Promoting Gender Equality in and through STEM: Opportunities for STCMs

ASTC Conference 1 October 2018

STEM + Gender Equality =
Critical Drivers of Global Sustainable Development Goals (SDGs)

Women and girls must be front and center in creating STEM based solutions that contribute to meeting the SDGs. Their talent, perspectives, needs are essential for the relevance and success of solutions and in ensuring that girls and women access STEM benefits.

STEM literacy and skills is also essential for empowerment of girls and women at the individual level;
for life decisions, for civic participation / citizenship, and for economic opportunity.

Snapshot: Gender Equality and STEM

❑ Access to Technology

- ~15 % global digital gender gap (up to 32% regionally)

❑ Education

- Access to quality STEM secondary education
- Self-Selection out and drop in self-perception and efficacy in Middle-High School

❑ Workforce & Leadership

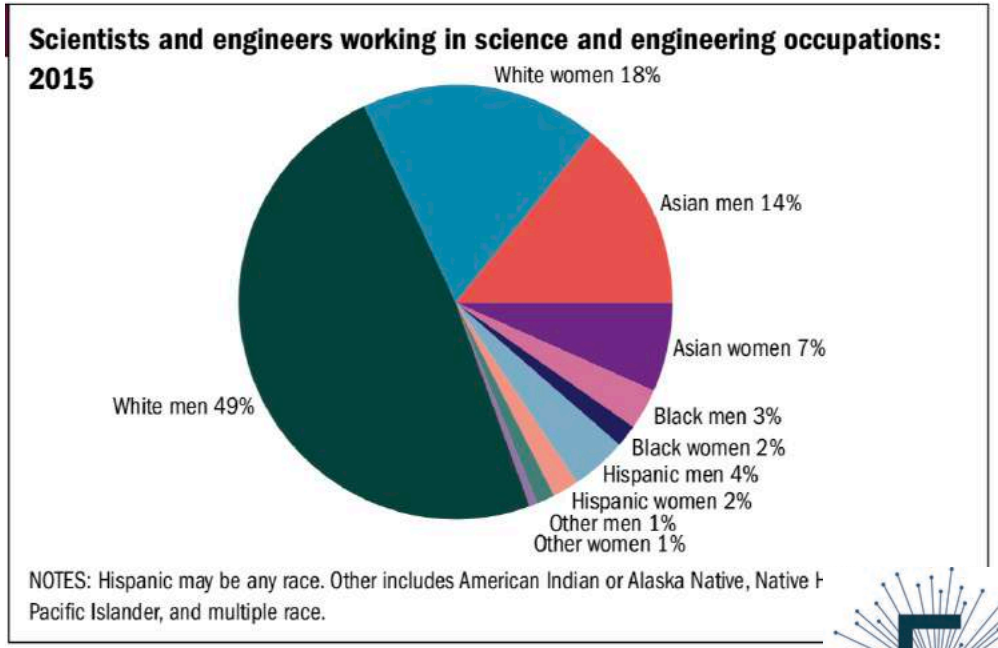
- Attrition: After about 12 years, 50% of women who originally worked in STEM have left
- Resources: 2% VC goes to women headed start-ups
- Leadership : ICT sector, 6% ICT Ministers and C-Suite top 100 companies

❑ Other Forms Influence

- Women make up 12% in National Academies of Science (global)
- Sources in journalism 3:1 (m/w)
- Authors of academic papers -> 16 years to achieve equality; 258 in physics discipline

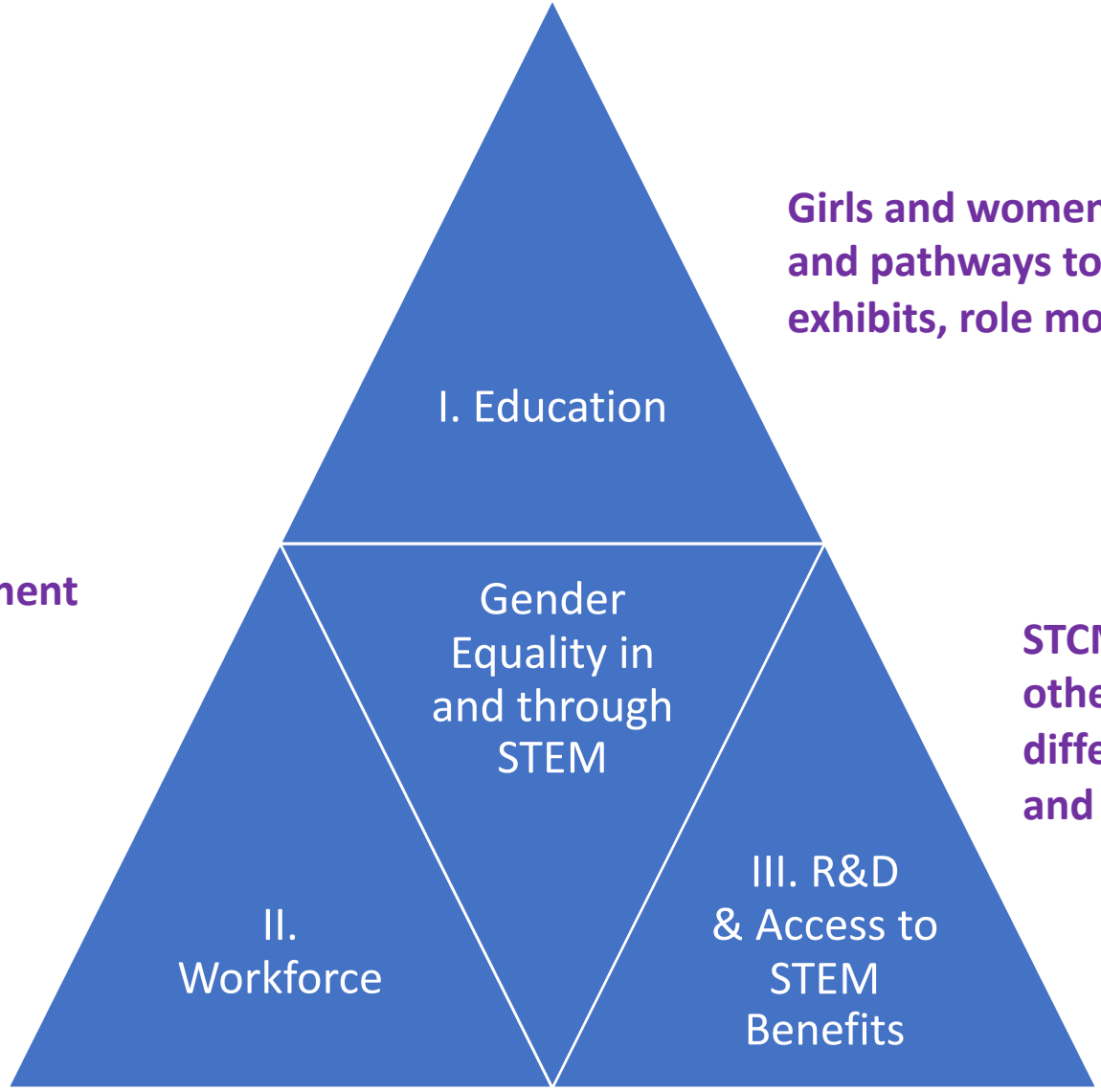
Educational and Occupational Segregation

