PROYECTO
BASE.

WOMEN IN STEM

THE ROUTE TO DEVELOPMENT FOR LATIN AMERICA

Executive summary

Gender differences in STEM (Science, Technology, Engineering and Mathematics) education can be often evidenced from an early age in elementary school, where girls are expected to excel in language related courses and boys in mathematics and sciences.

This condition becomes even more evident in high school, where adolescent girls are less motivated than boys to pursue scientific careers, due to a variety of social, cultural and contextual reasons.

In higher education, the gap becomes far more evident, young women account for only 35% of enrollments in scientific careers worldwide and, if they do enroll, they are more likely to not complete them or to leave the labor market after graduation. This statistic shows that men tend to pursue careers related to technology and innovation, which are usually better paid, while women are more likely to professionally develop in the field of humanities, a trend that accounts for a fundamental difference in how educational systems and cultural contexts still differentiate, on the basis of sex, from the very start.

It is not a matter of establishing one professional inclination as better than other, but rather of highlighting that **certain professions, even in 2021, are still reserved exclusively for men**, based on stereotypes that were thought to have been overcome but that affect the entry and advancement of women in certain job opportunities.

January 2021

Research and drafting
Ana Amundaray
Research analyst, Liberal Studies student

Sara Fadi
Research analyst, Liberal Studies graduate

Editing
Silvia Solórzano

Design
Sara Fadi

Index

INFO@PROYECTOBASE.ORG

Patterns in education

EN LATIN AMERICA

According to UNESCO's Third Regional Comparative and Explanatory Study (2016), significant gender disparities are found in students' achievements on specific courses. The study indicates that girls achieve better results in reading-based activities and boys, in comparison, excel in mathematics.
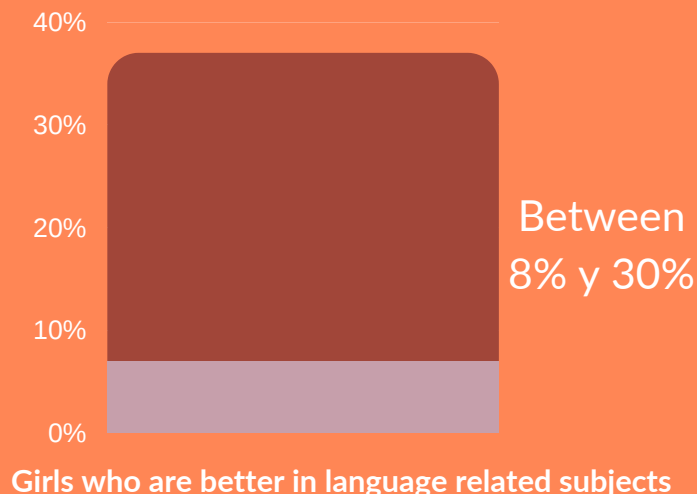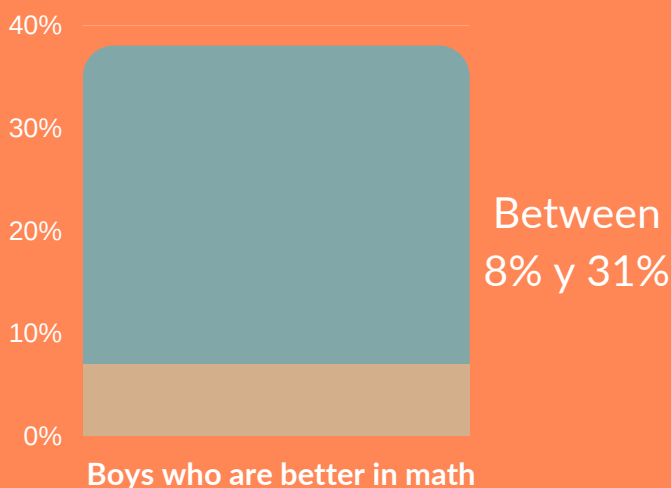
GIRLS

The data obtained from the TERCE study, suggests that the advantages in language related subjects in favor of girls **could be due to certain attributes typically allocated to them, such as dedicating more hours to study or homework.**

BOYS

The advantages achieved by boys in scientific or mathematical subjects **seem to be generated by socialization patterns specific to them,** which lead to more and better learning opportunities for boys in schools.

