

Gender inequality in STEM: a global assessment of key influencing factors across nations

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Abstract: This study investigates five major factors that contribute to gaps in STEM participation: stereotypes and cultural norms, educational access and quality, workplace discrimination and bias, representation and role models, and policy and institutional support. Societal norms affect conceptions of STEM as male-dominated disciplines, restricting female participation from a young age. Educational disadvantages, such as unequal access to STEM resources and gendered teaching styles, impede women's participation. In professional environments, workplace biases impede recruiting, promotion, and financing, restricting career advancement. The underrepresentation of female role models exacerbates these issues, lowering expectations among young women. Furthermore, disparities in national policies and institutional support structures have a substantial impact on gender equity, affecting recruitment, retention, and total STEM participation. Through a cross-national analysis, this research highlights systemic challenges and explores policy interventions that can foster greater inclusivity in STEM fields worldwide.

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Keywords: Stereotypes and cultural norms, Educational access and quality, Workplace discrimination and bias, Representation and role models, Policy and institutional support, Data mining

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INTRODUCTION

Despite tremendous improvements, gender discrepancies exist in STEM areas around the world. Women are still underrepresented in STEM areas due to a variety of social, educational, institutional, and policy-related reasons (UNESCO, 2021).

Stereotypes and cultural norms influence social conceptions of STEM as a largely male subject, deterring girls from pursuing STEM education and careers (Cheryan et al., 2017). Gender biases in educational resources, instructional methods, and career counseling reinforce these norms, reducing female students' confidence and aspirations in STEM professions (UNESCO, 2020). Furthermore, discrepancies in educational access and quality, particularly in low- and middle-income countries, worsen the gender gap in STEM participation (Singh, 2025).

Workplace prejudice and bias continue to impede women's success in STEM fields. Gender bias in recruiting, income disparities, and a lack of leadership chances all impede equal career

advancement (EIGE, 2021). Furthermore, the absence of female representation and role models in STEM inhibits young women from entering the profession, continuing the underrepresentation cycle (Afortor, 2024). Policies and institutional support are crucial in resolving these difficulties, but inconsistent or insufficient frameworks across nations fail to build a truly inclusive STEM environment (OECD, 2023).

Statement of the problem

This study aims to critically examine the persistent issue of gender inequality in Science, Technology, Engineering, and Mathematics (STEM) fields through a global lens by identifying and analyzing five major contributing factors: stereotypes and cultural norms, educational access and quality, workplace discrimination and bias, representation and role models, and policy and institutional support. By employing qualitative data mining methods and thematic analysis, the research seeks to uncover patterns and insights from diverse national contexts, highlighting how sociocultural, educational, institutional, and political structures shape women's participation and progression in STEM. The objective is to not only understand the systemic barriers that hinder gender equity but also to explore actionable policy interventions and strategic frameworks that can foster a more inclusive and diverse STEM environment worldwide.

METHODOLOGY

Research design

This study utilized a qualitative analysis approach through data mining methods to examine gender inequality in STEM across different countries. The qualitative design allowed the researcher to identify patterns and extract meaningful insights from large datasets, focusing on the significance and impacts of sociocultural, educational, institutional, and policy-related factors. The design emphasized thematic analysis and content analysis to understand how these variables influence women's participation and progression in STEM fields globally. By examining these five factors through a global lens, this research highlights systemic challenges and explores evidence-based strategies to foster greater gender inclusivity in STEM disciplines.

Respondents and locale of the study

The study has a global scope, evaluating data from multiple nations to identify the primary factors impacting gender imbalance in STEM subjects. Respondents included women in STEM disciplines, educators, legislators, and institutional leaders who influence STEM education and employment possibilities. Data were gathered from institutional databases, workplace surveys, government papers, and interviews with important stakeholders to ensure a broad representation of sociocultural and professional contexts.

