



OPEN ACCESS

EDITED BY

Karan Singh Rana,
Aston University, United Kingdom

REVIEWED BY

Mário Borges,
London South Bank University,
United Kingdom
Adriana Casallas,
Cayre Multiple Sclerosis Center, Colombia

*CORRESPONDENCE

Alicia Correa
✉ alicia.correa@zeu.uni-giessen.de

RECEIVED 20 September 2024

ACCEPTED 06 December 2024

PUBLISHED 17 January 2025

CITATION

Correa A, Glas MG and Opara J (2025)
Females in higher education and leadership:
insights from a multi-method approach.
Front. Educ. 9:1485395.
doi: 10.3389/feduc.2024.1485395

COPYRIGHT

© 2025 Correa, Glas and Opara. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Females in higher education and leadership: insights from a multi-method approach

Alicia Correa^{1*}, Maria Gracia Glas¹ and Jana Opara²

¹Centre for International Development and Environmental Research, Justus Liebig University Giessen, Giessen, Germany, ²Wirtschaftsuniversität Wien, Vienna University of Economics and Business, Wien, Austria

Despite constituting more than half of higher education students globally, females remain underrepresented in academic roles, particularly in leadership positions that shape the future direction of higher education and impact society at large. This study, aligned with the UN's Sustainable Development Goals 4 and 5, examines the gender gap in higher education and leadership across regional, national, and institutional contexts. Through descriptive analyses, surveys, and interviews, the research assesses female representation at various academic levels and identifies key factors influencing career progression. The findings reveal that gender parity in enrolment has been achieved, with Latin America & Caribbean leading, followed by Europe and Central Asia. However, parity in academic roles, such as teaching positions, remains unmet, with Central Asia showing higher female representation than Europe and Latin America & Caribbean. Parity in these roles is projected to be achieved well beyond 2030. Variations within regions, such as internal differences in Central Asia, emphasize the need for more granular analysis. Gender parity in senior and leadership roles is even further from being realized. Perceptions of obstacles faced by women in academia—such as work-life balance challenges and a lack of role models—are consistent across diverse regions and cultures. To address these issues, the results suggest improving visibility, offering mentoring programs, and promoting diverse leadership. Conducted across both developed and developing countries, the study concludes that achieving gender parity in leadership positions remains a distant goal, underscoring the need to reassess strategies to better align with the 2030 Agenda.

KEYWORDS

gender equality, higher education, academic leadership, multi-method approach, regional disparities

Introduction

Achieving the 2030 Agenda requires member states of the United Nations to intensify actions to make progress across economic, social, and environmental dimensions, with a specific focus on gender equality and women's empowerment. Gender equality, a core principle established across all 17 Sustainable Development Goals (SDGs), finds specific focus in SDG 5: 'Achieve gender equality and empower all women and girls.' This goal demands effort across multiple sectors, with a strong emphasis on education, particularly higher education (Bothwell et al., 2022), as a key pathway to women's empowerment. SDG 4, 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all,' reinforces this connection by aiming to empower women to contribute meaningfully to development. Moving beyond theoretical equal treatment in law and policies, achieving gender equality requires a dynamic political process that translates legal rights into practical realities (BMZ, 2023). This

ongoing effort demands active participation from higher education institutions, which are important drivers of the SDGs (De Iorio et al., 2022; Hirsu et al., 2021).

A global movement for gender equality is gaining momentum, with governments allocating resources to address gender disparities through legal frameworks that ensure equal pay, non-discrimination, parental leave, and childcare subsidies to support mothers' re-entry into the labor force (Bothwell et al., 2022; Hinds, 2015). Additionally, there are targeted calls for academic positions specifically for women. In several countries of the European Union, Gender Equality Plans (GEPs) have been implemented in the past decade (European Commission: Directorate-General for Research and Innovation, 2021; Rosa et al., 2020). Such initiatives are actively increasing female participation and leadership in higher education marking a successful initial step towards a more balanced academic landscape (di Luzio, 2009; Timmers et al., 2010). In addition to regional and governmental efforts, higher education institutions are also implementing gender equality practices, ranging from strategic inclusive policies to operational initiatives like promoting peer mentoring, networking, and establishing gender centers (UNESCO-IESALC, 2021). However, the available information on these policies and practices mainly consists of case studies from institutions in developed countries [e.g., Klenk et al., 2022], limiting the understanding of international common practices.

Participation in higher education (tertiary education defined by the International Standard Classification of Education (ISCED 2011) as levels 5–8), has surged in recent decades, with women experiencing a particularly rapid rise in a global scale. This trend originated in industrialized nations and is now spreading to developing countries (Heath and Jayachandran, 2018). Since 2005, on a global scale, females have surpassed males in higher education enrollment, as reported by UNESCO's Institute for Statistics (UIS data), demonstrating a shift from historical underrepresentation. Several factors contribute to this trend, including increased motivation among females to pursue higher education, access to resources based on family background, and lower male completion rates in secondary education (Buchmann and DiPrete, 2006). Nevertheless, it varies across fields of study, with the most unfavorable case in Science, Technology, Engineering, and Mathematics (STEM) fields -however not in all of them. Despite the strong performance of women in STEM (Almukhambetova et al., 2023), they are less likely to enroll and advance in STEM careers (Heß, 2020). This *leaky pipeline* effect leads to a reduced number of female researchers in STEM (Almukhambetova et al., 2023; Beede et al., 2011).

While females' access to higher education and career opportunities has improved, it has not resulted in equitable outcomes. Globally, the female-to-male ratio of higher education teachers stands at 0.76 (43%) in 2022 (UIS data). UNESCO reported that worldwide 30% of researchers were females in 2019 (UNESCO, 2019). In Europe, females represent 48.1% of Doctoral graduates, 40.3% of mid-level researchers, but only 26.2% are in top research positions, and 23.6% are heads of higher education institutions (European Commission: Directorate-General for Research and Innovation, 2021). This evidence once again highlights a *leaky pipeline* in the higher educational system (Pandit and Paul, 2023; Yousaf and Schmiede, 2017). These disparities extend beyond academia, influenced by broader issues like work-life balance, cultural stereotypes, access to mentorship (Ranieri et al., 2016), and labor conditions (e.g., prevalence of part-time positions and temporary contracts) (UNESCO-IESALC, 2021). Furthermore,

unconscious bias, such as in recommendation letters for academic job applications, can disadvantage females by influencing perceptions of their qualifications (Nitttrouer et al., 2018). However, Skov (2020) advises caution, as more empirical evidence on unconscious gender bias in academia is still needed.

Females in academia frequently find themselves confined to specific roles (Ramsay, 2007), such as teaching and service, leaving little time for research (Frechette, 2009). Typically they hold fewer large grants and are less likely to have them renewed than men (Burns et al., 2019; McAllister et al., 2016). Therefore, females are underrepresented in academic roles, have lower rates in research participation, and face barriers when seeking senior faculty and professorship positions (UNESCO-IESALC, 2021). The previous reveal what researchers categorize as the *first glass ceiling* -a metaphor for invisible barriers hindering advancement-, evident in both horizontal and vertical segregation. Horizontal segregation refers to the underrepresentation of females in certain fields of study, while vertical segregation becomes evident in the limited number of female attaining, e.g., professorship positions (UNESCO-IESALC, 2021). Beyond the *first glass ceiling* (encountering barriers) and the *leaky pipeline* (becoming lost along the way) concepts, there is the *sticky floor* hypothesis suggesting that females find themselves stuck at the early stages of their academic careers.

Females that overcome the challenges of early career advancement and reach senior academic positions encounter a *second glass ceiling* exhibited by their limited representation in leadership, power, and influential roles (Bruckmüller et al., 2014; Cook and Glass, 2014). This phenomenon is presented in every region of the world (Cheung, 2021). The lack of representation persists despite growing recognition of the value of diverse perspectives in leadership at universities (David, 2021), in decision-making processes (Fourie-Malherbe and Williams, 2013; Gero and Garrity, 2018; Kezar, 2014) and overall in society and economic progress (Profeta, 2017). Although women face obstacles in advancing to top academic positions like Rectors, there is more gender equality in high-level management roles that do not require a professorship. Gender-balanced leadership teams are crucial to achieving gender sensitivity in higher education, as policy success depends on leaders promoting gender equality (Rosa et al., 2020).

Multi-level barriers, operating across macro (societal), meso (organizational), and micro (individual) dimensions, hinder the advancement of females within academic hierarchies (Madsen and Longman, 2020), as evidenced in the stark gender gap among university Rectors (UNESCO-IESALC, 2021). For instance, within the European context, in 2020, only 15% of Rectors among European University Association (EUA) member universities across 48 countries were female. Of particular concern, 20 countries had no female Rectors appointed (UNESCO-IESALC, 2021). Similar disparities exist in Latin America & Caribbean, where only 18% of public universities have female Rectors (UNESCO-IESALC, 2020). This lack of female leadership reflects, in part, that females have rarely been supported to develop a leader identity of seeing oneself and being seen by others as a leader (Madsen and Longman, 2020).

Females in power and influential positions serve as clear role models and potential mentors, helping to build self-confidence and motivation. They can assist early and mid-career females in avoiding negative labels and stereotypes (Franco-Orozco and Franco-Orozco, 2018) and mentor them as future senior leaders in higher education (Winchester and Browning, 2015). Beyond individual influences, improving gender equality in higher education requires

implementation inclusive policies to eliminate all barriers and ensure equal participation, retention, and success of females in academia. It also involves developing measurable gender-focused action plans across institutions (Bell et al., 2009; Winchester and Browning, 2015) and the commitment of individuals, who may need to share or even relinquish some of their positions of power.

Recognizing the principle that “what gets measured gets more attention” (Winchester and Browning, 2015), monitoring progress in gender equality in higher education is a powerful tool. However, the existing data and body of literature is concentrated towards institutions in developed countries, with limited empirical studies addressing regions such as Latin America & the Caribbean and Central Asia. Furthermore, there is a lack of integration across macro-level societal-systematic factors, meso-level institutional dynamics, and micro-level individual experiences in analyzing the underrepresentation of women in academic leadership. This study addresses these gaps using a multi-method approach to examine regional and national trends, institutional perspectives, and personal narratives, thereby contributing to the creation of a more diverse and productive academic landscape that fully recognizes the contributions of women to both academia and societal progress. The SDG^{nexus} Network, a global community of universities, research centers and stakeholders, committed to the Agenda 2030. The network views gender equality as a critical component of sustainable development and seeks shade light on the situation within its geographic areas of intervention. These areas include member institutions in Europe (Germany), Latin America & Caribbean (Colombia and Ecuador), and Central Asia (Kyrgyzstan, Tajikistan, and Uzbekistan).

This study therefore use a multi-method approach to:

1. Analyze temporal trends in female participation in higher education in Europe, Latin America & Caribbean, and Central Asia.
2. Investigate the gender composition of academic staff in partner institutions of the SDG^{nexus} Network.
3. Gather insights through a survey on female perceptions of the academic environment factors influencing their career advancement.
4. Explore success stories of senior female academics through interviews to identify their views into the academic landscape and strategies for overcoming challenges in different regions.

Methods

A multi-method approach that combines descriptive analyses, surveys, and qualitative interviews were employed for data collection and visualization (both survey participants and interviewees provided informed consent for the use of their information in scientific publications). Additionally, the results were mapped to the relevant targets of SDGs 4 and 5, which are indicated in brackets () within the text. This approach ensures that the mapping reflects the data and information gathered, rather than imposing a predetermined target.

Objective 1

We analyzed the time evolution of female participation in higher education from 1992 to 2022 using the latest data available from the

UNESCO Institute for Statistics (2022). Our study focuses on Europe, Latin America & Caribbean, and Central Asia, following the UIS Sustainable Development Goals Regions classification. Additionally, we examined data from Germany, Colombia, Ecuador, Kyrgyzstan, Tajikistan, and Uzbekistan. By ‘participation’ we refer to the gender composition in student enrollment and among teaching staff. Regarding student enrollment, we used data from the section: “Education, Other Policy-Relevant Indicators, Enrolment in higher education, female and male in all programs,” to compute female-to-male ratios. A ratio of 1 indicates gender parity in enrollment. Similar processes were conducted for teachers in higher education across all programs. Moreover, for individual cases where the ratio is less than 1, linear regression analyses were employed to model the trend of these data over time and estimate the year when this ratio would reach the value of 1 following a similar approach of Villar and Hernández (2014). Descriptive figures, such as time series and tables illustrate these ratios and projections.