TEACHERS ALSO HAVE AN IMPACT

From an early age, teachers also contribute to the perpetuation of these stereotypes, which, along with the presence of an inadequate distribution of gender roles in Latin America, puts girls at a disadvantage when it comes to developing in more scientific areas. However, school-age girls and boys show similar results when it comes to excelling in mathematics or language.

Between 8% y 31%

Boys who are better in math

Between 8% y 30%

Girls who are better in language related subjects

44%

of *girls* say that reading is their favorite thing to do

25%

of *boys* say that reading in their favorite activity

26%

of *boys* with higher science or mathematics scores reported that they expect to work as professionals in science or engineering.
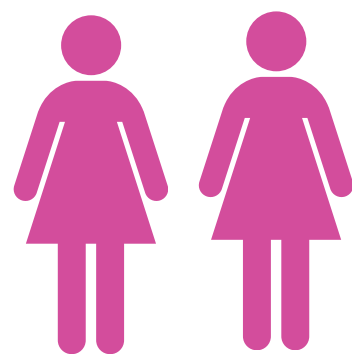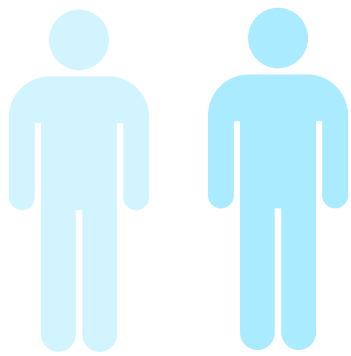
14%

of *girls* with higher science or mathematics scores reported that they expect to work as professionals in science or engineering.

Self-confidence matters

FEAR OF FAILURE

Regarding self-confidence and fear of failure, 1 out of 2 boys reported that failing at something made them doubt their abilities, **while this proportion rises to 2 out of 2 girls.**

CAREERS FOR BOYS, CAREERS FOR GIRLS

Stereotypes affect women's professional opportunities, as they believe that they cannot excel in scientific areas in the same way as men, which makes them focus on training for humanistic areas or in careers based in caring for others (nurses, physiotherapists, nannies). Therefore, this causes a low participation of women in STEM (science, technology, engineering and mathematics).

23%
of girls want to work in professions related to caring for others

8%
of boys want to work in professions related to caring for others

Inclusive public policies

EFFORTS IN LATIN AMERICA

Although Latin America presents stark gender inequalities, public and private entities have created programs to increase the number of women researchers and scientists:

1%

of young women reported wanting to work as ICT professionals (software developers, programmers).

BRAZIL

360

public education schools were the beneficiaries of 78 projects

Aiming at expanding the number of women in scientific and technological careers, the Secretariat of Policies for Women of the Presidency of the Republic (SPM/PR), along with the Ministry of Science and Technology and Petrobras, have implemented the **program Girls and Young Women in Exact Sciences, Engineering and Computing** (Projeto Meninas e Jovens Fazendo Ciências Exatas, Engenharias e Computação).

The program seeks to promote financial support for projects developed by schools that aim to encourage the training of women for careers in the exact sciences, engineering and computer science in Brazil, thus seeking to awaken the professional interest of female high school students in these professions.

Inclusive public policies

MEXICO

The **Training School Program for women in non-traditional occupations for their sex** seeks to strengthen the leadership abilities of women in marginalized situations. In collaboration with different trade union organizations (Mujeres trabajadoras unidas, A.C., Mujeres de acción sindical and MUTUA-MAS, among others) and

For every 100 pesos that a man earns in Mexico, a woman earns

78.8

The National Employment Office of the Ministry of Labor and Social Welfare they seek to include women in non traditional professions for their gender, such as electrician, silk screen printing, masonry or plumbing.

COSTA RICA

44%

of investigators in Costa Rica are women

The National Policy for Equality between Women and Men in Training, Employment and Enjoyment of the Products of Science, Technology, Telecommunications and Innovation (2018-2027) (PICTTI) was developed with five main objectives through which it aims to improve the participation of women in the STI (Science, Technology and Innovation) areas.

