst female university students in Bangladesh. Contemporary South Asia, 29(2), 257-270. doi:10.1080/09584935.2021.1915247

Ikkatai, Y., Inoue, A., Kano, K., Minamizaki, A., McKay, E., & Yokoyama, H. M. (2019). Parental egalitarian attitudes towards gender roles affect agreement on girls taking STEM fields at university in Japan. International Journal of Science Education, 41(16), 2254-2270.

Jones, M. G., Howe, A., & Rua, M. J. (2000). Gender differences in students' experiences, interests, and attitudes toward science and scientists. Science education, 84(2), 180-192.

Kalkbrenner, M. T., & Carlisle, K. L. (2024). Structural Pathways Between Social Support and Mental Health Among STEM Students: Implications for College Student Psychotherapy. Journal of College Student Mental Health, 38(2), 341-356. doi:10.1080/87568225.2023.2183164

Kaur, A. (2020). Peer pressure as predictor of career decision making among adolescents. IJRAR-International Journal of Research and Analytical Reviews (IJRAR), 7(1), 72-77.

Kirita, F. F., & Mwantimwa, K. (2021). Use of social media in marketing library resources and services. University of Dar es Salaam Library Journal, 16(2), 19-33.

Kurysheva, A., van Rijen, H. V., Stolte, C., & Dilaver, G. (2023). Validity, acceptability, and procedural issues of selection methods for graduate study admissions in the fields of science, technology, engineering, and mathematics: a mapping review. International Journal of STEM Education, 10(1), 55.

Lawrence, J., Poole, P., & Diener, S. (2003). Critical factors in career decision making for women medical graduates. Medical education, 37(4), 319-327.

Lent, R. W., Brown, S. D., Schmidt, J., Brenner, B., Lyons, H., & Treistman, D. (2003). Relation of contextual supports and barriers to choice behavior in engineering majors: Test of alternative social cognitive models. Journal of counseling psychology, 50(4), 458.

Lingyu, L., Wenqin, S., & Chao, L. (2021). The rise of women in STEM higher education in China: achievements and challenges. Gender Equity in STEM in Higher Education, 27-44.

Madjar, N., Huey, B. D., & LM, S. (2016). Parental Support and Acceptance Determines Women's Choice of Engineering as a Major. Paper presented at the Proceedings of 2016 ASEE Annual Conference & Exposition.

Marra, R. M., Rodgers, K. A., Shen, D., & Bogue, B. (2009). Women engineering students and self-efficacy: A multi-year, multi-institution study of women engineering student self-efficacy. Journal of engineering education, 98(1), 27-38.

Mavriplis, C., Heller, R., Beil, C., Dam, K., Yassinskaya, N., Shaw, M., & Sorensen, C. (2010). Mind the gap: Women in STEM career breaks. Journal of technology management & innovation, 5(1), 140-151.

McGuire, L., Hoffman, A. J., Mulvey, K. L., Hartstone-Rose, A., Winterbottom, M., Joy, A., . . . Butler, L. (2022). Gender stereotypes and peer selection in STEM domains among children and adolescents. Sex Roles, 87(9), 455-470.

McKinney, J., Chang, M.-L., & Glassmeyer, D. (2021). Why females choose STEM majors: Understanding the relationships between major, personality, interests, self-efficacy, and anxiety. Journal for STEM Education Research, 4(3), 278-300.

Morgan, H., Heritage, B., Lin, A., Perry, Y., Cook, A., Winter, S., . . . Strauss, P. (2022). Factors Influencing Parental Acceptance of Trans Children and Young People: Findings from Trans Pathways. LGBTQ+ Family: An Interdisciplinary Journal, 18(5), 475-494. doi:10.1080/27703371.2022.2125470

Mulyadi, S., Rahardjo, W., & Basuki, A. H. (2016). The role of parent-child relationship, self-esteem, academic self-efficacy to academic stress. Procedia-social and behavioral sciences, 217, 603-608.

Mutha, S., Takayama, J. I., & O'Neil, E. H. (1997). Insights into medical students' career choices based on third-and fourth-year students' focus-group discussions. Academic Medicine, 72(7), 635-640.

Nguyen, A. W., Walton, Q. L., Thomas, C., Mouzon, D. M., & Taylor, H. O. (2019). Social support from friends and depression among African Americans: The moderating influence of education. Journal of Affective Disorders, 253, 1-7.