Research instrument

This study's core instruments comprised institutional databases, workplace surveys, policy papers, and structured interviews. These instruments provided a comprehensive dataset for investigating gender differences in STEM engagement, job problems, and policy efficacy. Surveys were conducted with women in STEM, educators, and policymakers to learn about their experiences, impediments, and recommendations for increasing gender equity.

Data analyses procedure

The data were evaluated qualitatively, including thematic analysis, grounded theory, and content analysis. These methodologies were used to identify and categorize important variables such as gender stereotypes, educational access, employment discrimination, representation,

and policy support. The study sought to examine the underlying relationships between these characteristics and their effects on women's engagement in STEM. To ensure clarity, the findings were consolidated and presented in tabular fashion, representing both general patterns and specific sociocultural distinctions among countries.

FINDINGS AND DISCUSSIONS

Stereotypes and cultural norms

Traditional gender roles and societal expectations in Japan, South Korea, China, India, and Indonesia contribute to gender inequality in STEM fields. In Japan, men's careers are prioritized over women's, resulting in lower female enrollment in STEM programs. In South Korea, women face work-life balance challenges, while in China, government policies and societal expectations favor male candidates, exacerbating gender disparities in pay and job security. In India, societal expectations and traditional gender roles discourage women from pursuing STEM careers, while in Indonesia, traditional views continue to discourage women from entering STEM-related careers. Addressing these issues requires comprehensive strategies to challenge societal perceptions and promote inclusive practices in educational and professional STEM environments (Washizaki, 2022).

Gender inequality in STEM fields in Africa is largely due to societal stereotypes and cultural norms (Okeke 2025). These factors often discourage women from pursuing STEM careers, perpetuating gender disparities. In five African countries - South Africa, Rwanda, Cameroon, Côte d'Ivoire, and Nigeria -, the impact of these cultural elements is evident. South Africa's historical legacy of Apartheid and patriarchal norms continue to influence societal structures, deterring women from pursuing STEM careers (Joseph, 2025). Rwanda has made strides in promoting gender equality, but traditional gender roles still influence educational choices (Kamila, 2025). Cameroon's societal norms and cultural expectations significantly impact women's participation in STEM fields, with traditional views often discouraging women from pursuing engineering and technology careers (Courage et al, 2024). Côte d'Ivoire has made efforts to promote gender equality, but domestic activists' express concerns about the practical application of these laws (Schuerkens, 2025). Nigeria's cultural norms and stereotypes also contribute to underrepresentation in STEM fields (Okeke, 2025).

In Europe traditional gender roles and stereotypes discourage women from entering STEM fields, leading to psychological barriers. Austria has actively challenged these stereotypes through initiatives like the Fearleaders, aiming to redefine masculinity and promote gender inclusivity (Kassam, 2024). Media representations in Spain and the UK also play a role in shaping gender norms, with children's television shows often portraying technical and construction-related jobs as male-dominated (Changing Gender Norms: Engaging With Men and Boys, 2021). In the UK, urban planning initiatives like Edinburgh have adopted a feminist approach to improve safety and accessibility for marginalized genders (Green et al, 2023). Despite these efforts, women remain underrepresented in STEM, holding only about one-third of STEM degrees. Eliminating these stereotypes and cultural biases is crucial for closing the gender gap in STEM and fostering an inclusive workforce (Kong et al, 2020).

In the US, STEM careers are often associated with masculinity, leading to a lack of female role models and a perception that these careers are less suitable for women (Harmse & Dichaba, 2025). In Canada, cultural stereotypes persist, causing women to feel less encouraged to pursue STEM careers (Nazari, 2025). Mexico faces unique challenges, with traditional gender roles prioritizing domestic responsibilities, limiting women's participation in demanding fields like STEM (Bareket et al, 2025). In the Caribbean, societal expectations and limited support systems can hinder women's progression in STEM fields (Opong & Fider,

2025). Addressing these issues requires challenging biases, promoting diverse role models, and creating supportive environments that encourage women's participation and advancement in STEM fields.