Historical data of a similar nature is not available for researchers or other senior academic positions. However, to explore the participation of females in research, we examined data from the section: “Science, Technology and Innovation, Other Policy Relevant R&D (Research and Development) Indicators, Percentage of female researchers as a percentage of total researchers HC (Headcount) and in Higher Education.” According to UIS guidelines, total researchers include those in business enterprise, government, private nonprofit, and higher education sectors. In addition, researchers are categorized as professionals creating new knowledge and developing concepts, theories, models, and methods through R&D. HC of R&D personnel refers to the total number of individuals contributing to intramural R&D during a specific period, encompassing both full-time and part-time employment in R&D. For more details refer to UIS (OECD, 2015). Regarding other academic positions, data is very scattered and limited to case studies. Percentages were converted to ratios to ensure coherence in the data analysis of this study, using the conversion: $\text{ratio} = \% / (100 - \%)$.

Objective 2

We explored publicly available online repositories from the six higher education institutions partners of SDG^{nexus} Network: Justus Liebig University (Germany, hereinafter JLU), Los Andes University (Colombia, Los Andes), University of Cuenca (Ecuador, U Cuenca), Andina Simón Bolívar University (Ecuador, UASB), Tashkent Institute of Irrigation and Agricultural Mechanization Engineers National Research University (Uzbekistan, TIAME) and University of Central Asia (Tajikistan and Kyrgyzstan, UCA). Our objective was to gather the most up-to-date information on the gender composition of enrolled students and academic staff, incorporating historical data where feasible, to analyze temporal evolution. A significant limitation of this study was the lack of publicly available data from some institutions. To address this, we contacted the Human Resources departments of these institutions through researchers affiliated with the SDG^{nexus} Network. They facilitated requests for information on student and academic composition, as well as references for interviews. While some institutions responded satisfactorily, others provided incomplete data. The resulting data was then presented in figures for clear visualization.

Objective 3

We conducted an online survey among female academics from the mentioned institutions to identify factors influencing their career advancement. The survey (see [Appendix A](#)) was distributed in 2023 through principal investigators of SDG^{nexus} Network in each university to be randomly shared within their institutions among advanced students pursuing scientific careers and academic staff. Surveys are a commonly used methodology in gender studies in higher education ([Dalati et al., 2020](#); [Rosa and Clavero, 2022](#); [Zamir, 2013](#)). The survey focused on exploring personal, social, and academic dimensions, along with principal activities, performance and perceptions of the academic environment. It also aimed to identify needs that could be addressed through potential institutional strategies. A data protection agreement ensuring that the information provided would be used exclusively for research purposes was signed before proceeding with the survey, in accordance with Article 13 of the General Data Protection Regulation (DSGVO, Regulation (EU) 2016/679). The survey was prepared in English, German, Spanish, and Russian to avoid language barriers among participants. The questionnaire consisted of 30 close-ended questions based on ordinal, nominal, and interval scales. The questioner used is included in [Appendix A](#).

Objective 4

To further gain insights into the current and future perspectives of the academic landscape, we employed semi-structured interviews, as a well-established method in qualitative research ([Gill et al., 2008](#)). This approach allowed us to delve into sensitive topics and explore the lived experiences, perceptions, and emotions of the participants ([Creswell, 2013](#); [Hellum and Oláh, 2019](#)). We interviewed senior female academics from all partner institutions of the network between December 2022 and June 2023. ‘Senior’ was defined as having over 10 years of academic experience, holding a permanent position, and possessing current or past leadership roles.

Prior to the interviews, participants signed a detailed consent form, adhering to the General Data Protection Regulation (GDPR) and the Federal Data Protection Act. This form outlined the data collection process (image, sound, or video recordings) by Justus Liebig University (JLU).

Following guidance from [Gill et al. \(2008\)](#), the interviews fostered a flexible and in-depth conversation in a private setting with only the participant and the interviewer present. Open-ended questions allowed us to tailor the discussion to each participant’s unique background. The interviews were conducted online and lasting approximately 30 min. The interviews focused on several key themes, beginning with the participants’ academic journey, examining turning points, challenges, and successes throughout their careers. We explored their perspectives on gender equality in higher education, especially in relation to access, opportunities and institutional support for women in academia. Discussions also addressed participants’ experiences with leadership positions, investigating the barriers and opportunities for women to reach such positions within academic and scientific institutions. In addition, we delved into the changes that have occurred in the roles of women academics over time, examining how institutional and societal attitudes have evolved and impacted

women’s careers. Finally, we analyze actions and policies implemented at the institutional level to promote gender equality, focusing on specific programs, initiatives, or strategies aimed at addressing gender disparities in academia and in leadership positions. By covering these topics, the interviews provided a comprehensive understanding of the intersection of gender and academia, highlighting both individual experiences and broader institutional dynamics.

The interviews were audio and video recorded, then transcribed verbatim. To ensure conciseness while preserving meaning, we manually edited the transcripts, focusing on essential words. Thematic analysis, guided by [Braun and Clarke \(2012\)](#), framework, was employed in this study, involving six key steps: Familiarization with the data, Generating initial codes, Searching for themes, Reviewing themes, Defining and naming themes, and Writing up. Thematic analysis was preferred over grounded theory ([Glaser and Strauss, 1967](#)) and discourse analysis ([Hodge, 2017](#); [Palacios Díaz, 2020](#)) for analyzing the interviews, as it uncovers recurring patterns and themes in participants’ responses. This method provides a structured approach to explore their perceptions, offering flexibility to capture qualitative richness and effectively organize and interpret insights.

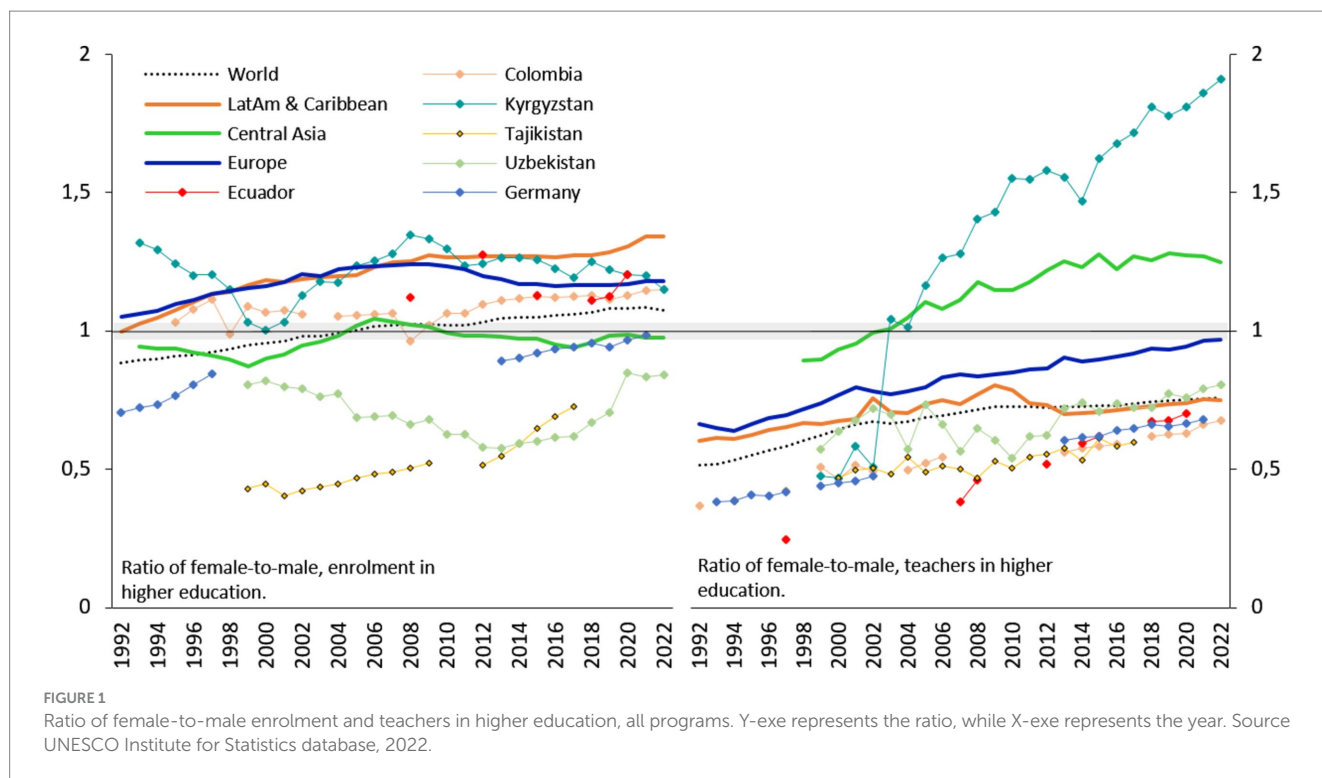
Results

According to [UIS \(2022\)](#) data, the world surpassed the female-to-male ratio of enrolment in higher education in 2005 ([Figure 1](#)). Europe and Latin America & Caribbean surpassed such ratio in 1983 and 1993 respectively, while Central Asia reached this milestone between 2005 and 2009 (SDG 4, Target 4.3).¹ Interregional differences exist and are evident at the country level. For instance, in Central Asia, Kyrgyzstan, with a fluctuating trend historically boasted a higher number of female students compared to Tajikistan, which trails behind in achieving equal representation of female and male students (SDG 4, Target 4.5).² Uzbekistan initially experienced a decline until 2012, but has since then shown an upward trend, reaching a peak ratio of 0.84 in 2022. In Latin America & Caribbean region, Colombia has shown a growing trend, consistently staying above 1, with exceptions in 1998 and 2008, reaching a peak of 1.15 in 2022. Occasional information from Ecuador also shows a surpassed ratio, however, a fluctuating trend. Germany has shown a consistent upward trend, reaching a maximum ratio of 0.99 in, 2021.

The ratio of female-to-male teachers in higher education shows a clear upward trend at the global, regional, and country levels. Europe demonstrates a consistent upward trend and is nearing a ratio of 1. A similar pattern is observed in the Latin America & Caribbean, although this region reached its peak ratio of 0.8 in 2009, experienced

1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes. Source: D STATIS, Statistisches Bundesamt <https://sdg-indikatoren.de/>.

2 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.



a period of decline until 2013, followed by a subsequent uptrend. Central Asia stands out as the region with the highest ratio, where females have outnumbered male teachers in tertiary education since 2003 (SDG 5, Target 5.1).³ At the country level, Uzbekistan has surpassed global ratios on several occasions, such as in 2001–2003 and 2019–2022. Meanwhile, Kyrgyzstan has consistently maintained significantly higher ratios compared to other countries. Kyrgyzstan surpassed the female-to-male ratio since 2003 and has dramatically increased, achieving ratios of 1.9 in 2022, which is 2.5 times the global ratio and 1.5 times the regional average in 2022. All other countries in this study fall below the global and corresponding regional ratios.

The results from the linear regression analyses of the female-to-male ratio of enrollment and teachers in higher education highlight variability in the estimated years to achieve gender parity (a ratio of 1) as well as in the determination coefficients (R^2) of the regressions.

Regarding enrollment, there are only two cases where parity has not been achieved: Tajikistan and Uzbekistan. Tajikistan is expected to achieve gender parity this year, 2024, based on data available until 2017, with a strong R^2 value of 0.87. Conversely, a weak fit does not allow us to estimate when Uzbekistan will reach this milestone.

Regarding teachers in higher education, on a global scale, gender parity is projected to be achieved by 2050 ($R^2 = 0.88$), with Europe showing an anticipated achievement by 2025 ($R^2 = 0.97$), both indicate robust and consistent trends (Table 1). In contrast, the Latin America & Caribbean region is expected to reach parity by 2080, reflecting

considerable variability in the trend with a moderate R^2 value of 0.52, suggesting less reliability in this projection. Central Asia reached this milestone as early as 2003.

This uneven progress is further reflected within regions. Germany aligns with the global trend and is on track to achieve parity by 2051. Colombia is likely to reach this goal by 2063, showing steady progression, while Ecuador earlier, by 2036, though this estimate carries some uncertainty due to limited data. Uzbekistan is projected to achieve gender parity by 2059, however, the lower determination coefficient indicates a weaker fit and potential data variability. Tajikistan is projected to achieve gender parity last, by 2082, with a moderate determination coefficient. Kyrgyzstan, like Central Asia, has already achieved gender parity as early as 2003.