Olutayo, M. O., & Adebayo, A. V. (2021). Navigating the Gendered STEM Path: Understanding Women's Experiences in Higher Education Institutions. Journal of Management & Social Sciences, 10(1).

Padilla-Carmona, M. T., & Martínez-García, I. (2013). Influences, values and career aspirations of future professionals in education: a gender perspective. Educational Review, 65(3), 357-371. doi:10.1080/00131911.2012.674010

Paechter, C. (2006). Masculine femininities/feminine masculinities: Power, identities and gender. Gender and Education, 18(3), 253-263.

Randell, R. K., Clifford, T., Drust, B., Moss, S. L., Unnithan, V. B., De Ste Croix, M. B., . . . Carter, J. M. (2021). Physiological characteristics of female soccer players and health and performance considerations: a narrative review. Sports Medicine, 51, 1377-1399.

Robillard, C. (2010). Honourable señoras, liminal campesinas and the shameful other: re-defining feminities in Bolivia. Culture, Health & Sexuality, 12(5), 529-542. doi:10.1080/13691051003668308

Sáinz, M., Fàbregues, S., Romano, M. J., & López, B.-S. (2022). Interventions to increase young people's interest in STEM. A scoping review. Frontiers in psychology, 13, 954996.

Schein, V. E. (1975). Relationships between sex role stereotypes and requisite management characteristics among female managers. Journal of applied psychology, 60(3), 340.

Shafi, B. (2015). Traditional Thinking and Attitude of Parents towards Female Education. Dialogue (Pakistan), 10(1).

Shaikh, M. A., Sahito, Z. H., & Dehraj, M. A. (2019). STEM education: social, cultural, and economic barriers faced by women of Khairpur (Pakistan). Global Regional Review, 4(2), 392-403.
Shoaib, M. (2021). Sociological Analysis of Teachers Perspectives on Students Academic Performance in Higher Education in the Punjab. (PhD Thesis). International Islamic University Islamabad, Central Library.
Shoaib, M. (2023a, September 22). Galvanising Bourdieu's typology with Pakistani education and social class. The Nation, p. 4.
Shoaib, M. (2023b, December 05). Gender Differences in Academic Performance. The Nation.
Shoaib, M. (2024a, January 09). Gender Disparity in Education. The Nation.
Shoaib, M. (2024b). Gender Diversity and Inclusion in Higher Education in Pakistan. Pakistan Journal of Law, Analysis and Wisdom, 3(1), 207-222.
Shoaib, M. (2024c, April 30). Gendered Space in Higher Education. Daily Parliament Times, p. 3.
Shoaib, M. (2024d). Gendering Bourdieu's Cultural Capital in Higher Education in Pakistan. Pakistan Journal of Law, Analysis and Wisdom, 3(2), 265-278.
Shoaib, M. (2024e). Tailoring Theoretical Lens and Nudging Bourdieu's Cultural Capital on Gender and Academic Performance. Journal of Social Sciences Review, 4(4), 87–101.
Shoaib, M. (2025a). Academic Achievement and Gender Inequality in Higher Education: A Systematic Review of Muslim Majority Nations. Sociology & Cultural Research Review 3(02), 373–380.
Shoaib, M. (2025b). A Systematic Review of Gender Disparities in Academic Achievement in Higher Education Across Muslim Countries. Advance Social Science Archive Journal, 3(02), 1622–1639.
Shoaib, M., & Bashir, Z. (2025). Virtual Classrooms and Academic Performance of the Students in Higher Education during the COVID-19 Outbreak. Paper presented at the 5th International Conference of PNQAHE and AGM on Stakeholder Engagement in Quality Assurance – Shaping Higher Education with Inputs from All Relevant Voices, Forman Christian College University, Lahore.
Shoaib, M., & Ullah, H. (2021a). Classroom Environment, Teacher, and Girl Students' Learning Skills. Education and Urban Society, 53(9), 1039-1063. doi:10.1177/00131245211001908
Shoaib, M., & Ullah, H. (2021b). Teachers' perspectives on factors of female students' outperformance and male students' underperformance in higher education. International Journal of Educational Management, 35(3), 684-699. doi:10.1108/IJEM-05-2020-0261
Shoaib, M., & Zaman, M. A. (2025). Evaluating Academic Performance in Higher Education during COVID-19 A Study of Virtual Learning Environments. Pakistan Journal of Law, Analysis and Wisdom, 4(4), 64-78.
Shoaib, M., Abdullah, F., & Ali, N. (2020). Library Resources and Research Environment in Higher Education Institutions: Students' Satisfaction. Library Philosophy and Practice, 1-18.
Shoaib, M., Abdullah, F., & Ali, N. (2021). A Research Visualization of Academic Learning Skills among Students in Higher Education Institutions: A Bibliometric Evidence from 1981 to 2020. Library Philosophy and Practice, 5579, 1-34.
Shoaib, M., Ahmad, A., Ali, N., & Abdullah, F. (2021). Trend of Research Visualization of Learning, Classroom, and Class Participation in Higher Education Institutions: A Bibliometric Analysis from 2001 to 2020. Library Philosophy and Practice, 5743, 1-26.
Shoaib, M., Ali, R., & Akbar, A. (2021). Library Services and Facilities in Higher Education Institutions in Pakistan: Satisfaction of Patrons. Library Philosophy and Practice, 1-19.