Gender imbalance in STEM disciplines throughout South America is heavily driven by entrenched assumptions and cultural conventions that discourage women from participating (Guo et al., 2024). In countries like Brazil, Argentina, Chile, Peru, and Colombia, traditional gender roles often dictate educational and career choices, steering women away from STEM disciplines (Gender Roles by Country 2025, n.d.). These societal expectations are reinforced by family, educational institutions, and media portrayals, perpetuating the notion that STEM fields are predominantly male domains. The lack of female role models in these sectors further exacerbates the issue, as young women have fewer examples to emulate, leading to diminished interest and confidence in pursuing STEM careers (Coded Bias: the Underrepresentation of Women in STEM in Latin America and the Caribbean, n.d.). Moreover, implicit biases within educational and professional settings can result in discriminatory practices, making it challenging for women to advance in these fields. Addressing these disparities requires comprehensive strategies, including revising educational curricula to challenge stereotypes, implementing mentorship programs, and promoting policies that encourage gender diversity in STEM (Guatemala, 2024). Such initiatives are crucial for fostering an inclusive environment that supports and empowers women in science and technology across South America.

Educational access and quality

Gender inequality in STEM education in Oceania is a significant issue, influenced by differences in access and quality. In Australia, boys outperform girls in primary mathematics and science (The Guardian, 2024), largely due to gender stereotypes and societal expectations (Sergent, 2025). In New Zealand, efforts to promote gender equality have led to initiatives promoting female participation. However, challenges persist in addressing unconscious biases and ensuring equal access to quality education (UNICEF, 2020). Pacific Island nations, such as Fiji, Papua New Guinea, and Samoa, face unique challenges due to limited resources, cultural norms, and infrastructural constraints (UNESCO, 2021). Addressing gender disparities requires comprehensive strategies that address both access and quality, including challenging stereotypes and creating inclusive educational environments (World Bank, 2020).

Gender inequality in STEM education across Asia varies significantly, influenced by disparities in educational access and quality. In South Asia, traditional gender roles and socio-economic barriers limit girls' participation in STEM fields. Traditional gender roles and socio-economic barriers limit girls' participation in STEM fields, with Nepal and India having low representation (Acharya, 2025). Southeast Asian countries like Malaysia show more balanced gender representation, with 48.19% of students enrolled in science programs being female and 49% of research positions being women (Hamdani, 2025). East Asia faces challenges in achieving gender parity, with Japan and China having low representation due to cultural norms and employment discrimination (Wen, 2025). Central Asian countries like Kazakhstan have a more equitable landscape, with 66% of enrollments being women (Harden-Wolfson & Shakirova, 2025). These variations highlight the complex interplay of cultural, socio-economic, and policy factors influencing gender inequality in STEM education.

In Africa gender inequality in STEM education is a significant issue, influenced by disparities in access and quality (Okeke & Ramaila, 2025). In Nigeria, cultural norms and limited technology access have historically hindered girls' participation in STEM fields. Initiatives like the Women's Technology Empowerment Centre (W.TEC) aim to bridge this gap by providing technology training and mentorship to young women (Adam et al, 2025). Kenya faces challenges due to gender-differentiated educational needs, particularly in rural

areas (Nyandoro, 2025). South Africa lacks dedicated gender policies, potentially perpetuating existing inequalities in STEM education and careers. Ghana has made strides in promoting gender equality through targeted educational policies, but challenges persist due to entrenched gender stereotypes. Ethiopia faces socio-cultural barriers and limited access to quality education, necessitating comprehensive strategies like community engagement, policy reforms, and investment in girls' education (Oganetse & Phiri, 2025).

In Europe gender inequality in STEM education is a significant issue, with boys outperforming girls in mathematics and science. In England, boys in Year 5 and 9 score higher than girls, partly due to differences in confidence and sense of belonging (Stenberg et al, 2025). Countries like Romania, Poland, and Greece have higher female representation among STEM graduates, with women accounting for over 40% of graduates in these nations (Eurostat, 2024). In Spain, women's representation in STEM fields remains low, with only 12.6% of graduates in Information and Communication Technology being women (EST, 2022). Estonia has implemented policy recommendations to address gender disparities in STEM, ensuring equal technology lessons and integrating ICT into the national curriculum (Raj & Gupta, 2025). Ireland has also published recommendations on gender balance in STEM education, focusing on a whole-school culture change, effective support for educators, and societal shifts to address gender imbalance (Foley et al, 2025).