Table 2 presents data on the female-to-male ratio of researchers in higher education and across all research sectors (Headcount). Kyrgyzstan stands out with a notably high ratio of 2.07, highlighting large participation of female researchers in higher education compared to other countries. All other countries show comparable ratios ranging from 0.77 to 0.61, indicating that none of these countries have achieved gender parity. There is no specific data available for the ratios of female researchers in higher education globally or for the Central Asia, Latin America & Caribbean, and Europe regions. However, data is available in relation to total researchers. Globally, the average ratio of female-to-male researchers is lower than in most of the cases analyzed, standing at 0.46. Latin America & the Caribbean and Central Asia have made notable progress towards gender parity compared to Europe. At the country level, similar patterns are observed between the ratios of total researchers and those in higher education, with exceptions such as Kyrgyzstan (ranging from 2.07

³ End all forms of discrimination against all women and girls everywhere.

TABLE 1 Estimated years and values (R^2) to reach parity of teachers in higher education by region and country.

Region/Country	Year (ratio 1)	R^2
Colombia	2063	0.94
Ecuador	2036	0.98
Kyrgyzstan	2003	-
Tajikistan	2082	0.67
Uzbekistan	2059	0.40
Germany	2051	0.99
World	2050	0.88
Central Asia	2003	-
Latin America & Caribbean	2080	0.52
Europe	2025	0.97

$R^2 > 0.7$ represents a strong fit, $0.4 \leq R^2 \leq 0.7$ moderate fit, and $R^2 < 0.4$ weak fit.

TABLE 2 Female-to-male ratio of researchers (Headcount).

Region/Country	Higher education	Total
Colombia	0.61	0.62
Ecuador	0.68	0.70
Kyrgyzstan	2.07	1.49
Tajikistan	0.62	0.59
Uzbekistan	0.77	0.72
Germany	0.71	0.42
World	-	0.46
Central Asia	-	0.87
Latin America & Caribbean	-	0.80
Europa	-	0.55

Source: UNESCO Institute for Statistics database. 2022 or latest year available.

to 1.49) and Germany (from 0.71 to 0.42). Germany presents the lowest ratio among the analyzed cases (SDG 5, Target 5.5).⁴

For the institutional level analysis, the data collected from online repositories and Human Resource departments are presented in the figures within this section. Despite our efforts to obtain information comparable to Figure 2 from JLU across all case studies, we encountered limitations, such as the absence of data for TIIAME and UASB. We limited the analysis period to 2010–2020 to ensure some level of comparability among the institutions.

The analysis of female-to-male student enrollment ratios at JLU revealed a relatively stable trend at the Bachelor’s level (between 1.3 and 1.7 in recent years, Figure 2). Master’s programs showed a more dynamic pattern, with a decline in the ratio until 2016 (from 1.3 to 2.8) followed by a recent increase. Doctoral programs also exhibited a decrease in the ratio (from 1.1 to 1.3) between 2016 and 2018.

⁴ Ensure women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

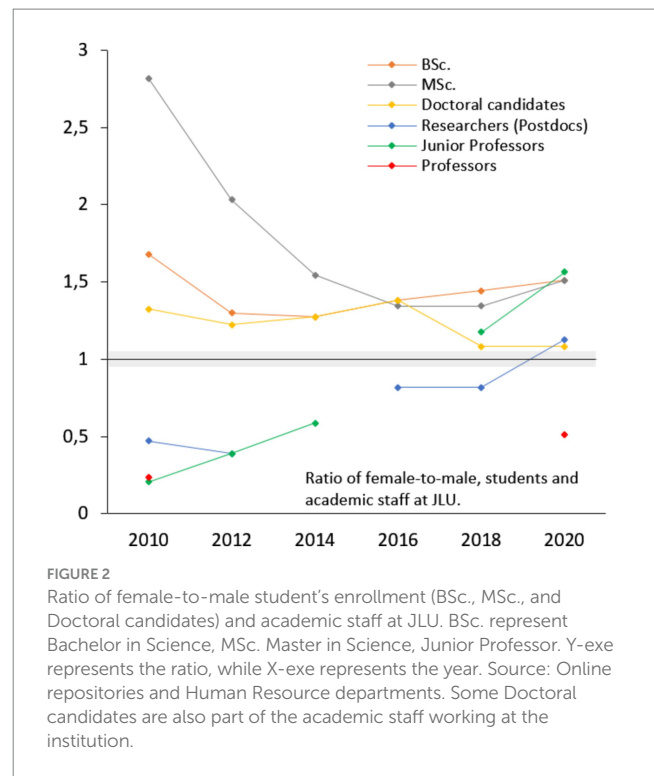


FIGURE 2 Ratio of female-to-male student’s enrollment (BSc., MSc., and Doctoral candidates) and academic staff at JLU. BSc. represent Bachelor in Science, MSc. Master in Science, Junior Professor. Y-exe represents the ratio, while X-exe represents the year. Source: Online repositories and Human Resource departments. Some Doctoral candidates are also part of the academic staff working at the institution.

Encouragingly, positive trends were observed at Postdoctoral and Junior Professor levels. The ratio surpassed parity for Postdoctoral researchers (1.1) in, 2020 and for Junior Professor (1.2) in 2018. At the Professor level, a positive trend was observed, with the ratio increasing from 0.2 in 2010 to 0.5 in, 2020, though further efforts are needed to achieve gender parity in these senior academic positions (SDG 5, Target 5.5).

The analysis revealed variations across universities and academic levels. JLU, U Cuenca, and UCA exhibited female-to-male ratios greater than 1 at the Bachelor’s level (Figure 3). In contrast, Los Andes, with a relatively stable trend, showed the lowest female-to-male ratio, ranging from 0.8 to 0.9.

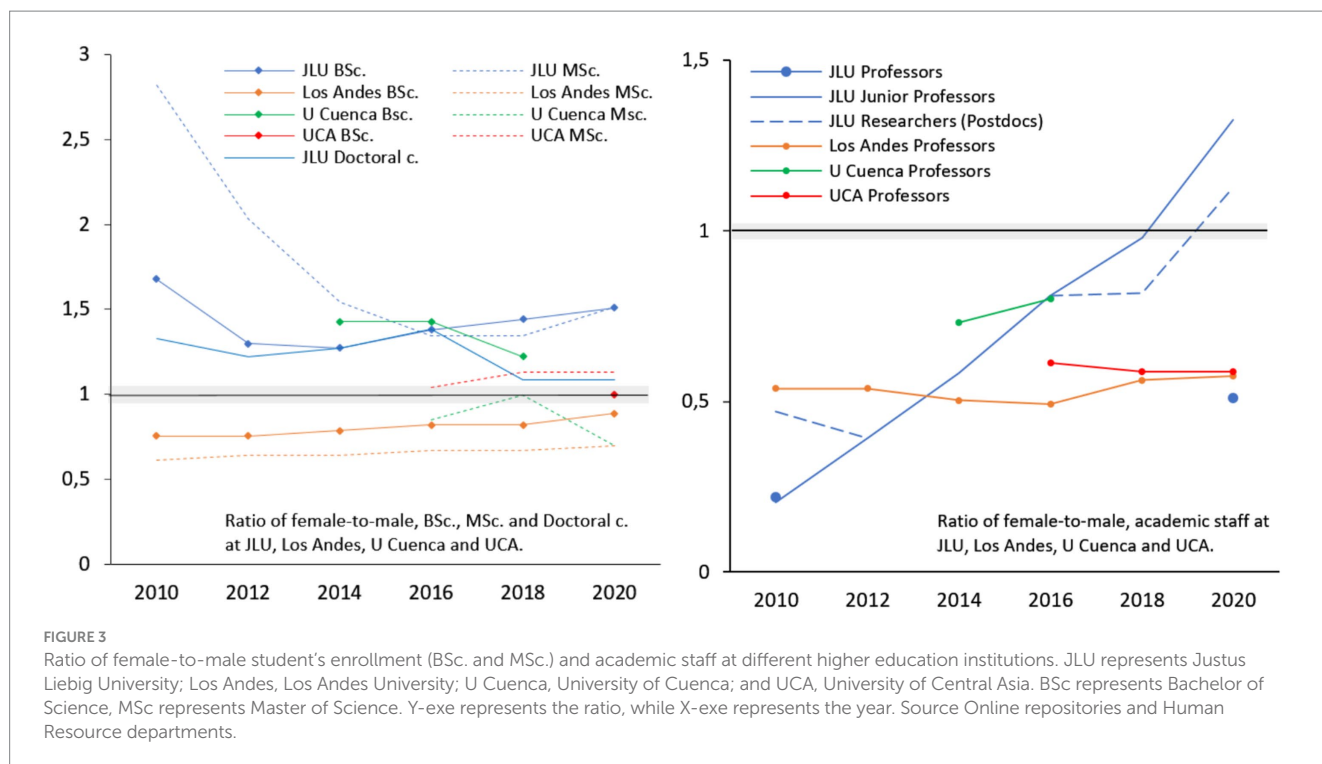
In Master’s programs, JLU and UCA showed higher female participation rates. Conversely, Los Andes had the lowest female-to-male ratios, ranging between 0.6 and 0.7.

The enrollment patterns at the Latin American universities displayed a higher proportion of female students in Bachelor’s programs compared to Master’s programs. On the contrary, the UCA presented a higher female-to-male ratio in Master’s compared to Bachelor’s programs (SDG 4, Target 4.5).

The data from JLU allowed us to separate information into different levels of academic staff: Professors (Full), Junior Professors, and Postdoctoral Researchers. For the other universities, only information on professors was available.

At the professor level, none of the analyzed universities have achieved gender parity (SDG 5, Target 5.5) (Figure 3). U Cuenca shows the highest female-to-male ratios, ranging from 0.7 to 0.8. UCA has ratios around 0.6, Los Andes between 0.5 and 0.6, and JLU between 0.2 and 0.5. All universities, except the UCA, show positive trends toward increasing female representation in senior academic positions (SDG 5, Target 5.5).

It is important to note that there may be differences in the equivalent professor positions at other universities compared to



JLU. Additionally, undergraduate studies in Ecuador and Colombia preceding Master's programs have a different structure and duration (5 to 6 years) compared to those in other regions. However, for the purposes of this study, we have referred to those as Bachelor students.

Results from the survey

The survey, which took an average of 10 min to complete, was initiated by 150 respondents; however, only 82 completed the questionnaire. Among the completed responses, the majority were affiliated with JLU, while the minority were from Universidad de Los Andes and TIAME (Figure 4A).

Regarding the backgrounds of the respondents' families of origin, urban locations are predominant at 73.2%, with rural and peri-urban areas each representing 13.4. Regarding parental education, many respondents come from families where at least one parent pursued higher education (64.6% of fathers and 53.7% of mothers), while a very small percentage come from families where parents had no formal education (3.7 and 1.3%, respectively). Parents with higher education degrees coupled with the fact that they primarily reside in urban centers, may influence the academic trajectories of the respondents. Comparable trends were observed in a disaggregated analysis by institution.

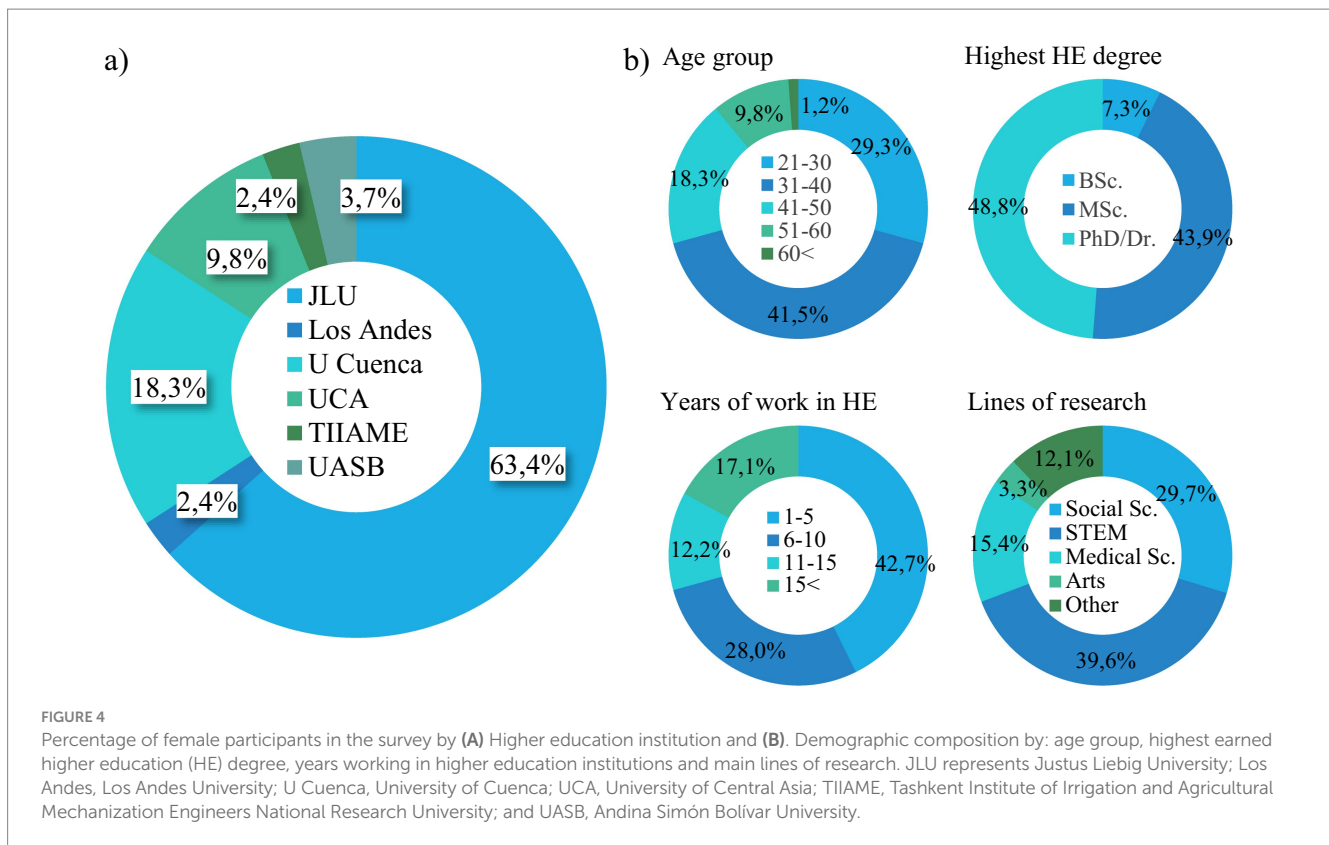
In terms of demographics (Figure 4B), the survey shows that over 40% of respondents are in the 31–40 age group, and an important portion (29.3%) having over 11 years of experience in higher education. Doctoral degrees are the most common qualification (48.8%), followed by Master's degrees (43.9%). Interestingly, academics in STEM fields make up the largest group, followed by those in social sciences, with arts being the least represented.