While women receive over half of bachelor's degrees awarded in the biological sciences, **they receive far fewer in the computer sciences (17.9%), engineering (19.3%), physical sciences (39%) and mathematics (43.1%).**



NSF 2017

Gender and STEM: A Three Part Framework



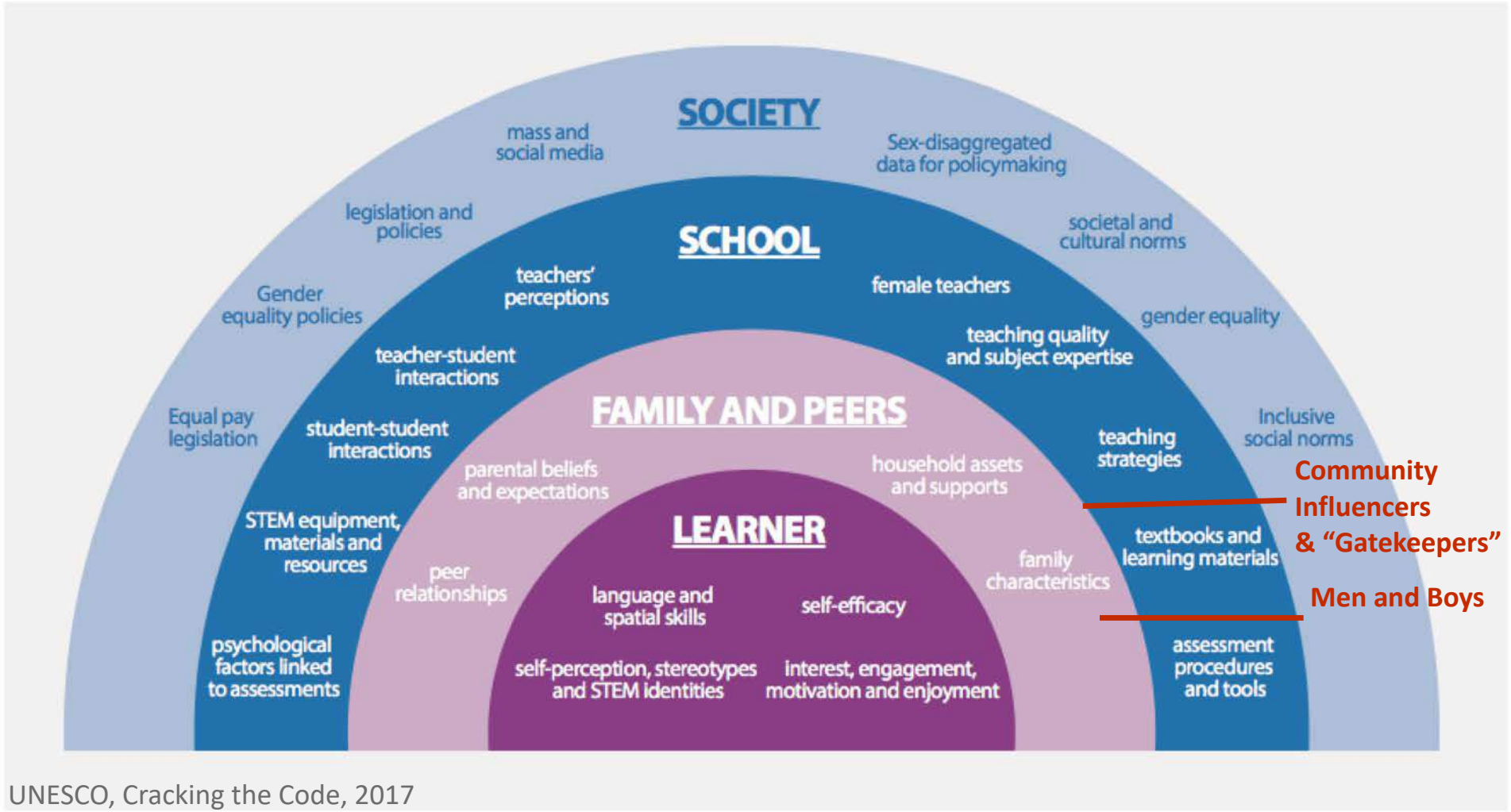
Girls and women's STEM literacy, skill development and pathways to studies through STCM outreach, exhibits, role modeling, and other programs

Women's employment and leadership in STCMs and their industry partners

STCM research, development, exhibitions and other work that considers and responds to differentiated experience and needs of women and girls.