Objectives:

1. Study the reasons for gender gaps in order to establish future actions.
2. Generate mechanisms to guarantee or improve the possibility of women's participation in scientific and technological careers.
3. Improve working conditions and support for women's scientific and technological entrepreneurship.
4. Promote social approval through leadership, legal frameworks, services and digital spaces for women.
5. Institutional strengthening for the evaluation of PICTTI policies.

Inclusive public policies

ARGENTINA

The L'Oréal-UNESCO National Prize "For Women in Science" is an award organized by L'Oréal Argentina and the National Council for Scientific and Technical Research (CONICET) which seeks to distinguish scientific excellence and promote the participation of women in scientific areas.

14th

award ceremony

The trajectory of a researcher will be recognized with a sum of 700 thousand pesos for her to continue developing the project in the country. Also, 490 thousand pesos will be given to a young researcher or fellow in postdoctoral training to reward her training.

CHILE

The Institutional Policy for Gender Equity in Science and Technology 2017-2025 has implemented three main lines of action to promote greater participation of women in scientific areas.

1. Promote and enhance gender equality in the development of scientific and technological activity

2. Make visible the development of science and technology in the country from a gender equality perspective

3. Establish a culture of gender equity and diversity in the management of human and financial resources.

51,3%

of the undergraduates are women but...

only 22%

work in scientific fields

Regional inclusive public policies

TEACH HER 🇨🇷

Is a global initiative launched by UNESCO in 2016 that aims to close the gender gap in STEM studies. Through the UNESCO Network of Training Institutes, it aims to train leading educators and support networks contributing to the cause.

210
adolescents from 7 different schools have participated in the initiative

In addition, practical workshops have been held in the early stages involving government actors and others, to learn how to formulate gender-based plans and to motivate young women to undertake gender studies. Likewise, the program seeks to motivate countries to develop their own Teach Her programmes at national and local levels, and to highlight the importance of developing extra-curricular activities and local networks for girls.

PROGRAMA DIGIGIRLZ 🇭🇳 🇳🇮 🇸🇻 🇵🇦 🇬🇹 🇨🇷

54.000
girls have been impacted by the program in 54 cities worldwide

It's a program created by Microsoft and implemented in countries around the world. In Latin America it's active in Panama, El Salvador, Guatemala, Costa Rica, Honduras and Nicaragua. Through this program, practical workshops on technology, soft skills, as well as motivational talks for young women between the ninth and twelfth levels have been conducted to inspire them to participate in the areas of STEM.

In addition to showcasing the advantages of science and technology careers today, this program offers a space for young women to experiment in workshops in robotics, gaming, code and computational thinking. Furthermore, they can consult with women who have work in these areas, counteracting the lack of referents, a factor that can discourage young women in pursuing STEM careers.

Global inclusive public policies

SAGA PROGRAM (UNESCO)

SAGA (STEM and Gender Advancement) is a global UNESCO project that contributes to the promotion of women and girls in STEM, supporting key stakeholders in the design and implementation of STI (Science, Technology and Innovation) policies for gender equality. It also provides ways to develop and access evidence to assess STI policies using sex-disaggregated data and collecting new information on drivers and barriers in STEM.

1. Reduce the gender gap in STEM at all levels of education and research
2. Identify policy gaps and improve evidence-based national policies for gender-related science, technology and innovation
3. Develop gender data collection capacity in STEM
4. Increase the visibility, participation and respect for women in STEM
5. Improving tools to measure the status of women and girls in science.