Additionally, the majority of respondents are working in academic positions as Doctoral candidates and Postdoctoral researchers (32 and 24%, respectively), with 12% as Full Professors and 3% as project managers, among other roles (not included in Figure 4B). This mix suggests a survey population that is both highly educated and relatively young, while still incorporating valuable perspectives from more senior academics across various career stages (SDG 4, Target 4.4)⁵.

Respondents show important achievements in their academic careers. These include positions such as Vice Rector (U Cuenca), Full Professor (Los Andes, U Cuenca, UASB, JLU), Dean (JLU), Executive director of research centers (JLU), Research group leader (JLU, U Cuenca), Scientific research ambassador (JLU), Director of career and/or scientific international projects (JLU, U Cuenca, UCA), and Head of scientific research centers (TIAME), (SDG 5, Target 5.5).

Participants across the institutions share core activities: producing and publishing scientific work, and teaching. However, their engagement in additional academic activities varies. Publishing in international journals, both as lead and co-authors, is a prevalent practice, though not general, around 27% have not yet engaged in this activity. Leading research projects as principal investigators is less common, with only 26% having this experience. On average, they work in an academic landscape where male colleagues are the majority (except from the perspective of respondents from UCA). However 41.5% of respondents do not believe males are more attracted to academic careers than females. The rest are divided, with 36.5% saying 'Yes' and 22% saying 'Maybe.'

⁵ By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.



Concerning satisfaction with their academic achievements, a mixed picture emerges. While 12.2% of respondents expressed being very satisfied, and 40.2% indicated they were satisfied, a significant portion (22%) were neutral. Dissatisfaction was also present, with 22% reporting being dissatisfied and a small minority (3.7%) very dissatisfied. Participants aspire to achieve higher roles such as, e.g., Full Professor or research group leaders, emphasizing the importance of research and the drive to make substantial contributions to their fields and the society. Others aim for leadership positions like Deans or Rectors to be in decision-making roles. Still, some express a more practical desire for job stability and a better work-life balance within academia (SDG 5, Target 5.4).⁶ Interestingly, 39% of the respondents consider networks of female researchers as a critical strategy to confront the glass ceiling, while the remaining responses were split between “No” (13.4%) and “Maybe” (47.6%).

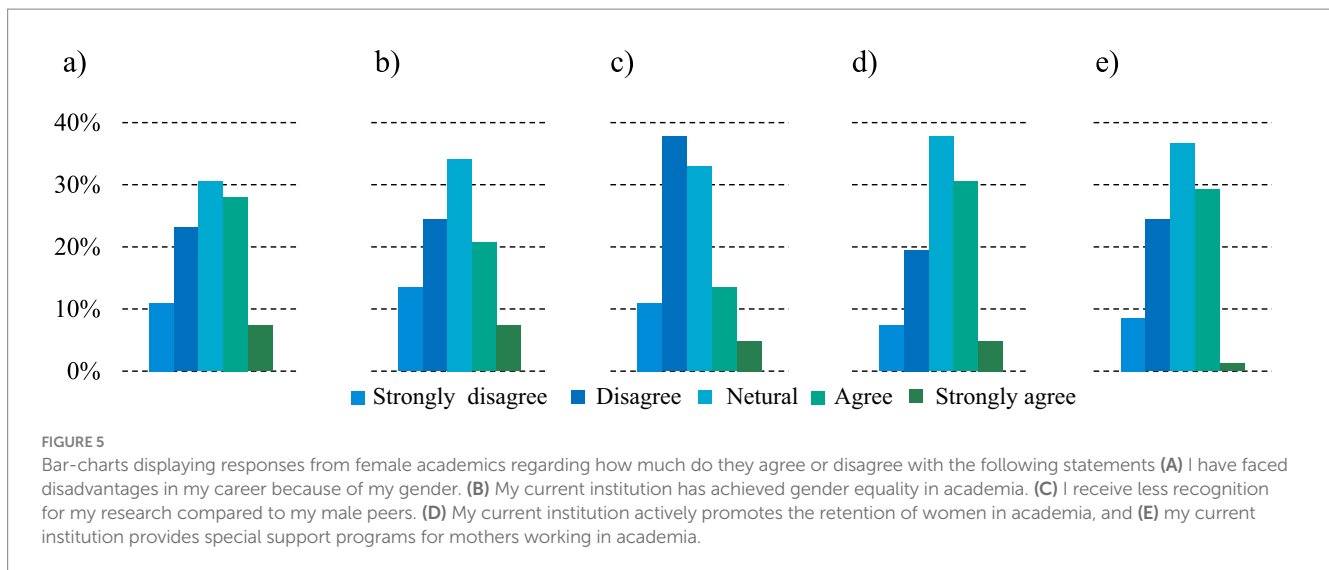
Regarding the knowledge on the implementation of institutional policies aimed at achieving gender equality, 37.8% of respondents affirmed to know that their university has implemented such policies (SDG 5, Target 5.c).⁷ Meanwhile, 52.4% expressed uncertainty about

the implementation, and 9.8% reported the absence of specific initiatives in this regard.

Results reveal a complex picture of females’ perceptions of the academic landscape, based on their level of agreement (Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree) from several statements (a-e). Concerning statement (a) “I have faced disadvantages in my career because of my gender,” 35.4% of respondents agreed or strongly agreed, while 30.5% indicated neutrality (Figure 5). The remaining 34.1% disagreed or strongly disagreed with the statement. A similar pattern emerges regarding the recognition of their research compared to their male peers (b) “I receive less recognition for my research compared to my male peers.” While 34.2% of respondents remained neutral, 20.7% agree and 7.3% strongly agree on the feel that they receive less recognition, highlighting a gender disparity in academic credit (a & b are related to SDG 5, Target 5.1). Concerning gender equality at their current institutions (c) “My current institution has achieved gender equality in academia,” a significant majority (48.8%) do not perceive that gender equality has been achieved, with only 18.3% agreeing otherwise (SDG 5, Target 5.c). On a positive note, the survey reveals a supportive trend towards retaining female talent in academia (d) “My current institution actively promotes the permanence of women in academia.” 35.4% of respondents (30.5% agree and 4.9% strongly agree) acknowledge their institutions’ efforts, while 26.8% did not observe such initiatives (SDG 4, Target 4.4). Finally, regarding special support programs for mothers in academia (e) “My current institution provides special support programs for mothers working in academia,” 30.49% of respondents (29.27% agree and 1.22% strongly agree) affirm that their institutions provide this support, while 32.9% report otherwise (SDG 5, Target 5.5).

⁶ Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.

⁷ Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels.



To simplify the analysis, responses from individual institutions were grouped into the “agreement side” (combining ‘agree’ and ‘strongly agree’) and the ‘disagreement side’ (combining ‘disagree’ and ‘strongly disagree’). Concerning the statement (a) most responses trend towards agree or strongly agree, except for JLU, which shows parity between agreement and disagreement. For statement (b), survey participants from JLU and Los Andes had more people disagreeing, while from UCA and TIIAME had balanced responses. U Cuenca and UASB leaned towards agreement side. Concerning statement (c), respondents from JLU, UASB, and UCA predominantly disagree, whereas from Los Andes, U Cuenca, and TIIAME lean towards agreement side. In terms of statement (d), participants from UCA and JLU lean towards agreement, TIIAME and UASB had parity on responses, from U Cuenca leaned slightly towards disagreement, and from Los Andes remained neutral. Lastly, for statement (e), survey participants from JLU and U Cuenca lean towards agreement with a slight margin over disagreement side, from UCA, TIIAME, and UASB are on the disagreement side, and respondents from Los Andes has an equal distribution between agreement and disagreement.

Figure 6, illustrates the perceived obstacles among females in achieving leading positions. The most important challenges include time-based conflicts between family and career (63.4%), followed by concerns about maternity and/or caregiving responsibilities (46%) (SDG 5, Target 5.4). Part-time or short period contracts (34%), stereotypes (27%) and lack of self-confidence (24%) are also notable concerns. Conversely, the perceived lack of obstacles is minimal, accounting for only 2% of responses. Comparable trend are observed analyzing at institutional level, however, the fear of not meeting expectations of their gender role and the lack of female role models are additional highlighted topics. Additional aspects were highlighted such as: concerns about fairness in selection processes, sexism in academia and economic disparities affecting career choices.

In addition, the survey highlights diverse perceptions from respondents on what is needed to achieve gender equality at their academic institutions. The majority of respondents emphasize the necessity of making women’s achievements more visible (57.3%) and the implementation of mentoring programs (47.6%) and as crucial steps. Additionally, there is important call for opening positions for

underrepresented genders (35.4%), and quotas for leadership positions (29.3%) (SDG 5, Target 5.5). Several responses from the ‘Others’ category emphasize that a cultural change within institutions to combat patriarchy (SDG 5, Target 5.1, 5.2).⁸ Additionally, implementing safe reporting channels, providing better career support for women scientists, and ensuring equal opportunities and recognition in academia (SDG 5, Target 5.2) are crucial steps (see Figure 7).

Results from the interviews

Step 1: Familiarization with Data.

Six interview transcripts with senior academics from various academic institutions and research fields were used for thematic analysis. The academics interviewed are: Dr. Gulnara Dzhunushalieva (UCA) Eng. Lorena Sigüenza Guzmán, PhD (Ucuenca), Prof. Dr. Ramona Teuber (JLU), Dr. Miriam Lang (UASB), Dr. Maria Radkevich (TIIAME), and Dr. Lina Morrús (Los Andes). For the analysis, their initials were used: GD, LS, RT, ML, MR, and LM, respectively.

The interviewees highlighted the cultural and social aspects of their surroundings as key elements shaping their academic trajectories. They discussed their motivations for entering and staying in academia, as well as their journeys toward leadership roles. Additionally, they offered their perspectives on the situation of women in academia, discussing both opportunities and challenges at institutional, local, and regional levels. Finally, they provided advice for aspiring female academics.

Step 2: Coding, the initial codes identified are based on their recurrency:

Family Influence, Vocation, Opportunities, Curiosity, Early Leadership, Ambitions, Research, Impact, Transition, Self-Confidence,

⁸ Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation.