Gender inequality in STEM education in South America is a significant issue, influenced by disparities in educational access and quality. The "Equality in Leadership for Latin America STEM" (ELLAS) initiative in Bolivia, Brazil, and Peru aims to address these disparities by promoting open data on gender inequality in STEM (El País, 2025). However, challenges persist, especially in rural areas where limited resources hinder women's participation. Chile has made strides in promoting gender equality, but disparities persist, particularly in computational thinking skills (EST, 2022). Argentina, Colombia, and Ecuador have also faced challenges in promoting gender equality in STEM. Despite these efforts, traditional gender roles and limited access to quality education in rural regions continue to impede women's full participation (Elacqua et al, 2025). Addressing these issues requires targeted interventions considering each country's unique context.

North America gender inequality in STEM education varies significantly among countries, influenced by disparities in educational access and quality. In the United States, despite women earning higher grades in STEM courses, they often exhibit lower self-efficacy compared to men, potentially deterring their continued participation in these fields (Whitcomb et al., 2020). Canada has made strides in increasing female enrollment in STEM, yet challenges persist. A study examining Ontario's secondary schools revealed a persistent gender gap in physics, with median Grade 12 physics classes comprising only 36.5% female students in 2018 (Corrigan et al., 2023). Mexico faces significant underrepresentation of women in STEM, attributed to cultural norms and limited access to quality education, which hinder female participation in these fields.

In Central American countries like Guatemala and Honduras, educational inequalities are pronounced, with girls facing barriers such as early marriage and limited access to secondary education, resulting in low female representation in STEM. Conversely, Costa Rica has implemented initiatives to promote gender equality in STEM, leading to improved female participation rates; however, ongoing efforts are necessary to address persistent challenges UNICEF (2020).

Workplace discrimination and bias

North America gender inequality in STEM fields is largely due to workplace discrimination and bias. Women make up only 25% of the STEM workforce in the US, despite representing

47% of the workforce. This underrepresentation is exacerbated by systemic discrimination, unconscious bias, and sexual harassment (National Geographic, 2024). In Canada, women account for 23% of science and technology workers, facing wage disparities and limited advancement opportunities (Canadian Women's Foundation, 2023). Mexico's women represent 34% of researchers, but face gender biases and cultural norms (Maheshwari, 2025). Costa Rica and Panama have made progress towards gender parity, with women comprising 45% and 43% of professionals, respectively (OECD, 2023).

Gender inequality in STEM fields in South America is largely due to workplace discrimination and bias, with Bolivia, Chile, and the Latin American region experiencing significant disparities. Women in Bolivia face sexual harassment, discrimination, and wage disparities, earning 38% less than their male counterparts (The Guardian, 2024). In Chile, cultural barriers, gender biases, and limited funding contribute to the underrepresentation of women in STEM, particularly in leadership positions (El País, 2025). Globally, women make up only 33.3% of researchers and 35% of STEM students. The male-dominated nature of STEM fields exacerbates labor discrimination, further hindering female entry. Addressing these disparities requires reforming laws, enhancing pay transparency, and improving parental leave policies. Investments in early education initiatives, workplace practices promoting diversity, and better metrics for assessing gender discrimination are essential steps towards achieving gender equity in STEM fields (UNDP, 2024).

Asia's gender inequality in STEM fields is significantly influenced by workplace discrimination and bias. Women in China face challenges in securing employment and achieving pay equity due to societal expectations (Volodzkiene, 2025). Cultural norms and systemic biases in Japan and South Korea also hinder women's participation (Gul et al, 2025). In India, the corporate sector often overlooks caste and gender biases, further underrepresenting women in high-paying STEM roles (Singh, 2024). These patterns highlight the pervasive impact of workplace discrimination and bias on gender inequality in STEM fields.