I. STEM Education Ecosystem

Ecological Framework of factors influencing girls' & women's participation, achievement & progression in STEM studies.



UNESCO, Cracking the Code, 2017

Where do STCMs fit into this picture?

Where can they add value?

II. Gender Equality in the Workplace

The Principles

1. Leadership Promotes Gender Equality
2. Equal Opportunity, Inclusion and Nondiscrimination
3. Health, Safety and Freedom from Violence
4. Education and Training
5. Enterprise Development, Supply Chain and Marketing Practices
6. Community Leadership and Engagement
7. Transparency, Measuring and Reporting

UN Women

Leadership

- CEO Statement of Support
- Company has Board, CEO, and/or Executive support for gender equality
- Company has an organization-wide gender equality strategy

Workplace

- Recruitment & retention
- Professional development and promotion
- Equal Pay, Flexi time & Telework
- Parental leave
- Zero violence, harassment and sexual exploitation
- Health, safety, and hygiene

Market and Community *(adapted)*

- Expand relationships with women-owned businesses and women's organizations
- Encourage partners to advance gender equality
- Responsible marketing practices
- Gender issues considered when engaging with community – as partners and as users, beneficiaries, and as co-creators

Though created for businesses, these principles can be applied in STCMs and by their partners in industry

III. Gendered Innovations – R&D and Benefits of STEM

Three Strategic Approaches

•1. "Fix the Numbers of Women" focuses on increasing women's participation.
•2. "Fix the Institutions" promotes gender equality in careers through structural change in research organizations (NSF; European Commission, 2011).
•3. "Fix the Knowledge" or "gendered innovations" or the "gender dimension" stimulates excellence in science and technology by integrating sex and gender analysis into research.

STCMs R&D and related work can also be informed by a gender lens

Gendered Innovations:

● **Add value to research and engineering** by ensuring excellence and quality in outcomes and enhancing sustainability.
● **Add value to society** by making research more responsive to social needs.
● **Add value to business** by developing new ideas, patents, and technology.

Gendered Innovations stimulate gender-responsible science and technology, thereby enhancing the quality of life for both women and men worldwide.

*** From Stanford University Gendered Innovations**

Building a Gender Equality Initiative: Global Cooperation and Collaboration amongst ASTC members

Select insights from the ongoing STCM consultation on gender equality and STEM include:

- ❑ Set the Foundations
- ❑ Take Holistic Approaches
- ❑ Recognize Context
- ❑ Make Global to Local Connections

Led by:

ASTC
ASSOCIATION OF SCIENCE-TECHNOLOGY CENTERS

FUTURISTAS

National Girls Collaborative Project

Insights from ongoing STCMs consultation on gender equality and STEM

Foundations

- Need for stronger theoretical foundations on gender equality and stem to inform work.
- Basic knowledge sharing and support, particularly around the “how-to” is required.
- Engage women and girls in development/advisory role.

Holistic Approaches

- Seek transformation. Once off or narrow focused programs are not transformative. Need to embed gender equality lens in all work.
- Understand how STCMs fit within larger gender and stem ecosystem and where most valuable contributions can be made.

Insights from ongoing STCMs consultation on gender equality and STEM

Context

- Not all girls and women are the same. Address intersectionality.
- Not all STCMs are the same. Account for specific challenges/opportunities around: regional variation, girls & stem bottlenecks; target audience; etc. Create clusters where commonalities in addition to addressing cross-cutting issues (e.g stereotypes).
- Locally, STCMs need to work with range of stakeholder groups (like women's organizations in addition to private sector).

Local - Global

- Connect local community needs to global imperatives and trends.
- Take better advantage of regional and global opportunities around learning, partnerships, advocacy and accessing resources.

Global Cooperation and Collaboration: Your Views

- What are you doing on these issues and what would you like to do looking forward? What is working, isn't, and why (barriers)? Where are there gaps in action? How does your STCM fit into the larger ecosystem?
- What would you like to see in terms of cross-institutional support and collaboration?
- How can we work together on something collectively that affects change?

Global Cooperation and Collaboration: Next Steps

- Form a Community of Practice for general knowledge sharing and networking
- Continued consultation and workshopping
- Identify strategic, impactful and innovative action to implement.

Get in Touch!