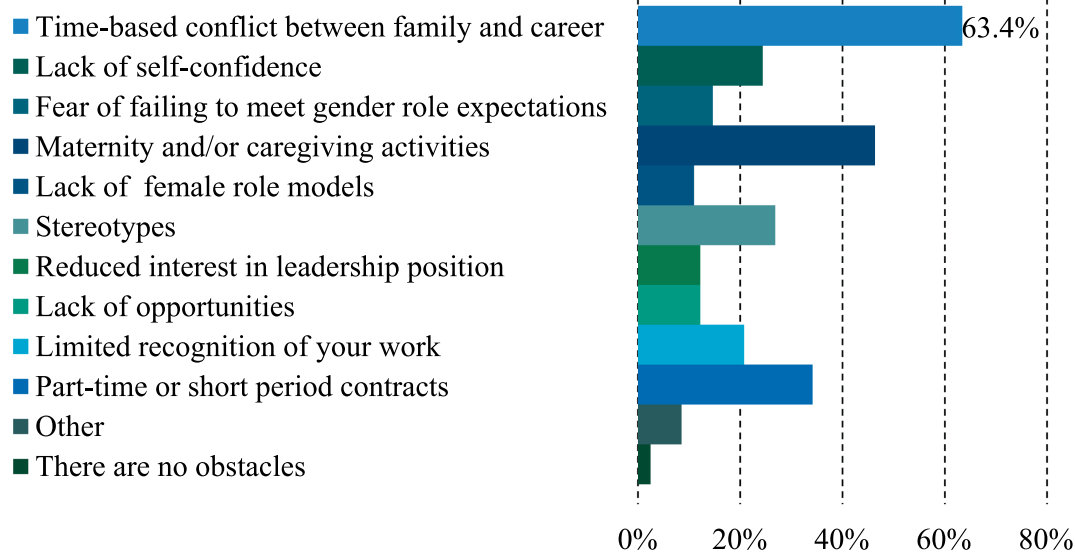


FIGURE 6

Bar-chart showing the obstacles perceived by participants in reaching leading academic positions. The x-axis displays the percentage of responses, with participants able to select up to five main obstacles.

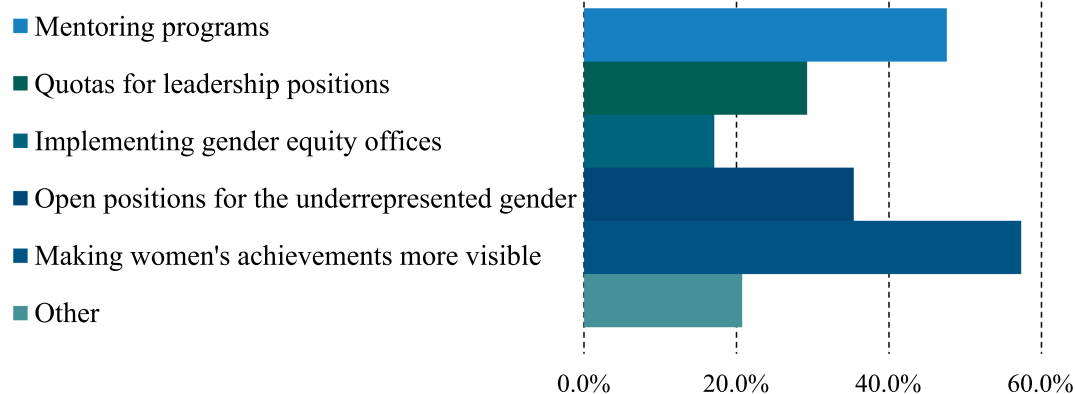


FIGURE 7

Strategies needed to achieve gender equality in higher education institutions. The chart illustrates the percentage of responses.

Advancement, Teaching, Leadership, Adaptation, Authenticity, Social Impact, Positions, Work-Life Balance Challenges, Discrimination, Equality, Biases, Salaries, Representation, Obstacles, Stress, Societal Influences, Contracts, Culture, Prejudices, Self-Sufficiency, Gaps, Perceptions, Stereotypes, Policies, SDGs, Support, Persistence, Overcoming Obstacles, Mentors, Networks, Training, Initiatives, Tools, Progress Needed, Confidence, Collaboration, Taking Risks.

Steps 3 to 5: Figure 8 illustrates the thematic analysis process, focusing on steps 3, 4, and 5: Searching for Themes, Reviewing Themes, and Defining and naming themes.

Step 6: Writing the report.

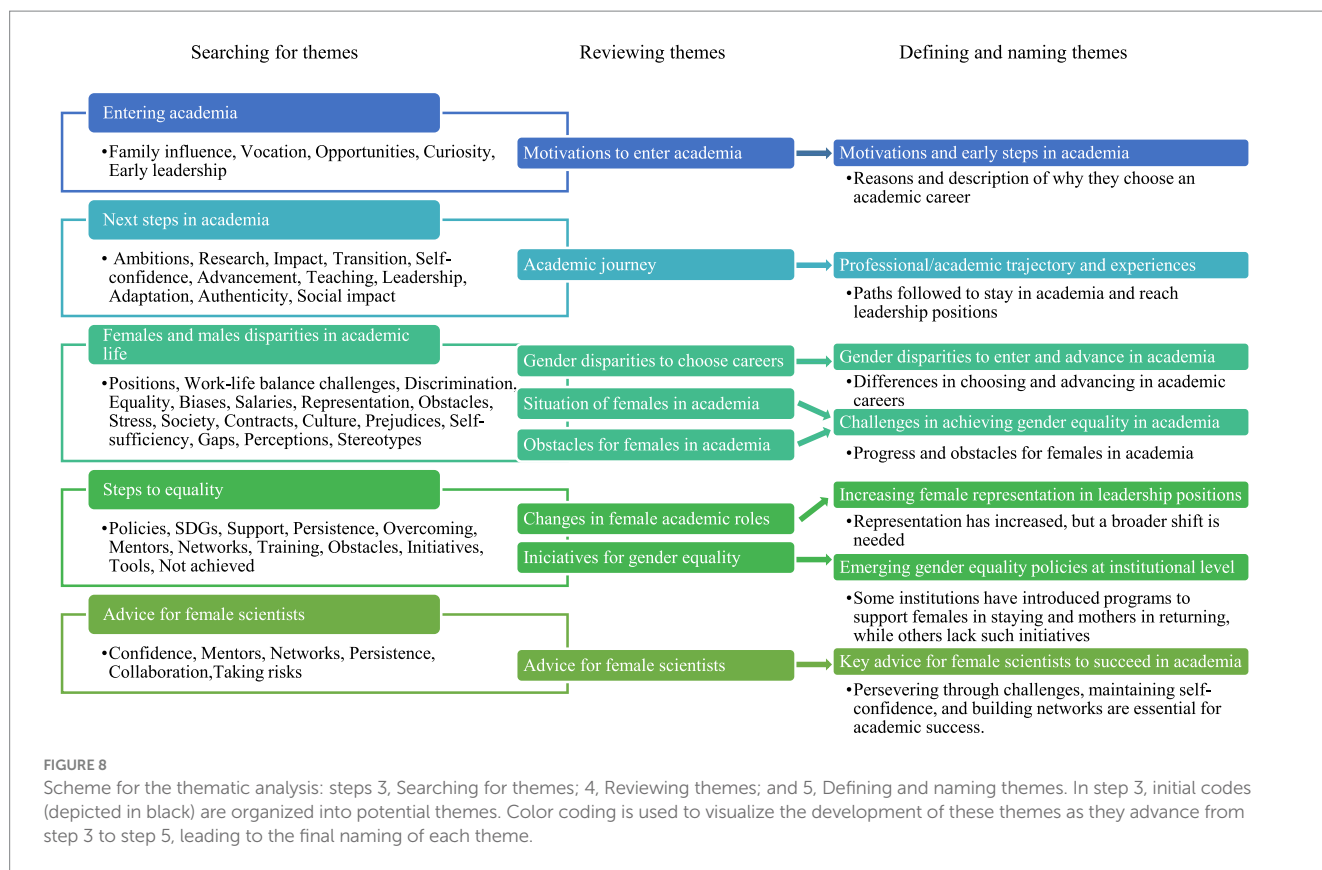
Motivations and early steps in academia

The motivations for entering academia varied among the interviewees. Some, like RT and LM, were drawn to academia early in their careers due to a passion for teaching, learning, and the variety of

tasks that the academic environment offers. Others, such as LS and ML, entered academia after pursuing other career paths. These motivations included personal and family influences, such as having relatives in academia, as well as a deep curiosity and passion for research, teaching, and leadership. Many interviewees felt a calling or strong personal drive from an early age, benefited from good access to education (SDG 4, Target 4.3), and were motivated by a desire to make societal impacts through research and education. As ML stated, “The university could be a good place to enact dreams to transform society, I tried to make the world a better place in my previous and present occupations.”

Professional/academic trajectory and experience

Their paths often involve a transition from other fields into academia, or maintaining parallel jobs, such as IT management or work with NGOs. Their experiences include changing institutions, roles, and working in different countries, reflecting their adaptation



and career development. LS mentioned, “After completing my studies, I worked as an IT manager at a library. I then received a scholarship to pursue a PhD in Belgium, and in the middle of my PhD, a call for a Professorship position opened up. I applied and got it (...) now, I am the first-ever female dean of the Engineering Faculty at the University of Cuenca.” Several interviewees highlighted pivotal moments of transition, such as balancing family responsibilities with career advancements (SDG 5, Target 5.4) or transitioning between different academic institutions and research focuses.

Gender disparities in entering and advancing in academia

Almost all interviewees agreed that both men and females are equally attracted to academia. However, staying in academia and reaching leadership positions is still more accessible for men due to historical and traditional reasons (SDG 5, Target 5.5). While men are often perceived as more drawn to academia, personal and professional motivations are similar across genders. As ML stated, “Women and men are equally attracted to academia, but females get frustrated on their path and leave, they have weaker positions weaker positions. There are women professors, but they often have more precarious contracts, less stability, and less authority in their positions. It is still a patriarchal space in Latin America and Europe, in Germany as well” highlighting the structural obstacles females face in reaching leadership positions. RT mentioned, “People like to hire similar people, if there are only men, they hire more men, they consider the candidate that is most similar to them” explaining that if there are only men in leadership, they tend to hire more men. In addition, females face more obstacles in advanced stages, including stereotypes about female behavior and traditional

attitudes. MR mentioned, “The main obstacle is the traditional attitude toward females. Despite the fact that officially everywhere they talk about equal rights and even priority support for women in the academic sphere, in reality men are not always ready to submit to a female leader... In addition, women themselves are often reluctant to take on leadership positions so that they can devote more time to raising children” Females encounter resistance from male colleagues and subordinates and are often perceived as leading differently, such as being more emotional. However, as RT pointed out, “there are stereotypes about how women lead, such as being more emotional, but it is not bad to lead differently.”

While there were notable examples of progress in gender representation—such as MR observing increasing opportunities for females in technical fields in Uzbekistan—challenges like gender disparities in leadership positions persisted across contexts. LS’s observations in Ecuador and ML’s experiences in Germany and Latin America highlighted ongoing gender gaps in academia despite incremental changes.

Challenges in achieving gender equality in academia

“There are many obstacles, but not so tangible (...) and you breathe patriarchal air at university... In teaching plans and syllabi, I have noticed that not a single woman is cited in the literature. I feel like there’s an inner laziness to change this, to actively look for female authors... there’s also a prejudice that women’s papers are of lesser quality” ML said. LM mentioned, “At the university, there are many biases and mental models of what a woman is supposed to be.” Some challenges mentioned include subtle discrimination, precarious contracts, and prejudice that women’s research is of lesser quality (SDG

5, Target 5.1). All interviewees pointed out the reduced number of female colleagues in the advanced stages of academic careers. Nearly all interviewees highlighted that raising children and having a family is the major challenge for women in academia. It is embedded in society to see women as the main caregivers (SDG 5, Target 5.4). LS mentioned, “People who hire assume that men can work later hours than women and do not need time off for children.” During recruitment, some interviewees mentioned being asked about plans for having and caring for children. GD stated, “As an academic, you travel a lot, but as a mother, you do not want to go when your children are ill.” RT expressed however that a change in the perspective on mothers is also important, “You can be very good even if you do not attend every meeting and conference, it is ok to leave early... I have felt more relaxed working full-time in Denmark than part-time in Germany. However, I have noticed that there are slowly changes in Germany as well, with more flexibility for mothers depending on the leader of the working group.”

Increasing female representation in leadership positions

There is an overall positive perception among the interviewees regarding the progress in the representation of women in leadership roles in higher education (SDG 5, Target 5.5). LM stated, “I see that there are many gaps to be filled, but many leadership positions have now been taken by women. I feel that this is a good sign for change. If you dream big, maybe the institution will support you.” Institutions are appointing Rectors, Presidents, and Deans in STEM fields for the first time. However, while a transformation process has begun, having women in such positions does not necessarily indicate a successful transformation in gender equality. It is a gradual process that still faces significant challenges. What was once a dream is now seen as a positive sign and a step towards gender equality. ML mentioned, “There are female professors, but they often have more precarious contracts, less stability, and less authority in their positions (...) it is still a patriarchal space.” MR noted, “Everywhere we talk about equal rights and even priority support for women in the academic sphere, in reality, men are not always ready to submit to a female leader.” Despite this, LS pointed out that there has been an improvement in the acceptance of women in leadership roles, regardless of initial cultural beliefs and structural attitudes against it. Women’s empowerment movements have contributed to these changes. Some interviewees also highlighted differences between public and private institutions and their political commitment to either advancing or restricting the path for women to leadership positions. GD remarked, “It is easy to choose female leaders in private universities.”