African nations gender inequality in (STEM) persists with workplace discrimination and bias significantly influencing women's participation and advancement in these fields. Côte d'Ivoire, Nigeria, South Africa, Kenya, and Cameroon are all grappling with gender equality issues. Despite legal reforms, challenges persist in enforcing these laws, leading to femicides and patriarchal norms (Le Monde, 2024). Discriminatory practices against women limit their participation in STEM careers, with microaggressions and lack of supportive policies (IDRC, 2024). South Africa faces challenges in retaining women due to workplace cultures that don't fully support gender inclusivity (SGCI Africa, 2023). Kenya faces systemic issues like gender bias and work-life balance, while Cameroon faces more discrimination in engineering and STEM fields.

Europe's gender inequality in STEM fields is a significant issue, with variations across countries. Women in Germany face gender stereotypes and a lack of female role models, hindering career progression (European Parliament, 2021). In the UK, a significant "gender numeracy gap" exists, limiting women's participation in STEM careers (National Numeracy, 2025). In Poland, restrictive societal attitudes and educational practices contribute to underrepresentation. France has made progress in promoting gender equality, but women still face biases and underrepresentation in leadership positions. Sweden's progressive policies have increased female participation, but unconscious bias and discrimination persist (European Commission, 2024).

In Oceania gender inequality in STEM fields is largely due to workplace discrimination and bias, with varying degrees observed in countries like Australia, New Zealand, Papua New Guinea, Fiji, and Samoa. Australia faces gender bias and underrepresentation in STEM fields, with only 37% of STEM university enrollments being female in 2022 (Nweje, 2025). New Zealand has been proactive in addressing gender disparities, but challenges persist

(Zharfpeykan & Bai, 2025). Traditional gender roles and cultural norms may contribute to workplace discrimination, hindering women's participation and advancement. Addressing these disparities requires targeted policies and cultural shifts to promote inclusivity and equal opportunities for women in STEM.

Representation and role models

Gender inequality in STEM fields in Oceania is influenced by representation and role models. Australia has been criticized for its boys' outperforming girls in mathematics and science, despite efforts to promote gender equity (Schismenos et al, 2025). New Zealand has made progress, but women are still underrepresented in senior STEM roles (Borger, 2025). Traditional gender roles and limited access to education in Pacific Island nations like Fiji, Papua New Guinea, and Samoa also hinder women's participation. Cultural expectations and a scarcity of female STEM professionals further contribute to the cycle of underrepresentation. Addressing these disparities requires policy interventions, educational programs, and initiatives to support female role models in STEM fields Barr and Barr (2023). By addressing both representation and visibility, Oceania can work towards reducing gender inequality in STEM.

South America faces a significant gender inequality in STEM fields, with women comprising nearly half of PhD graduates. Despite these women being active in research, their participation in decision-making is limited, highlighting a leadership gap (Women in STEM fields, 2025). Initiatives like "Scientist Barbie" in Argentina and Brazil aim to challenge gender biases, but cultural norms continue to hinder women's full participation (Agostina Mileo, 2024). Chile's statistics show that only 28% of projects and patent applications are led by women, indicating significant underrepresentation in innovation sectors (Mujeres invisibilizadas, 2025). Networks like "Equality in Leadership for Latin America STEM" in Peru aim to promote female leadership in STEM fields (An Open Data Platform to Advance Gender Equality in STEM in Latin America, 2024). Colombia also faces gender biases, a scarcity of female mentors, and societal expectations that discourage women from entering STEM fields (Gender inequality in Latin America, 2025). Addressing this issue requires systemic changes, policy interventions, and societal shifts to promote gender equality in STEM.