Shoaib, M., Ali, S. R., & Abbas, Z. (2024). Self-Fulfilling Prophecy of Learning Skills Among Students in Higher Education. Pakistan Journal of Law, Analysis and Wisdom, 3(7), 164-177.

Shoaib, M., Ali, S. R., & Kausar, N. (2025). Gender Disparity on Teaching Materials, Communication, Institutional Support, and Learning Achievements of the Students in Higher Education in Pakistan. International Journal of Social Sciences Bulletin, 3(7), 169-183.

Shoaib, M., Ali, S. R., Iqbal, T., & Abdullah, F. (2025). Gender Disparity in Learning Achievements of the Students in Higher Education in Pakistan. International Journal of Social Sciences Bulletin, 3(6), 840-853.

Shoaib, M., Fatima, U., & Jamil, R. (2021). Academic Library and Students' Learning at University Level: Nothing is Pleasanter than Exploring a Library. Library Philosophy and Practice, 1-19.

Shoaib, M., Iqbal, A., & Iftikhar, I. (2025). Engagement of Students in Learning in Higher Education: The Role of Academic Library Spaces. The Regional Tribune, 4(3), 311-328.

Shoaib, M., Iqbal, S., & Tahira, G. (2021). Digitalization of Academic Libraries in Higher Education Institutions during COVID-19 Pandemic. Library Philosophy and Practice, 1-15.

Shoaib, M., Kausar, N., Ali, S. R., & Abdullah, F. (2025). Gender Disparity in Learning Achievements in Higher Education: Insights from a Literature Review. Policy Research Journal, 3(6), 634–648.

Shoaib, M., Rasool, S., Kalsoom, A., & Ali, S. R. (2025). Exploring Gender-Based Dissimilarities in Educational Outcomes at the Tertiary Level: A Review of Existing Literature. Policy Research Journal, 3(7), 287–302.

Shoaib, M., Shamsher, A., & Iqbal, S. (2025). A Systematic Review of Academic Library Spaces as Facilitators of Student Engagement in Higher Education Learning. The Knowledge, 4(1), 123-134.

Shoaib, M., Shamsher, A., & Iqbal, S. (2025). Understanding Student Engagement in Higher Education: The Contribution of Academic Library Spaces. ProScholar Insights, 4(1), 245-257.

Shoaib, M., Shehzadi, K., & Abbas, Z. (2023). Contemporary Research on Learning Spaces and Teacher Effectiveness in Higher Education. Pakistan Journal of Law, Analysis and Wisdom, 2(03), 352–369.

Shoaib, M., Shehzadi, K., & Abbas, Z. (2024a). Inclusivity and Teachers' Aptitude in Higher Education in Pakistan. Pakistan Journal of Law, Analysis and Wisdom, 3(6), 219-237.

Shoaib, M., Shehzadi, K., & Abbas, Z. (2024b). Inclusivity, Teacher Competency, and Learning Environment at Higher Education: Empirical Evidences. Pakistan Journal of Law, Analysis and Wisdom, 3(5), 244-261.

Shoaib, M., Tariq, I., & Iqbal, S. (2025a). Extracurricular Activities in Higher Education: Diversity and Inclusion. Regional Lens, 4(1), 174-187.

Shoaib, M., Tariq, I., & Iqbal, S. (2025b). Intersectionality and Student Inclusion in Higher Education: A Study of Class, Residence, Culture, and Extracurricular Participation. Journal of Social Horizons, 2(1), 1-14.