Emerging gender equality policies at the institutional level

The interviewees expressed that gender equality initiatives are in the early stages or emerging as mainstream concerns to create a more inclusive and fair environment (SDG 5, Target 5.5). Some institutions are introducing grants, establishing equal opportunities offices, and implementing policies to address sexual harassment and gender violence in the academic context (SDG 4, Target 4.a⁹ and SDG 5, Target 5.2). MR

mentioned, “Grant places for girls are allocated in universities, and free education for women in master’s degree programs is provided,” and RT agreed with the creation of a “gender equality office” but not a “women’s office.” RT also noted that initiatives such as gender equality concepts and recruitment groups focused on equal opportunities are being established at JLU. Additionally, there are movements and networks for women in research, including mentoring programs for women in science, as stated by LS and MR. However, even with these structures in place, some interviewees indicated that an unwelcoming environment from colleagues persists for women of childbearing age or those with caregiving responsibilities (SDG 5, Targets 5.1 and 5.4). Unfortunately, other institutions lack policies or programs to support females (ML), mothers returning to academia, and those with family caregiving duties.

Key advice for female scientists to succeed in academia

The interviewees offered advice for women starting careers in science, highlighting the importance of perseverance, self-belief, and networking. They encouraged women to trust their abilities, manage stress, and persist through challenges. GD emphasized the importance of deep specialization: “Be very specific and deep in one area to ensure you give something valuable to the world.” RT encouraged women to overcome fear and pursue their path: “Do not think too much about what could go wrong. If you want to go this way, you will find a way.” MR advised “It is not a good idea to start this career for those who are not ready for difficulties. You need to be prepared for stiff competition, bureaucratic procedures, huge problems with finding information, lack of funding and laboratory equipment. If you want to do science, you have to rely only on yourself...” LS advised women to overcome their doubts and have confidence in their abilities: “We can do it!” ML highlighted the value of networking and collaboration: “Do not try to do it alone! Team up with former students and teachers. It’s time-consuming but enriching.”

The mapping of specific SDG 4 and 5 targets in our results shows that not all targets are closely related to our research, but several have been highlighted in key aspects in our quantitative and qualitative results. For SDG 4, the focus includes targets: 4.3, 4.4, 4.5, and 4.a. For SDG 5, the relevant targets include 5.1, 5.2, 5.4, 5.5, and 5.c. Overall the most frequently related targets are linked to SDG 5, particularly 5.5 ‘Ensure women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life’, 5.1 ‘End all forms of discrimination against all women and girls everywhere, and 5.4 ‘Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.’

Discussion

The analysis of female representation in higher education from 1992 to 2022 shows steady progress toward gender parity in Europe, partly driven by initiatives such as gender equality policies and the implementation of GEPs in higher education institutions ([European Commission: Directorate-General for Research and Innovation, 2021](#); [Rosa and Clavero, 2022](#)). In Germany, the progress has been slower but consistent. While enrollment parity has been achieved, parity

⁹ Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.

among higher education teachers is projected for 2051, with longer timelines likely for other academic positions including researchers, and leadership roles. In line with our findings, the [European Commission: Directorate-General for Research and Innovation \(2021\)](#), reports that Germany ranks 28th among EU countries for females in top research positions and 19th for female heads of higher education institutions. Despite the widespread adoption of frameworks like Germany's Excellence Initiative ([Riegraf and Weber, 2017](#)) and GEPs, noteworthy institutional and cultural shifts in universities have been limited ([Rosa et al., 2020](#)). Critics argue that the effectiveness of GEPs is hindered by the dynamic and complex academic landscape, influenced by emerging social movements ([Gilligan and Richards, 2018](#); [Grosser and McCarthy, 2019](#); [Subašić et al., 2018](#)) and increased focus on intersectional perspectives on gender inequality and discrimination ([Woods et al., 2022](#)).

As previously mentioned, detailed studies on gender equality initiatives and policies primarily come from developed countries ([Klenk et al., 2022](#)). However, major efforts have also been made in developing countries in Latin America & Caribbean. Although there is no unified regional plan, individual policies are being implemented. Our findings on female student enrollment in this region reveal a positive increasing trend, consistent with [Mella San Martin \(2021\)](#). This trend exceeds those observed in Europe. Countries like Colombia and Ecuador have shown a constant upward trend, outperforming Germany. In Colombia, this trend can be driven by the Law of Gender Equality ([Franco-Orozco and Franco-Orozco, 2018](#)) and in Ecuador by the Organic Law on Higher Education (LOES) ([Salazar et al., 2019](#)). Gender parity among teachers in Latin America & Caribbean remains below European trends, with projections indicating parity might be reached by 2080, Colombia by 2063, and Ecuador by 2036. A similar situation is observed for female researchers, where gender equality in academia and science remains elusive in this region. Other studies aligns with our findings showing persistent gender disparities in Latin American countries ([Franco-Orozco and Franco-Orozco, 2018](#); [Maheshwari et al., 2023](#)).

Central Asia presents a mixed picture regarding gender equality in student enrollment. While this region shows a positive trend, it is lower than in Latin America & Caribbean and Europe, and achieving parity in enrollment remains challenging ([UNESCO, 2021](#)). The gender issues in Central Asian countries are strikingly different from those in other parts of the world, with societal resistance to gender equality ideology ([Zharkynbayeva et al., 2020](#)). Kyrgyzstan has consistently surpassed gender parity, contrasting sharply with Tajikistan and Uzbekistan, where female students are underrepresented in higher education institutions, aligning with findings of [Zharkynbayeva et al. \(2020\)](#). This disparity within the region can be attributed to differences in national policies and economic conditions. Notably, Kyrgyzstan became the first post-Soviet country to adopt the Law on the Basics of Social Perspectives: Gender Equality in Central Asia in 2003.

Regarding teachers, Central Asia surpasses Europe and Latin America, influenced by the high female participation in Kyrgyzstan, while other countries in the region lag significantly ([UNESCO, 2021](#)). Similarly, Kyrgyzstan leads in research participation, tripling the rates of Tajikistan and Uzbekistan. Historically, in the Soviet Union, Central Asian women had broad access to education and made up a significant part of the workforce. However, they were largely excluded from leadership roles ([Zharkynbayeva et al., 2020](#)), which may still affect the region today.

In discussing the female-to-male ratio of female researchers across all research sectors and in higher education, most countries show similar ratios. However, Kyrgyzstan stands out with lower ratios in the business enterprise and government sectors, which explains the reduction in the total relative to higher education ratios. Similarly, Germany also shows a notably lower ratio in the business enterprise sector.

A major limitation in assessing institutional-level information is the scarcity of publicly available data on the gender composition of students, academic positions, and leadership roles within higher education institutions. This challenge reflects systemic issues in data transparency and accessibility in some regions, which can result in an incomplete representation of gender realities. In addition, this highlights the disparities in information-sharing practices among institutions and regions, and underscores the need for governments to implement policies that improve the implementation of standardized data reporting practices to ensure more accurate and comprehensive records, facilitating better analysis and policy development to address gender disparities.

Although at JLU female students are in the majority and gender parity has been achieved in Postdoctoral research positions and Junior Professor roles, progress to faculty roles, particularly Full Professorships, remains slow reflecting the glass ceiling and sticky floor definitions. Women have consistently earned the majority of academic degrees, but men are primarily filling the top academic positions. This suggests that while targeted initiatives at JLU and within the national framework may be effectively addressing some barriers to gender balance in academia, noteworthy challenges persist. This observation is consistent with a substantial body of literature that highlights the mechanisms affecting women's advancement in academia ([Diehl and Dzubinski, 2017](#); [Lerchenmueller and Sorenson, 2018](#); [Yousaf and Schmiede, 2017](#)) and leadership in higher education ([Klenk et al., 2022](#)).

Overall, the study cases have shown a steady or positive trend in female student enrollment and in the number of academic staff, although gender disparities become pronounced with advancement in the academic career ([Franco-Orozco and Franco-Orozco, 2018](#)). Therefore, our findings reflect the *leaky pipeline* effect ([Pandit and Paul, 2023](#); [Yousaf and Schmiede, 2017](#)). Our results also align with studies showing that the participation of female students in higher education in developing countries is lower compared to developed countries ([CohenMiller et al., 2022](#)). Particularly in developing countries, where socioeconomic factors like low per capita income and systemic inequities severely restrict higher education and career advancement opportunities. Regional variations in progress toward gender equality indicate that local initiatives and institutional structures may be crucial in this process. However, individual institutions usually lack the resources to track and measure impact of such initiatives ([Bothwell et al., 2022](#)). It is important to recognize that national or regional frameworks could unify and standardize these dispersed initiatives, consolidating policies and creating cohesive action plans. Thus, such policies could be understood as tools for shaping progress in gender equality in higher education ([Klenk et al., 2022](#)) enabling monitoring and comparison as in the case of the GEPs in the European Union. Moreover, there needs to be a shift in approach from merely monitoring females' enrollment in higher education to actively tracking their progress and success throughout their academic careers.

The predominance of families of origin from urban areas with high levels of parental education influences participants' access to higher education. This is supported with the fact that parental aspirations and support play a crucial role in shaping academic trajectories and educational decision-making (Castro et al., 2016; Jung and Lee, 2019; Rughoobur-Seetah, 2019). An add-on from the interviews results highlights once again the crucial role of family influence in entering and succeeding in academic careers (Castro et al., 2016).

Female respondents to the survey widely perceive that they develop their careers in male-dominated academic environments. Although they have achieved significant milestones and some have taken on leadership roles, they remain underrepresented in research leadership and decision-making positions. They clearly aspire to reach higher academic ranks, such as Full Professors, research group leaders, Presidents and Rectors, and improve their institutions. This aligns with existing literature, which suggests that to succeed, women often need to perform within a masculine context and conform to pre-established masculine behaviors deemed characteristic of successful leadership (Cañas et al., 2019; Haveman and Beresford, 2012). While interviewed participants do not view their gender as a barrier to developing leadership identities, the masculine academic culture resists accepting leadership styles typically associated with women (Bhatti and Ali, 2021). The adaptation to masculine standards can limit their ability to develop an authentic leadership identity and to be recognized as effective and genuine leaders in academia (Madsen and Longman, 2020). Additionally, the interviews shed light on the demystification of leadership styles, indicating that leading differently is not only acceptable but also beneficial. This aligns with the increasing recognition of the added value that gender-balanced leadership and diversity bring to leading higher education institutions (David, 2021; Rosa et al., 2020). Therefore, it is crucial to continue implementing gender-sensitive policies at universities to avoid perpetuating masculine academic discourse and to celebrate diverse forms of leadership.

While progress has been made towards gender equality in academia, the survey results show that it seems inadequate, as many other studies. It highlights that gaps persist. A considerable number of respondents reported experiencing gender-based disadvantages, resulting in lower recognition of their scientific contributions. Similar outcomes were evidenced from the interviews, where participants emphasize not so tangible obstacles but for example prejudice that women's research is of lesser quality. Moreover, institutions have not effectively achieved gender equality nor actively promoted the retention of women in academia, both with and without children. These findings align with broader research indicating that higher education institutions often manage gender diversity challenges reactively, rather than proactively addressing them (Pandit and Paul, 2023).

The outputs reveal that major obstacles to advancing to leadership positions are closely related to the time-based conflicts between family and career duties, and disproportionate responsibilities of maternity and caregiving activities traditionally assigned to women. This output aligns with existing literature highlighting deeply ingrained cultural expectations about gender roles—not merely a matter of choice, but one where choices are constrained by culture—as a fundamental cause of observed differences in educational attainment and job preferences (Haveman

and Beresford, 2012). Deeply ingrained cultural norms and oral traditions in some regions perpetuate caregiving responsibilities as predominantly female roles, further hindering women's career progression. Additionally, concerns about fairness in selection processes, sexism in academia, and economic disparities affecting career choices were noted by respondents, consistent with prior studies that emphasize structural barriers, such as those in hiring processes (Reuben et al., 2014; Sheltzer and Smith, 2014). The tendency to hire and promote individuals who are similar to oneself perpetuates this imbalance, further hinder women's academic careers as mentioned on one interview. In neoliberal universities, gender equality policies are often undermined by a merit-based system that is claimed to be gender-neutral but, in practice, favors men. This system exacerbates the challenges of balancing paid work and personal life, negatively impacting women in academia (Ivancheva et al., 2019). Nonetheless, advances in gender equality have shown an inverse trend in hiring processes in a study conducted in the USA (Williams and Ceci, 2015).