In North America gender inequality in STEM fields varies across countries, with women's representation and availability of role models being key factors. In the US, women have increased their share of STEM occupations from 8% in 1970 to 27% in 2019, but men still dominate the field, comprising 73% of STEM workers (U.S. Census Bureau, 2021). This underrepresentation is exacerbated by a scarcity of female role models in leadership positions (MIT Professional Education, 2023). In Canada, women account for 34% of STEM degree holders and 23% of science and technology workers, partly due to persistent stereotypes and a lack of visible female role models (Canada, 2025). Mexico faces significant challenges, with women constituting only 8% of engineering professionals (Mexico STEM Workforce - Society of Women Engineers, n.d.). Costa Rica has implemented policies to promote gender equality in education, but the transition from education to the workforce remains a challenge due to a lack of female role models in senior positions (Case Study on Gender and Education in Costa Rica, 2018). Panama's efforts to encourage girls to pursue STEM education and careers are also hindered by a scarcity of female role models (Meyer & Baogui, 2025).

In Asia gender inequality in STEM fields is influenced by factors such as representation and role models. In Japan, women make up 25% of tertiary STEM program enrollments, a significant gap due to traditional societal norms (Yamada, 2025). Kazakhstan has a more balanced representation of women at 66% (Kazakhstan | Equal Future, n.d.). South Korea has a significant gender gap, with women making up 30.63% of students in science programs, but

only 15.4% are female in engineering (So, 2025). Pakistan has a similar gap, with women making up only 34% of researchers and 4.9% of engineering jobs (Sadia, 2022). Malaysia has a higher female representation in science programs, but only 36% of students are women in engineering (Alam, 2021). The presence of female role models is crucial in influencing women's participation in STEM. Addressing these disparities requires challenging societal norms, promoting female role models, and creating supportive environments.

Africa is influenced by representation and role models. Nigeria's APKEN has promoted female participation in engineering through scholarships and mentorship programs (Obboh, 2024). South Africa lacks specific gender policies, despite top universities (Breaking Barriers: Addressing Gender Inequities in African Universities, 2024). Rwanda has made progress through youth-led organizations like Starlight, while Kenya's AWSE encourages girls to pursue STEM (Mukashyaka, 2020). However, in countries like the Democratic Republic of Congo, women face challenges in balancing demanding STEM careers with family responsibilities, leading some to opt for less demanding careers or exit the field altogether (Wins, 2023). Despite progress, challenges remain in providing strong role models and supportive policies to encourage women's participation in these fields.

Gender inequality in STEM fields is a significant issue in Europe, with variations among countries. In the European Union, women make up 33% of researchers, with higher representation in higher education and government sectors (Striebing, 2020). Romania and Bulgaria have a higher representation of women in ICT specialist roles, surpassing the EU average of 16.7%. Germany has historically had lower female representation in STEM fields, but recent efforts have led to progress (Vrabie, 2023). The United Kingdom also faces challenges, with women underrepresented in STEM leadership positions (Jeferson.Zambrano, 2023). France has made strides in promoting gender equality through policy interventions and societal attitude shifts, but women remain underrepresented in certain sectors (The Art of Inclusion: EU Moves to Empower Girls in Science, 2025). Addressing gender inequality in STEM requires tailored strategies, including enhancing female representation and providing role models.

Policy and institutional support

European countries - Sweden, Finland, Norway, Germany, and Italy - implemented policies and institutional measures to address gender inequality in STEM fields. Sweden, Finland, and Norway adopted a holistic strategy, focusing on collaboration across all educational levels and sectors to create inclusive environments (European Commission, 2022). Germany implemented Gender Equality Plans (GEPs) within research organizations, promoting gender budgeting and stakeholder awareness (CORDIS, 2022). Italy participated in international collaborations like the European Network for Gender Balance in Informatics (EUGAIN) to advance gender balance in the field (Jaccheri et al., 2024). However, challenges persist, with women still underrepresented in STEM careers and among graduates. Addressing this requires continuous policy interventions, societal attitude shifts, and targeted support mechanisms to increase women's participation in STEM.