ALTHOUGH LATIN AMERICA HAS 45% OF WOMEN RESEARCHERS, ONLY 6 COUNTRIES (ARGENTINA, CUBA. GUATEMALA, PANAMA, PARAGUAY AND URUGUAY) HAVE ACHIEVED PARITY

Percentage of female researchers

- < 32.6
- 32.6 - 38.6
- 38.6 - 48.2
- 48.2 - 56.6
- > 56.6
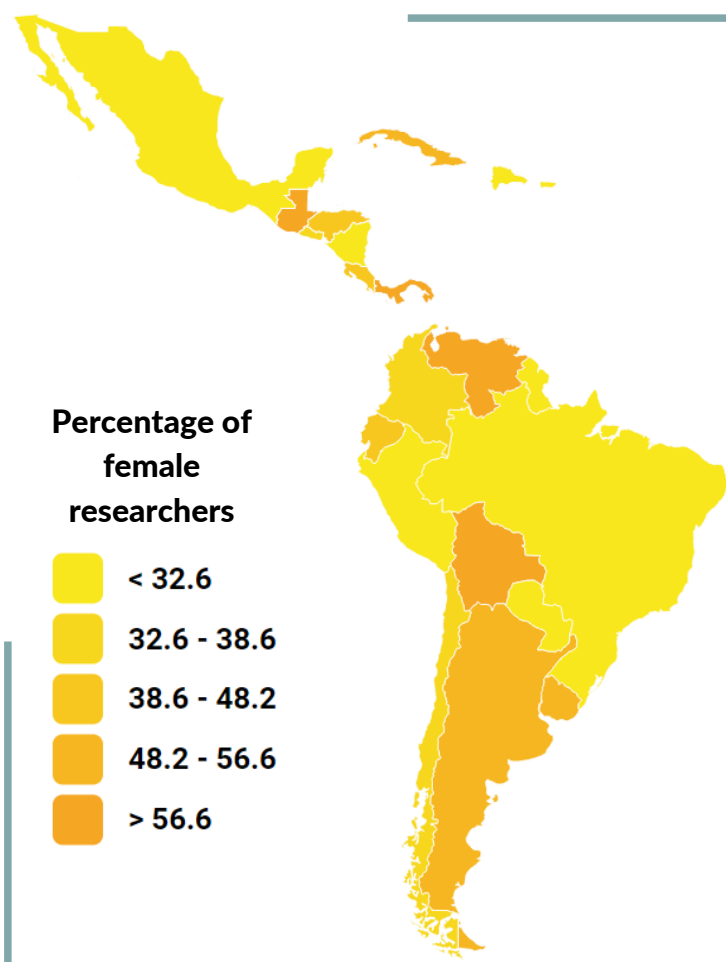
Conclusions

Gender gaps in education have been present since the last century. In consequence different countries, organizations and institutions have begun to take action to narrow these gaps. The main measures include: the study of the causes of gender gaps, recognition of distinguished women scientists, financial support for institutions and programmes that seek to motivate the training of women in scientific field, and finally, motivational talks and workshops in scientific areas for young women.

In the policies planned in Latin America, the importance of generating a change in the region's culture has been highlighted in order to include women in areas in which they participate to a lesser extent. This requires support from different levels: teachers must set aside stereotypes and act on the basis of education based on gender equity, parents at home must encourage young women to work in the field of their choice and policymakers should continue to develop plans to encourage greater participation of women. With all these measures, the goal is that progressively, women have greater freedom to work in the areas they wish, so they can fully develop their capacities and projects contributing to their society.

Conclusions

However, Latin America still has major shortcomings in terms of these public policies. In this investigation, when inquiring about the results of the different policies, it was not possible to find official reports that follow up on the projects showcased and evaluate their results. The lack of institutional control hinders the development of successful public policies, since it prevents the evaluation of their results and limits the capacity to take appropriate measures, as well as it makes it difficult to determine the right time to implement new proyects.

Gender parity is not only an essential area to work towards development, but also has an impact on 6 of the Sustainable Development Goals (SDGs) of the 2030 Agenda, as it promotes: quality education, decent jobs and economic growth, industry development, innovation and infrastructure, reducing inequalities, fostering peace, justice and strong institutions and seeking partnerships to achieve goals.

Despite the fact that Latin America has a high number of women researchers (on average 45%), it still has significant gender disparities, which can be seen in the fact that only 6 countries have reached parity in this area. The perpetuation of stereotypes that limit women into a given field of work and discriminatory attitudes still affect the confidence of Latin American women to excel in STEM. While steps had been taken to counter that, the region still had a long way to go and only by implementing innovative and useful plans it's possible to gradually narrow the gender gap and achieve greater developments.