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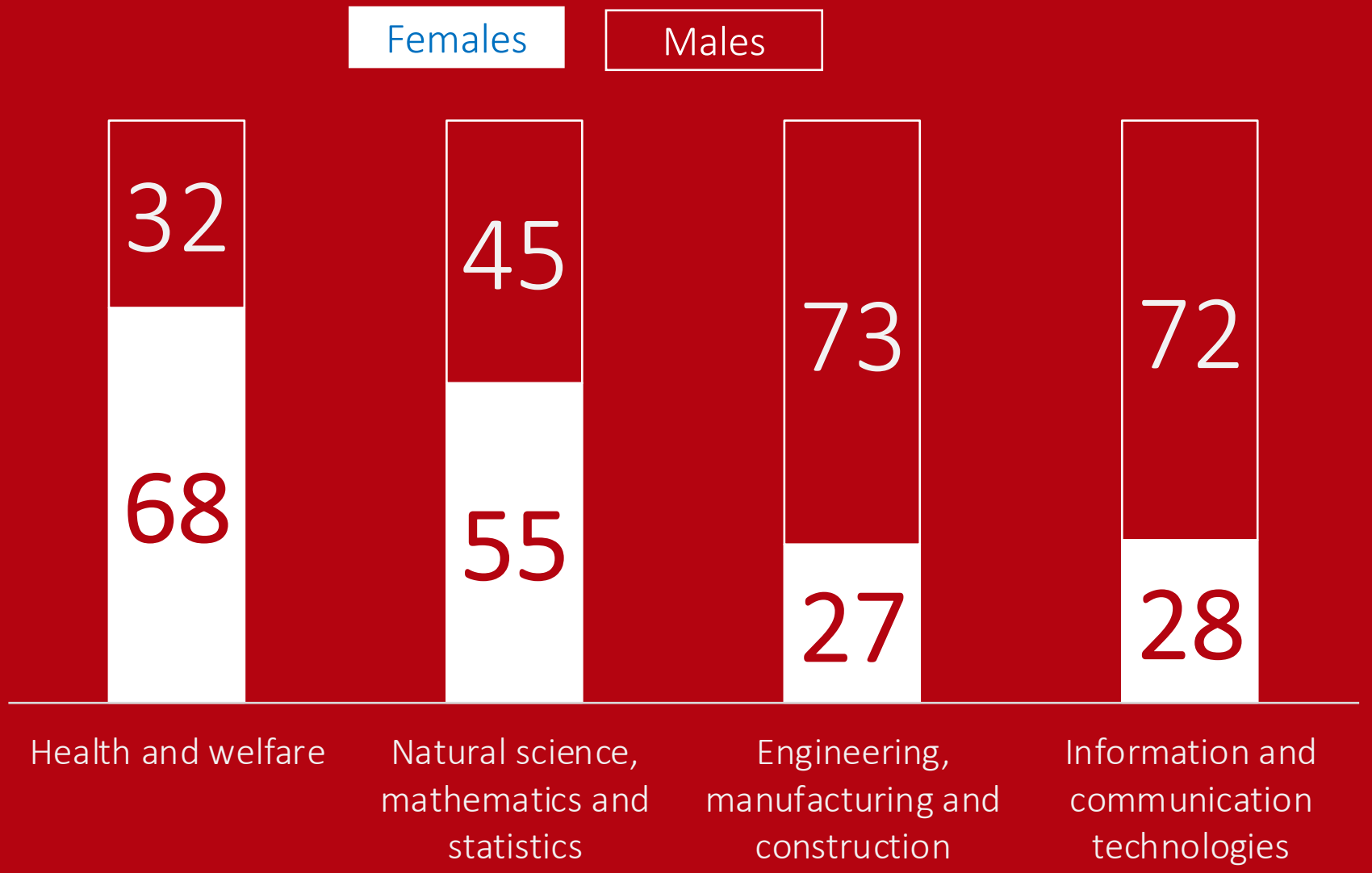
GENDER
segregation
in subject choice

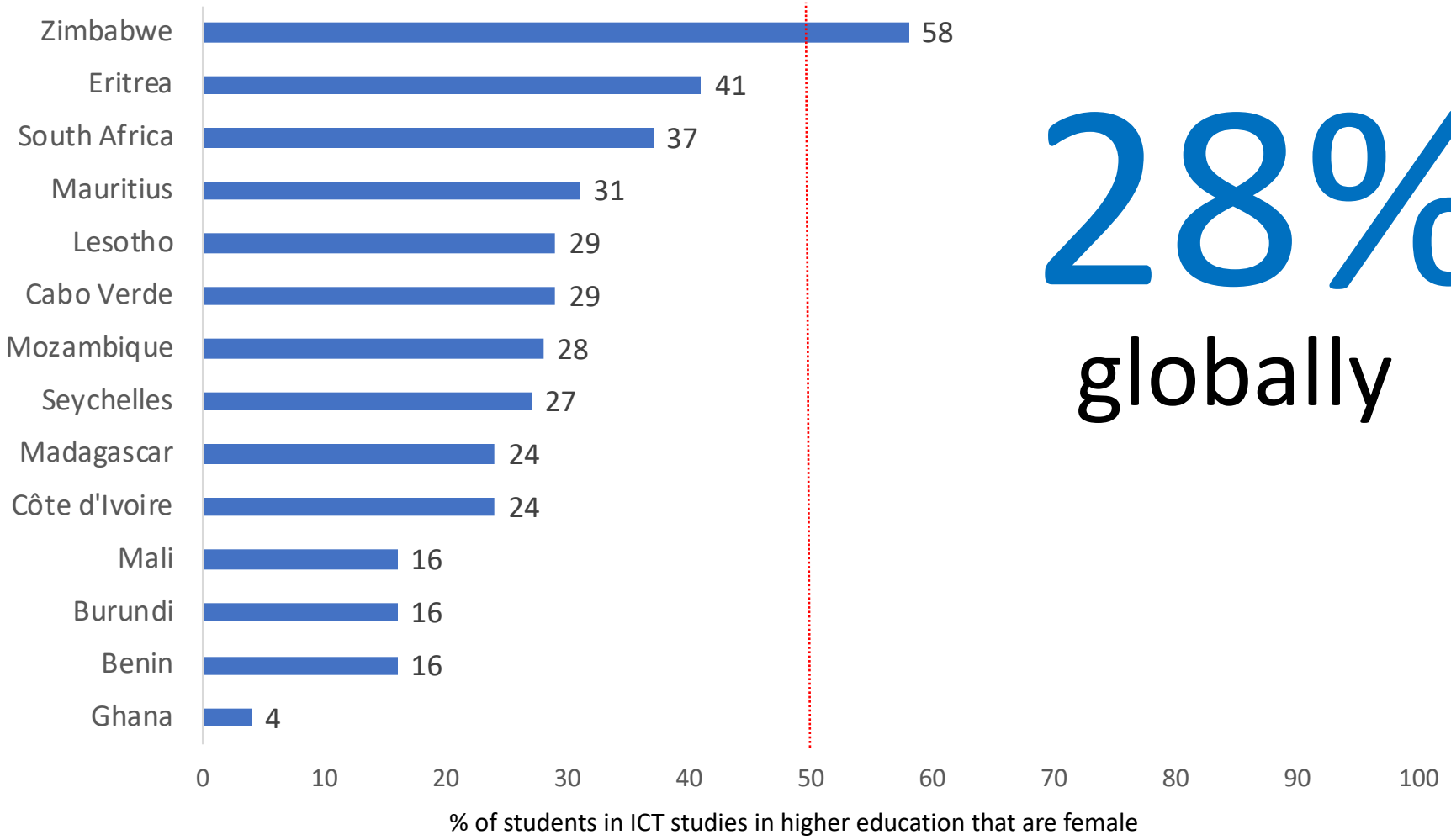
Source: Global Education Monitoring Report Team blog, 2018,