Asia is influenced by policy and institutional support. Japan has implemented the Basic Law for a Gender-equal Society since 1999, with the latest plan in 2020 aiming to increase female university faculty members in science and engineering. The Philippines has been implementing gender-responsive budgeting for over a decade, integrating gender equality themes into STEM education (Gender budgeting, 2024). Pakistan faces one of the highest gender gaps globally, with women representing nearly half of the population (Pakistani women in STEM, 2024). China has made strides in increasing female university enrollment, but women still face hurdles in securing employment and achieving pay equity in STEM sectors

(More Chinese women graduate but jobs and equal pay still elude them, 2024). The ASEAN region has made efforts to bolster women's participation in STEM through policy briefs and collaborations, such as the Women in STEM Webinar Series. These examples highlight the importance of robust policy frameworks and institutional commitments in mitigating gender inequality in STEM across Asia (Supporting STEM Career Transitions for Girls in ASEAN, 2023).

African countries have implemented policies and institutional reforms to address gender inequality in STEM fields, such as Botswana's achievement of gender parity in secondary education and South Africa's SARChI's efforts to increase women's representation in research positions (SGCI Africa, 2023). However, challenges persist, with seven out of fifteen African Research Universities Alliance institutions lacking specific gender policies (InterAcademies, 2023). The UNESCO Regional Office for Southern Africa is promoting gender-responsive STEM curricula to accelerate socio-economic transformation by 2024 (UNESCO, 2023). Despite these efforts, persistent socio-cultural barriers and inadequate policy implementation continue to hinder progress in achieving gender equality in STEM across Africa (Invictus Africa, 2024).

South America faces gender inequality in STEM fields, with women underrepresented in leadership roles globally. Despite international recognition, women occupy only 24% of leadership positions in the technology sector (González Ramos et al., 2023). Argentina has implemented gender-responsive policies (UNDP, 2023), while Chile has integrated gender perspectives within academic institutions (El País, 2025). Brazil has taken steps to address gender inequality through policy interventions, but challenges persist in translating policies into effective institutional practices. Colombia has used open data to formulate gender equality policies (IDRC, 2023), while Peru is working to address cultural and institutional barriers (UNDP, 2023). However, the region faces challenges in achieving full gender parity in STEM, with the World Economic Forum predicting it will take several decades for Latin America and the Caribbean to achieve full gender parity (WEF, 2023). Therefore, sustained policy and institutional support are needed to effectively address gender inequalities in STEM across South America.

North America's gender inequality in STEM fields is a significant issue, with varying degrees of policy and institutional support. In the US, while top universities have made progress in narrowing the gender gap in PECS majors, institutions serving students with lower math achievement are falling further behind (Cimpian, 2025). Canada has implemented targeted initiatives to address gender disparities in STEM, such as the Chairs for Women in Science and Engineering program (Barabino, 2020). Mexico faces challenges due to cultural norms and limited institutional support, but efforts are underway to create policies encouraging female participation (Zavala-Parrales, 2025). Caribbean nations like Jamaica and Trinidad and Tobago are focusing on gender equity in STEM education (Devonish, 2025). However, a comprehensive study across North America found that institutional barriers and biases continue to hinder women's full participation in STEM. Targeted interventions are needed to recruit and retain women in these fields.

CONCLUSIONS

To summarize, gender inequality in STEM exists throughout nations, driven by cultural, educational, workplace, representation, and policy issues. Societal conventions and preconceptions continue to dissuade women from pursuing STEM occupations, while gaps in educational access and quality limit female students' chances. Workplace prejudice and bias impede career advancement, while unequal compensation and leadership chances create additional impediments. The dearth of female role models exacerbates the problem by lowering

expectations among young women. Although several countries have enacted regulations to encourage gender equality in STEM, institutional support remains inconsistent. Gender equity in STEM areas requires focused interventions, such as systematic policy reforms, mentorship programs, and activities that address cultural biases. Addressing these issues holistically will foster a more inclusive and diverse STEM workforce globally.

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