Regarding the measures needed to achieve gender equality in academic institutions, the results indicate that although emerging efforts, such as new gender equality policies and support networks, represent promising steps forward, these initiatives are still in their early stages and require sustained effort for significant change. The majority of respondent's view emphasizes that increasing the visibility of women's work and implementing mentoring programs as crucial steps to work on. Visibility is closely linked to power (Lewis and Simpson, 2012) and systems of recognition and reward within organizations, where favorable visibility increases the likelihood of employees' successes being recognized and rewarded (Turner et al., 2008). Furthermore, other studies have identified a common obstacle as the lack of mentors during the ascent to higher leadership positions, underscoring the need for both formal and informal mentoring programs as opportunities to support women in academia (Ballenger, 2010; Cañas et al., 2019; Searby et al., 2015). From the interviews, results emphasized the importance of support networks and persistence and resilience as key elements to succeed.

Despite ongoing efforts to align policies with the 2030 Agenda, significant challenges persist for SDGs 4 and 5. Our study indicates that many targets are hindered by ineffective contexts, limiting their impact. Insufficient progress in areas such as women's equal participation and leadership, elimination of discrimination, and the valuation of unpaid care work further complicates achieving these goals. Current trends suggest that gender parity and related objectives might be further off than 2030. This calls for a reassessment of the UN's targets and a re-evaluation of strategies to ensure progress towards gender equality in education and leadership in the near future.

As a final piece, a comprehensive conceptual model (Figure 9) has been developed based on our study. It will help identify the factors influencing female participation in higher education and leadership. This model illustrates the trends in enrollment and faculty representation, highlights gaps in senior roles, and addresses the impact of gender biases and institutional lag. It also outlines key challenges such as balancing family and career, and the need for structural and cultural transformation. By presenting strategies for improvement, aligning with SDG targets, and reviewing relevant laws and policies, the model provides a holistic view of the current landscape and opportunities for advancing gender equality in academia.

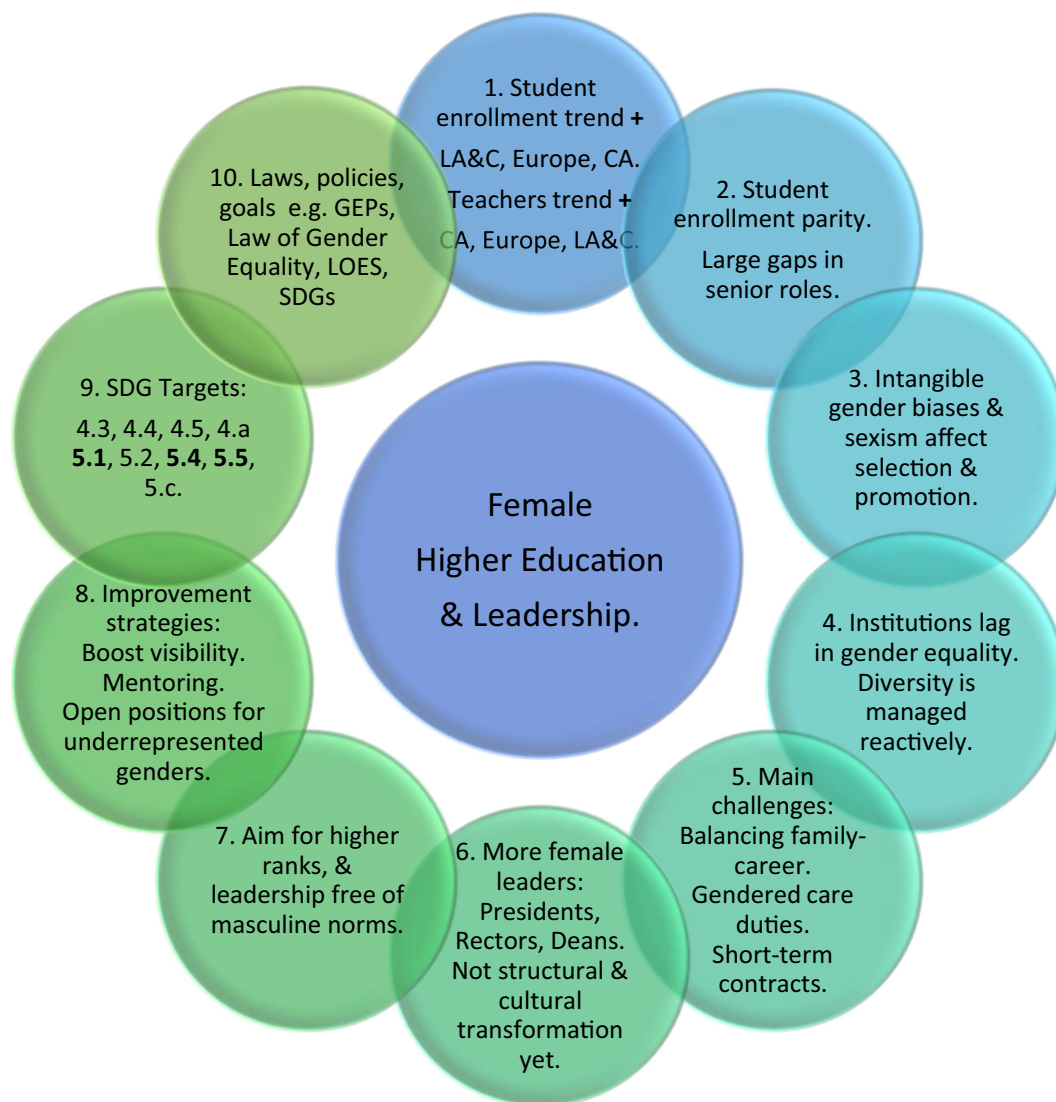


FIGURE 9

Conceptual model of factors influencing female participation and leadership in higher education. LA&C refers to Latin America & Caribbean, and CA to central Asia.

Conclusion

Although there is observable progress in female participation in higher education globally, this advancement is slow. The policies implemented have not significantly accelerated gender parity, and the projected years to achieve this equality extend beyond 2030. Internal variations within regions may be greater than the differences between regions, highlighting the need to analyze realities at smaller scales for a more accurate understanding.

The increase in the proportion of women in higher education teaching roles is evident in many regions. However, gender equality in academic leadership positions remains a significant challenge. Despite advances at junior levels, parity at the professor level is still far from being achieved in most institutions.

Perceptions of the obstacles faced by women in the academic environment are surprisingly similar across institutions, regardless of regional and cultural differences. Key barriers include work-life

balance, lack of role models, and perceived disadvantages due to gender.

Senior academics emphasize the importance of perseverance, networking, and specialization to overcome ongoing challenges related to gender stereotypes and traditional attitudes. While there have been advancements, women continue to face significant difficulties in achieving and maintaining leadership positions without male standards.

Several SDG targets appear to be related to ineffective contexts, limiting their impact. Insufficient progress is evident in areas such as equal female participation and leadership in higher education, the elimination of discrimination, and the valuation of unpaid care work, further complicating the achievement of these goals. Current trends suggest that gender parity and related objectives will not be achieved by 2030, necessitating a review of strategies and policies to ensure significant progress towards gender equality in education and leadership in the near future.

Limitations

We acknowledge the limitations of this study. Due to the limited number of participants, we cannot express results as representative of the institutions themselves, but only of the participants affiliated with those institutions. Nevertheless, this study has helped us outline similarities and differences in trends and perceptions across various cultural and regional contexts, as well as issues related to public information accessibility. The mapping methodology used outlines the relationship between findings and SDG targets, but it also highlights the need for careful interpretation and potential additional review to ensure comprehensive coverage of relevant objectives. Regarding gender parity projections, numerous external variables could potentially affect these predictions; however, they are beyond the scope of this study.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Ethics statement

Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

AC: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft. MG: Methodology, Writing – review & editing. JO: Data curation, Formal analysis, Methodology, Visualization, Writing – review & editing.

References

- Almukhambetova, A., Torrano, D. H., and Nam, A. (2023). Fixing the leaky pipeline for talented women in STEM. *Int. J. Sci. Math. Educ.* 21, 305–324. doi: 10.1007/s10763-021-10239-1
- Ballenger, J. (2010). Women's access to higher education leadership: cultural and structural barriers: forum on public policy online. Available at: https://www.academia.edu/26809814/Womens_Access_to_Higher_Education_Leadership_Cultural_and_Structural_Barriers (Accessed January, 08 2024).
- Beede, D., Julian, T., Langdon, D., McKittrick, G., Khan, B., and Doms, M. (2011). Women in STEM: A gender gap to innovation. *SSRN Electron. J.* doi: 10.2139/ssrn.1964782
- Bell, S., O'Halloran, K., Saw, J., and Zhao, Y. (2009). Women in science: Maximising productivity, diversity and innovation.
- Bhatti, A., and Ali, R. (2021). Women constructing leadership identities in academia: intersection of gender and culture. *Issues Educ. Res.* 31, 1–18. doi: 10.3316/informit.748616904401492
- BMZ. (2023). Feminist Development Policy—For Just and Strong Societies Worldwide. Available at: <https://www.bmz.de/resource/blob/153806/bmz-strategy-feminist-development-policy.pdf> (Accessed January, 15 2024).
- Bothwell, E., Roser-Chinchilla, J., Deraze, E., Ellis, R., Galán-Muris, V., Gallegos, G., et al. (2022). Gender equality: How global universities are performing. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000381739/PDF/381739eng.pdf.multi> (Accessed January, 15 2024).
- Braun, V., and Clarke, V. (2012). Thematic analysis.
- Bruckmüller, S., Ryan, M. K., Rink, F., and Haslam, S. A. (2014). Beyond the Glass ceiling: the Glass cliff and its lessons for organizational policy. *Soc. Issues Policy Rev.* 8, 202–232. doi: 10.1111/sipr.12006
- Buchmann, C., and DiPrete, T. A. (2006). The growing female advantage in college completion: the role of family background and academic achievement. *Am. Sociol. Rev.* 71, 515–541. doi: 10.1177/000312240607100401
- Burns, K. E. A., Straus, S. E., Liu, K., Rizvi, L., and Guyatt, G. (2019). Gender differences in grant and personnel award funding rates at the Canadian Institutes of Health Research based on research content area: A retrospective analysis. *PLoS Med.* 16:e1002935. doi: 10.1371/journal.pmed.1002935
- Cañas, C., Keeve, C., Ramos, C., Rivera, J., and Samuel, M. (2019). Women in higher educational leadership: representation, career progression, and compensation. *Am. J. Undergrad. Res.* 16, 5–13. doi: 10.33697/ajur.2019.026
- Castro, J. F., Yamada, G., and Arias, O. (2016). Higher education decisions in Peru: on the role of financial constraints, skills, and family background. *High. Educ.* 72, 457–486. doi: 10.1007/s10734-016-0040-x
- Cheung, F. (2021). The 'state' of Women's leadership in higher education. Boston, US: International Briefs for Higher Education Leaders.
- CohenMiller, A., Hinton-Smith, T., Samuel, N., and Haeri Mazanderani, F. (2022). Leading change in gender and diversity in higher education from margins to mainstream. first Edn.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This study was funded by the German Academic Exchange Service (DAAD) from funds of Federal Ministry for Economic Cooperation (BMZ), SDGnexus Network (grant number 57526248), program “exceed - Hochschulexzellen in der Entwicklungszusammenarbeit.