Source: UIS, UNESCO 2017 Cracking the Code: Girls' and Women's Education in Science, Technology, Engineering and Mathematics. Paris, UNESCO



Source: UIS, UNESCO 2017 Cracking the Code: Girls' and Women's Education in Science, Technology, Engineering and Mathematics. Paris, UNESCO

African context: Women in ICT in higher education

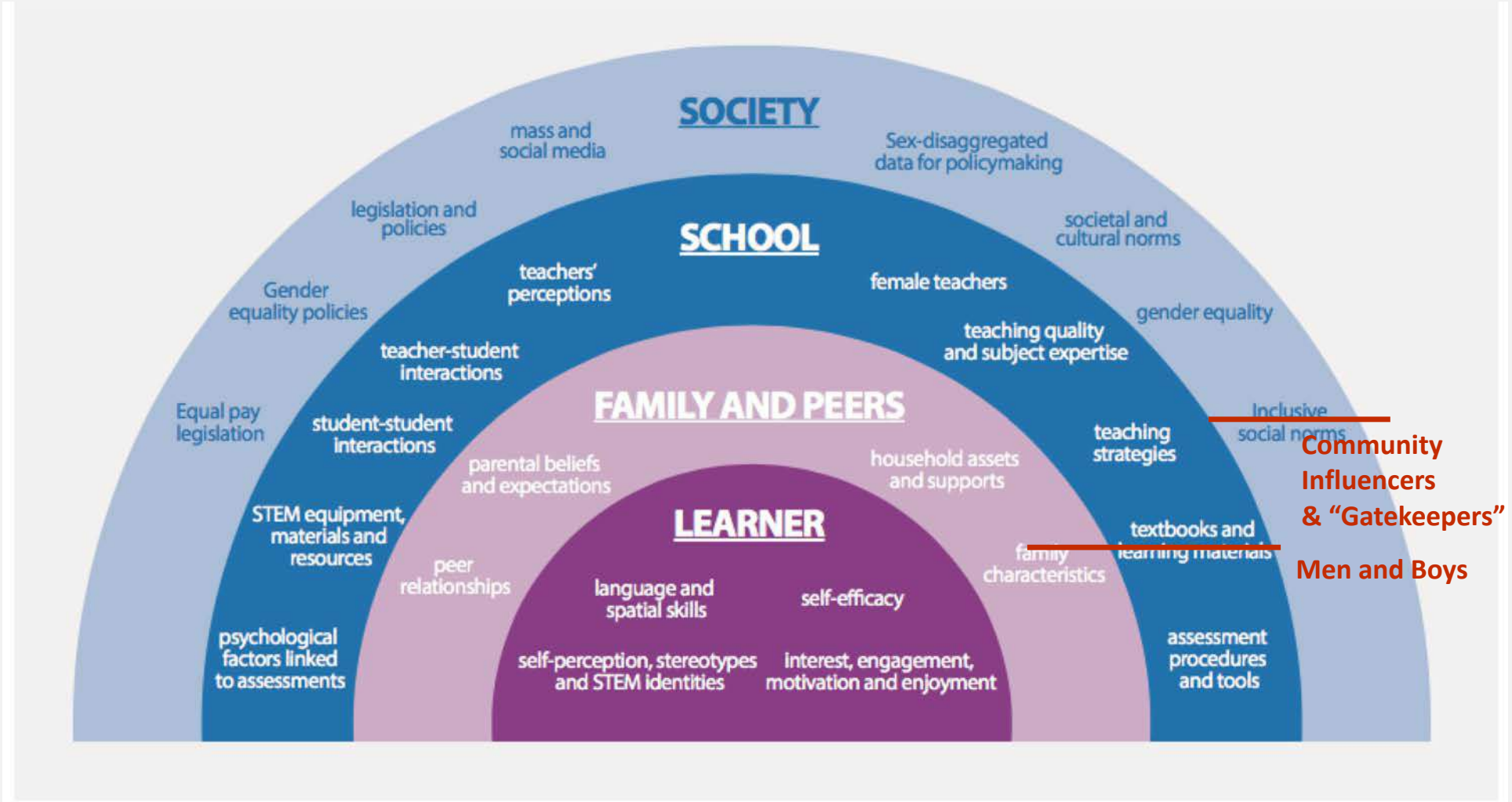


28%

globally

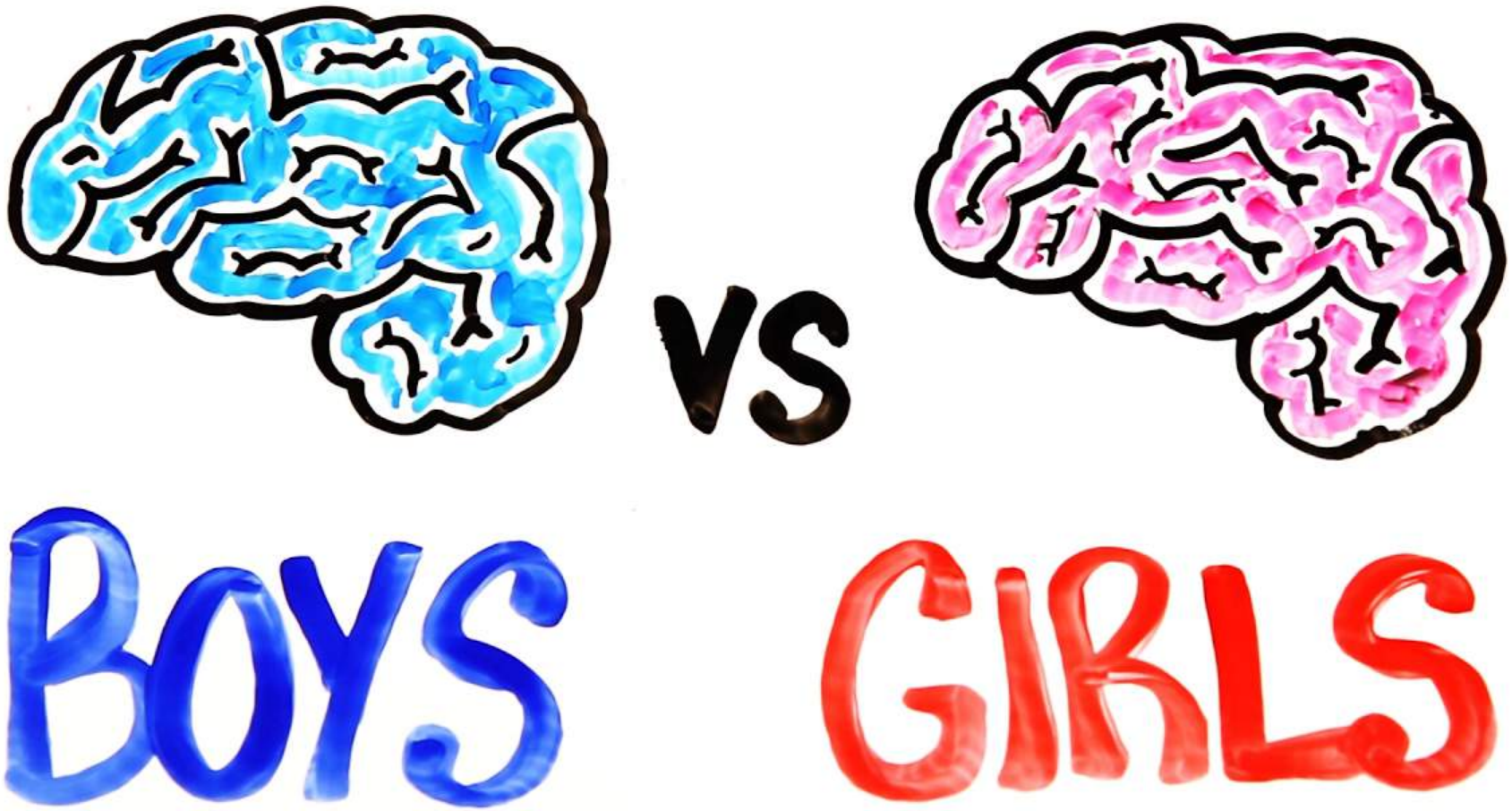
Source: UNESCO Institute of Statistics database