Bibliographic references

Christie, M., O'Neill, M., Rutter, K., Young, G., & Medland, A. (2017). Understanding why women
are under-represented in Science, Technology, Engineering and Mathematics (STEM) within Higher Education: a regional
case study. Retrieved from: https://www.scielo.br/pdf/prod/v27nspe/0103-6513-prod-0103-6513220516.pdf

CONICYT. (2017). Política institucional de género en ciencia y tecnología. Retrieved from: https://www.conicyt.cl/wp-content/uploads/2015/03/Politica-Institucional-Equidad-de-Genero-en-CyT-Periodo-2017_2025.pdf

Fundação de Apoio a Pesquisa do Distrito Federal. (2020). Meninas nas exatas. Retrieved from: http://www.fap.df.gov.br/meninas-nas-exatas/

Gobierno de Argentina. (19 de abril 2019). Sobre el proyecto. Retrieved from: https://www.argentina.gob.ar/ciencia/sact/equidad-de-genero-en-ciencia-tecnologia-e-innovacion/saga-argentina/proyecto

L'Oreal. (2020). UNESCO FOR WOMEN IN SCIENCE - POR LAS MUJERES EN LA CIENCIA, en colaboración con el CONICET para el mejor Proyecto de Investigación en "Ciencias de la materia". Edición 2020. Retrieved from: https://www.conicet.gov.ar/wp-content/uploads/BASES-DEL-PROGRAMA-LOREAL-Premios-y-Beca-2020.pdf

Ministerio de Ciencia, Tecnología y Telecomunicaciones (Micitt) Costa Rica. (2018). I Plan de Acción 2018 -2023. Retrieved from: https://www.micit.go.cr/sites/default/files/plan_de_accion_de_la_pictti.pdf

MICITT. (2018). Ciencia y Género. Retrieved from: https://www.micit.go.cr/ciudadania/ciencia-y-genero

Bibliographic references

Microsoft (6 de agosto 2020). Microsoft da un giro virtual a su evento anual DigiGirlz para llegar con talleres de habilidades STEM a muchas más niñas de toda Centroamérica. Retrieved from: https://news.microsoft.com/es-xl/microsoft-da-un-giro-virtual-a-su-evento-anual-digigirlz-para-llegar-con-talleres-de-habilidades-stem-a-muchas-mas-ninas-de-toda-centroamerica-2/

Ministerio de Ciencia, Tecnología y Telecomunicaciones (Micitt) Costa Rica. (2018). I Plan de Acción 2018 -2023. Retrieved from: https://www.micit.go.cr/sites/default/files/plan_de_accion_de_la_pictti.pdf

OECD. (2018). PISA 2018 Results (Volume II) Where All Students Can Succeed. Retrieved from: https://www.oecd-ilibrary.org/education/pisa-2018-results-volume-ii_b5fd1b8f-en;jsessionid=73PgllO1kBeGJPsIrle90w9_.ip-10-240-5-75

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. (2016). Mujeres inspiran a adolescentes a ser ingenieras, matemáticas y científicas. Retrieved from: http://www.unesco.org/new/es/media-services/single-view-tv-release/news/women_inspire_teenagers_to_be_engineers_mathematicians_and/

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. (2016). Uruguay es el primer país piloto de SAGA. Retrieved from : http://www.unesco.org/new/es/media-services/single-view-tv-release/news/uruguay_is_the_first_saga_pilot_country/

Bibliographic references

UNESCO. (26 de julio de 2019). Chile implementará SAGA para disminuir su brecha de género en las carreras de ciencia, tecnología, ingeniería y mátemáticas. UNESCO. Retrieved from: https://es.unesco.org/news/chile-implementara-saga-disminuir-su-brecha-genero-carreras-ciencia-tecnologia-ingenieria-y

UNESCO (2019). Descifrar el código: la educación de las niñas y las mujeres en ciencias, tecnología, ingeniería y matemáticas (STEM). Retrieved from: https://unesdoc.unesco.org/ark:/48223/pf0000366649

UNESCO. (2016). Recomendaciones de políticas educativas en latinoamérica en base al TERCE. Retrieved from: http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Santiago/pdf/Recomendaciones-politicas-educativas-TERCE.pdf