Acknowledgments

Special thanks to the interviewees for sharing their knowledge, a pivotal factor in the development of this study.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2024.1485395/full#supplementary-material>

- Cook, A., and Glass, C. (2014). Women and top leadership positions: towards an institutional analysis. *Gender Work Organ.* 21, 91–103. doi: 10.1111/gwao.12018
- Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches*. 3rd Edn. Los Angeles, Calif. London New Dehli Singapore Washington: SAGE.
- Dalati, S., Raudeliuniene, J., and Davidavičienė, V. (2020). Innovations in the management of higher education: situation analysis of Syrian female students empowerment. *Mark. Manag. Innov.*:245. doi: 10.21272/mmi.2020.4-20
- David, M. E. (2021). Changing global gender involvement in higher education participation. *Oxford Res. Encycl. Educ.* doi: 10.1093/acrefore/9780190264093.013.1304
- De Iorio, S., Zampone, G., and Piccolo, A. (2022). Determinant factors of SDG disclosure in the university context. *Admin. Sci.* 12:1. doi: 10.3390/admsci12010021
- di Luzio, G. (2009). Women, universities, and change: gender equality in the European Union and the United States. *Equal. Oppor. Int.* 28, 110–112. doi: 10.1108/02610150910933686
- Diehl, A. B., and Dzubinski, L. (2017). “An overview of gender-based leadership barriers” in *Handbook of research on gender and leadership*. eds. S. R. Madsen and J. M. Huntsman.
- European Commission: Directorate-General for Research and Innovation. (2021). *She figures 2021 – Gender in research and innovation – Statistics and indicators*, Publications Office. Available at: <https://data.europa.eu/doi/10.2777/06090>
- Fourie-Malherbe, M., and Williams, D. A. (2013). *Strategic diversity leadership: activating change and transformation in higher education*. Sterling, Virginia: stylus publishing. *J. Stud. Affairs Afr.* 1:28. doi: 10.14426/jsaa.v1i1-2.28
- Franco-Orozco, C. M., and Franco-Orozco, B. (2018). Women in academia and research: an overview of the challenges toward gender equality in Colombia and how to move forward. *Front. Astron. Space Sci.* 5:24. doi: 10.3389/fspas.2018.00024
- Frechette, J. (2009). Women, leadership, and equality in academe: moving beyond double binds. Available at: <https://eric.ed.gov/?id=EJ870466> (Accessed May, 10 2024).
- Gero, M., and Garrity, E. (2018). When women lead: cultivating diversity from the top. In *more women on boards: an international perspective* (pp. 225–240). Available at: <https://www.infoagepub.com/products/More-Women-on-Boards> (Accessed May, 08 2024).
- Gill, P., Stewart, K., Treasure, E., and Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *Br. Dent. J.* 204, 291–295. doi: 10.1038/bdj.2008.192
- Gilligan, C., and Richards, D. A. J. (2018). *Darkness now visible: Patriarchy's resurgence and feminist resistance*. Cambridge: Cambridge University Press.
- Glaser, B. G., and Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Editorial Aldine.
- Grosser, K., and McCarthy, L. (2019). Imagining new feminist futures: how feminist social movements contest the neoliberalization of feminism in an increasingly corporate-dominated world. *Gender Work Organ.* 26, 1100–1116. doi: 10.1111/gwao.12267
- Haveman, H. A., and Beresford, L. S. (2012). If You're so smart, why Aren't you the boss? Explaining the persistent vertical gender gap in management. *Ann. Am. Acad. Pol. Soc. Sci.* 639, 114–130. doi: 10.1177/0002716211418443
- Heath, R., and Jayachandran, S. (2018). “The causes and consequences of increased female education and labor force participation in developing countries” in *The Oxford handbook of women and the economy*. eds. S. L. Averett, L. M. Argys and S. D. Hoffman (Oxford: Oxford University Press).
- Hellum, M., and Oláh, L. S. (2019). ‘Doing gender and gender equality’ through emotional expressions during a research interview. Views of highly educated Swedish young adults. *J. Gen. Stud.* 28, 304–317. doi: 10.1080/09589236.2018.1441018
- Heß, P. (2020). SDG 5 and the gender gap in standardization: empirical evidence from Germany. *Sustain. For.* 12:20. doi: 10.3390/su12208699
- Hinds, B. (2015). Strategies for increased participation of women in leadership across the commonwealth (DISCUSSION PAPER). Available at: <https://production-new-commonwealth-files.s3.eu-west-2.amazonaws.com/migrated/inline/Women%20in%20Leadership%20Discussion%20Paper.pdf> (Accessed June, 14 2024).
- Hirsu, L., Quezada-Reyes, Z., and Hashemi, L. (2021). Moving SDG5 forward: Women's public engagement activities in higher education. *High. Educ.* 81, 51–67. doi: 10.1007/s10734-020-00597-0
- Hodge, B. (2017). “Discourse analysis” in *The Routledge handbook of systemic functional linguistics*. eds. T. Bartlett and G. O'Grady (London: Routledge).
- Ivancheva, M., Lynch, K., and Keating, K. (2019). Precarity, gender and care in the neoliberal academy. *Gender Work Organ.* 26, 448–462. doi: 10.1111/gwao.12350
- Jung, J., and Lee, S. J. (2019). Exploring the factors of pursuing a master's degree in South Korea. *High. Educ.* 78, 855–870. doi: 10.1007/s10734-019-00374-8
- Kezar, A. (2014). “Women's contributions to higher education leadership and the road ahead” in *Women and leadership in higher education*. eds. K. A. Longman and S. R. Madsen (Charlotte, NC, US: IAP Information Age Publishing), 117–134.
- Klenk, T., Antonowicz, D., Geschwind, L., Pinheiro, R., and Pokorska, A. (2022). Taking women on boards: A comparative analysis of public policies in higher education. *Policy Rev. High. Educ.* 6, 128–152. doi: 10.1080/23322969.2022.2066014
- Lerchenmueller, M. J., and Sorenson, O. (2018). The gender gap in early career transitions in the life sciences. *Res. Policy* 47, 1007–1017. doi: 10.1016/j.respol.2018.02.009
- Lewis, P., and Simpson, R. (2012). Kanter revisited: gender, power and (in)visibility. *Int. J. Manag. Rev.* 14, 141–158. doi: 10.1111/j.1468-2370.2011.00327.x
- Madsen, S., and Longman, K. (2020). Women's leadership in higher education: status, barriers, and motivators. *J. High. Educ. Manag.* 35, 13–24.
- Maheshwari, G., Gonzalez-Tamayo, L. A., and Olarewaju, A. D. (2023). An exploratory study on barriers and enablers for women leaders in higher education institutions in Mexico. *Educ. Manag. Admin. Leadership* 1:174114322311532. doi: 10.1177/17411432231153295
- McAllister, D., Juillerat, J., and Hunter, J. (2016). What stops women getting more grants? *Nature* 529:466. doi: 10.1038/529466d
- Mella San Martin, C. (2021). *Between persistence and change in Latin America: Did the recent expansion of higher education reduce educational inequality by social origins?* Oxford: University of Oxford.
- Nittrouer, C. L., Hebl, M. R., Ashburn-Nardo, L., Trump-Steele, R. C. E., Lane, D. M., and Valian, V. (2018). Gender disparities in colloquium speakers at top universities. *Proc. Natl. Acad. Sci.* 115, 104–108. doi: 10.1073/pnas.1708414115
- OECD. (2015). *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological and Innovation Activities*. Paris: OECD Publishing.
- Palacios Díaz, D. (2020). Norman Fairclough y el análisis crítico de discurso: Armas para una lingüística materialista. *Pensamiento Margen* 12, 103–116.
- Pandit, J. M., and Paul, B. (2023). Gender diversity, sustainable development goals and human resource management practices in higher education. *Indian J. Hum. Dev.* 17, 111–130. doi: 10.1177/09737030231169699
- Profeta, P. (2017). Gender equality in decision-making positions: the efficiency gains. *Intereconomics* 52, 34–37. doi: 10.1007/s10272-017-0640-4
- Ramsay, K. (2007). “Women: mothers and others. Discourses of women and motherhood in three academic departments” in *Challenges and Negotiations for Women in Higher Education*. eds. P. Cotterill, S. Jackson and G. Letherby (Berlin: Springer), 33–52.
- Ranieri, V., Barratt, H., Fulop, N., and Rees, G. (2016). Factors that influence career progression among postdoctoral clinical academics: A scoping review of the literature. *BMJ Open* 6:e013523. doi: 10.1136/bmjopen-2016-013523
- Reuben, E., Sapienza, P., and Zingales, L. (2014). How stereotypes impair women's careers in science. *Proc. Natl. Acad. Sci.* 111, 4403–4408. doi: 10.1073/pnas.1314788111
- Riegraf, B., and Weber, L. (2017). Excellence and gender equality policies in neoliberal universities. *Gender Res.* 18, 92–112. doi: 10.13060/25706578.2017.18.1.351
- Rosa, R., and Clavero, S. (2022). Gender equality in higher education and research. *J. Gen. Stud.* 31, 1–7. doi: 10.1080/09589236.2022.2007446
- Rosa, R., Drew, E., and Canavan, S. (2020). *An overview of gender inequality in EU universities in The Gender-Sensitive University*. London: Routledge.
- Rughoobur-Seetah, S. (2019). Factors affecting students' choices of tertiary institutions in small island developing economies. *Qual. High. Educ.* 25, 117–132. doi: 10.1080/13538322.2019.1635303
- Salazar, T., Del, R. S., Guillén, G. E. B., Hernández Lara, P. V., Franco, I. M. A., and Mayorga, G. A. V. (2019). The university and its role in achieving gender equality from diversity. *Dilemas Contemporáneos* VI, 1–21.
- Searby, L., Ballenger, J., and Tripses, J. (2015). Climbing the ladder, holding the ladder: the mentoring experiences of higher education female leaders. *Adv. Women Leadership J.* 35, 98–107. doi: 10.21423/awlj-v35.a141
- Sheltzer, J. M., and Smith, J. C. (2014). Elite male faculty in the life sciences employ fewer women. *Proc. Natl. Acad. Sci.* 111, 10107–10112. doi: 10.1073/pnas.1403334111
- Skov, T. (2020). Unconscious gender Bias in academia: scarcity of empirical evidence. *Societies* 10:2. doi: 10.3390/soc10020031
- Subašić, E., Hardacre, S., Elton, B., Branscombe, N. R., Ryan, M. K., and Reynolds, K. J. (2018). “We for she”: Mobilising men and women to act in solidarity for gender equality. *Group Process. Intergr. Relat.* 21, 707–724. doi: 10.1177/1368430218763272
- Timmers, T. M., Willemsen, T. M., and Tijdens, K. G. (2010). Gender diversity policies in universities: A multi-perspective framework of policy measures. *High. Educ.* 59, 719–735. doi: 10.1007/s10734-009-9276-z
- Turner, C. S. V., González, J. C., and Wood, J. L. (2008). Faculty of color in academe: what 20 years of literature tells us. *J. Divers. High. Educ.* 1, 139–168. doi: 10.1037/a0012837
- UNESCO. (2019). *Women in science: Fact Sheet No. 55*. Available at: <https://uis.unesco.org/sites/default/files/documents/fs55-women-in-science-2019-en.pdf> (Accessed May, 15 2024).

- UNESCO. (2021). Policy brief: Gender equality in and through education in Central Asia. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000377910> (Accessed February, 08 2024).
- UNESCO-IESALC. (2020). Where are the women university rectors in Latin America? Available at: <https://www.iesalc.unesco.org/en/2020/03/07/where-are-the-women-university-rectors-in-latin-america-unesco-iesalc-data-reveals-that-only-18-of-the-regions-universities-have-women-as-rectors/> (Accessed April, 09 2024).
- UNESCO-IESALC. (2021). Women in higher education: Has the female advantage put an end to gender inequalities? - UNESCO Biblioteca Digital. <https://unesdoc.unesco.org/ark:/48223/pf0000377182?1=null&queryId=7632b911-aeaa-48bd-9cd0-92779957ced5%0D> (Accessed April, 09 2024).
- UIS. (2022). UIS Statistics. Available at: <https://data.uis.unesco.org/>
- Villar, A., and Hernández, F. J. (2014). University transitions and gender: from choice of studies to academic career development. *Policy Futures Educ.* 12, 633–645. doi: 10.2304/pfie.2014.12.5.633
- Williams, W. M., and Ceci, S. J. (2015). National hiring experiments reveal 2:1 faculty preference for women on STEM tenure track. *Proc. Natl. Acad. Sci.* 112, 5360–5365. doi: 10.1073/pnas.1418878112
- Winchester, H. P. M., and Browning, L. (2015). Gender equality in academia: A critical reflection. *J. High. Educ. Policy Manag.* 37, 269–281. doi: 10.1080/1360080X.2015.1034427
- Woods, D. R., Benschop, Y., and van den Brink, M. (2022). What is intersectional equality? A definition and goal of equality for organizations. *Gender Work Organ.* 29, 92–109. doi: 10.1111/gwao.12760
- Yousaf, R., and Schmiede, R. (2017). Barriers to women's representation in academic excellence and positions of power. *Asian J. Ger. Eur. Stud.* 2.2. doi: 10.1186/s40856-017-0013-6
- Zamir, S. (2013). Difficulties faced by females in continuing higher education. *J. Res. Soc. Sci.* 1, 165–178.
- Zharkynbayeva, R., Abdiraimova, A., Sarsenbayev, A., and Bekzhanova, N. (2020). Societal perspectives: gender equality in Central Asia, between desideratum and realities. *Codrul Cosminului* 26, 331–356. doi: 10.4316/CC.2020.02.003