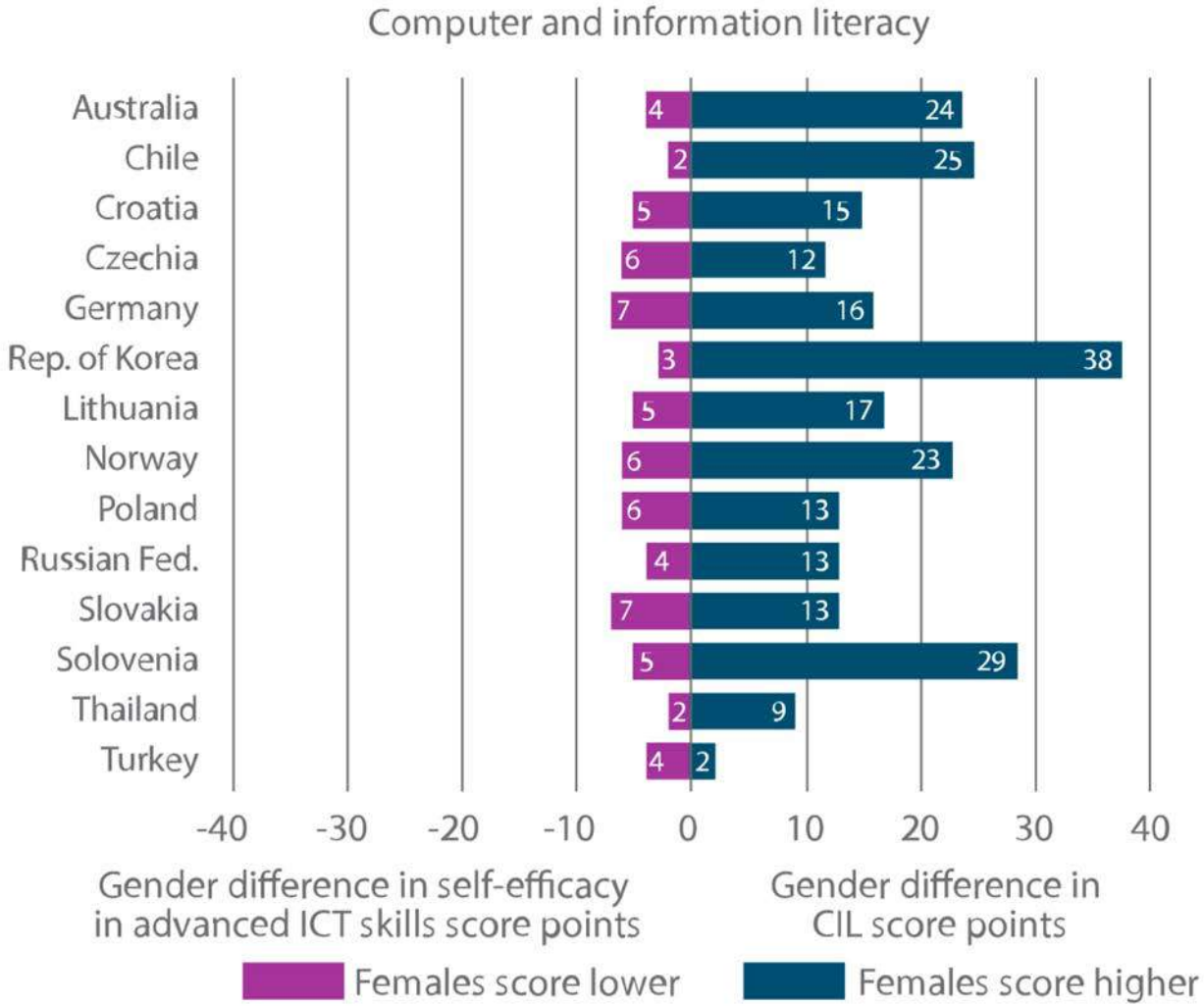
Factors influencing girls' education in STEM



Source: UNESCO 2017 Cracking the Code: Girls' and Women's Education in Science, Technology, Engineering and Mathematics. Paris, UNESCO

Biology





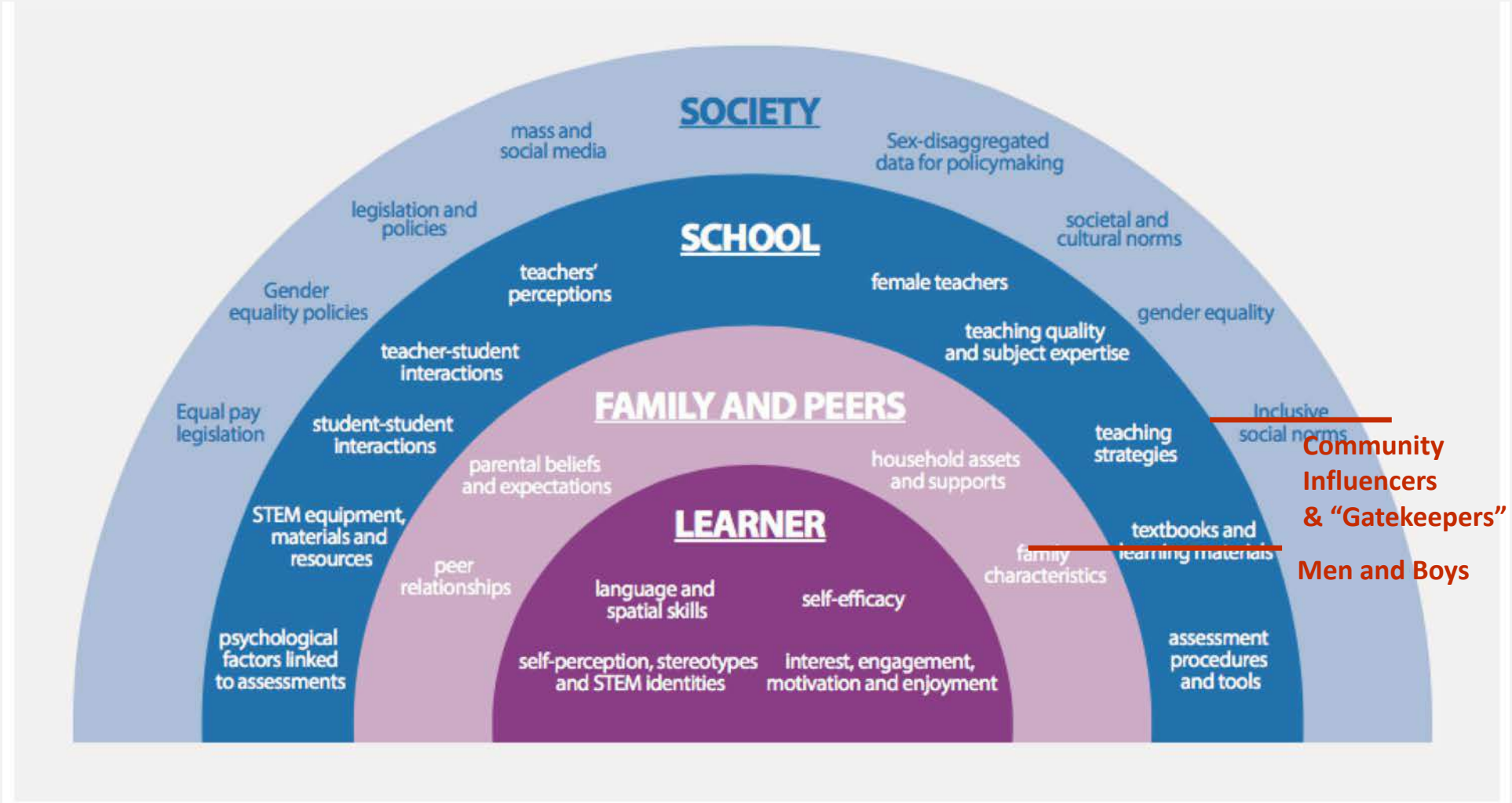
Source: IEA ICILS 2013. In: UNESCO 2017 Cracking the Code: Girls' and Women's Education in Science, Technology, Engineering and Mathematics. Paris, UNESCO