Shoaib, M., Tariq, I., Rasool, S., & Iqbal, S. (2025). The Role of Extracurricular Activities in Fostering Diversity and Inclusion in Higher Education: A Systematic Review. Advance Social Science Archive Journal, 3(2), 1377–1392.

Shoaib, M., Tariq, M., Shahzadi, S., & Ali, M. (2022). Role of Academic Libraries in Online Academic Activities during COVID-19 Outbreak at Tertiary Level: A Library is a Thought in Cold Storage. Library Philosophy and Practice, 1-19.

Shoaib, M., Usmani, F., & Abdullah, F. (2023). Plotting The Literature On Social Work Education From 1971-2020: A Scientometric Analysis. Pakistan Journal of Social Research, 5(2), 1347-1360.

Shoaib, M., Waris, T., & Iqbal, S. (2025a). A Review-Based Examination of Gender Dynamics in Virtual Learning Environments in Higher Education. Sociology & Cultural Research Review, 3(02), 448–454.
Shoaib, M., Waris, T., & Iqbal, S. (2025a). Assessing Gendered Participation Spaces in Online Learning Environments in Higher Education in Pakistan. The Knowledge, 4(2), 63-74.
Shoaib, M., Waris, T., & Iqbal, S. (2025b). Gender Dynamics in Online Higher Education: Insights from Empirical Evidence. The Regional Tribune, 4(2), 89-102.
Shoaib, M., Waris, T., & Iqbal, S. (2025b). Virtual Learning Environments and Gendered Spaces in Higher Education in Pakistan: A Quantitative Approach. Regional Lens, 4(2), 65-78.
Shoaib, M., Waris, T., & Iqbal, S. (2025c). A Quantitative Study of Gendered Interactions and Spatial Perceptions in Online Higher Education in Pakistan. ProScholar Insights, 4(2), 96-108.
Shoaib, M., Zaman, M. A., & Abbas, Z. (2024). Trends of Research Visualization of Gender Based Violence (GBV) from 1971-2020: A Bibliometric Analysis. Pakistan Journal of Law, Analysis and Wisdom, 3(7), 203-216.

Siani, A., Marley, S. A., Smith, C., & Donnelly, J. (2020). Gender and parental education as indicators of students' engagement with STEM subjects. International Journal of Gender, Science and Technology, 12(2), 246-261.
Šimunović, M., & Babarović, T. (2020). The role of parents' beliefs in students' motivation, achievement, and choices in the STEM domain: a review and directions for future research. Social Psychology of Education, 23(3), 701-719.
Siregar, N. C., Rosli, R., & Nite, S. (2023). Students' interest in Science, Technology, Engineering, and Mathematics (STEM) based on parental education and gender factors. International Electronic Journal of Mathematics Education, 18(2), em0736.
Sullivan, M., & Sullivan, M. (1983). Women and career development: Group activities to overcome internal barriers. The Journal for Specialists in Group Work, 8(1), 47-55. doi:10.1080/01933928308411731
Tandrayen-Ragoobur, V., & Gokulsing, D. (2022). Gender gap in STEM education and career choices: what matters? Journal of Applied Research in Higher Education, 14(3), 1021-1040.
van der Vleuten, M., Steinmetz, S., & van de Werfhorst, H. (2018). Gender norms and STEM: the importance of friends for stopping leakage from the STEM pipeline. Educational Research and Evaluation, 24(6-7), 417-436. doi:10.1080/13803611.2019.1589525
Van Veelen, R., Derks, B., & Endedijk, M. D. (2019). Double trouble: How being outnumbered and negatively stereotyped threatens career outcomes of women in STEM. Frontiers in psychology, 10, 150.
Welsh, S. (2020). 'This is the plan': mature women's vocational education choices and decisions about Honours degrees. Research in Post-Compulsory Education, 25(3), 259-278.
Yenilmez, M. İ. (2016). Women in Academia in Turkey: Challenges and Opportunities. Journal of Administrative Sciences/Yonetim Bilimleri Dergisi, 14(28).
Yunusa, S., Jaafar, W., Ismail, A., & Othman, W. (2022). A Study on the relationship between family peer group media and career decision making among undergraduates in Nigeria. International. Journal of Academic Research in Progresive Education and Development, 11(1), 319-330.
Zhou, D., & Santos, A. (2007). Career decision-making difficulties of British and Chinese international university students. British Journal of Guidance & Counselling, 35(2), 219-235.