Parents

Learning environment

Media

Ecosystem approach



Source: UNESCO 2017 Cracking the Code: Girls' and Women's Education in Science, Technology, Engineering and Mathematics. Paris, UNESCO


nysci

Engaging Girls in Engineering and Design

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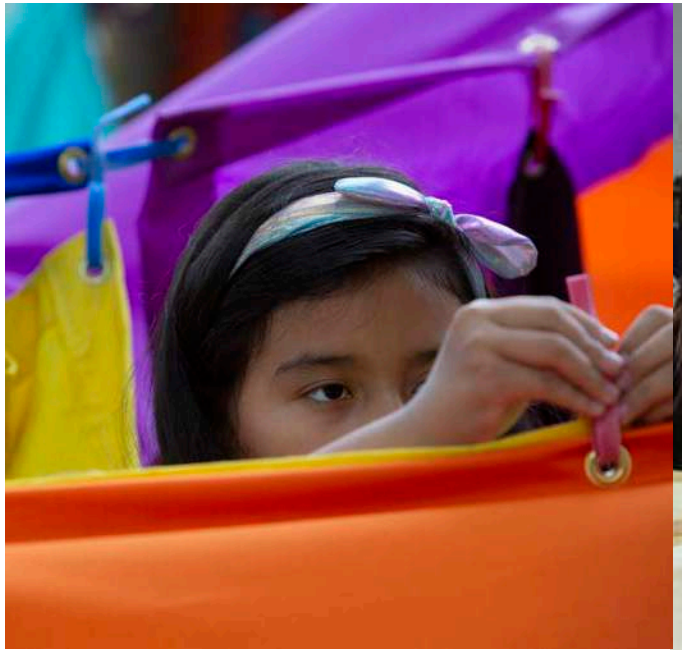
DESIGN MAKE PLAY



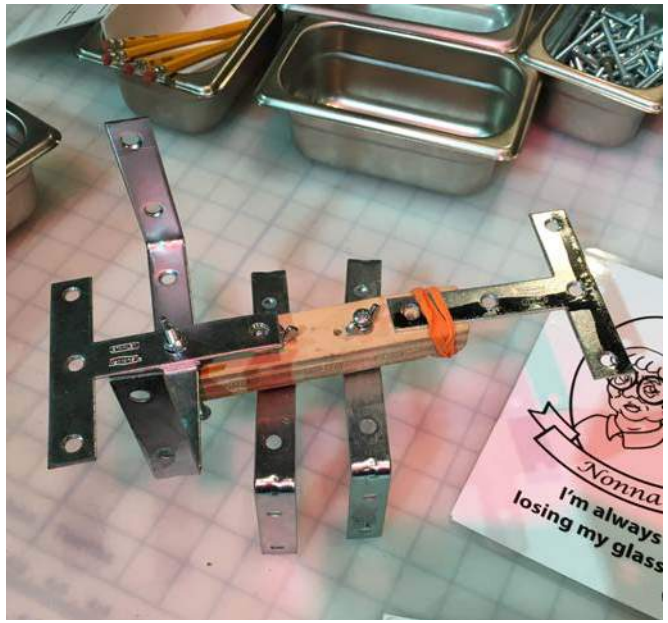
emphasizes problem-solving and helps people discover possibilities

provides confidence-building experience with materials, tools and processes

promotes intrinsic motivation, deep engagement and delight

Design Lab & Maker Space: Invitations into design and engineering

Current Research:
Narratives, Empathy, and Engineering



Using characters, settings, and stories to convey a design problem and encourage perspective-taking

Acknowledgments

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New York Hall of Science

Gender Equality and STEAM in ILE - ASTC

Maloka at School

Sigrid Falla
Director of Experiences

Women and STEM Colombia

Data: MEN -2015

2%
Math-Sci
19%
Engineering

Enrollment percentage

33%
SCI (less Bio-Che)
16%-31%
Engineering

Women participation

33%
Women PhD/total
34%
Team Leadership inv./total

Scientific career

Gender Equality and STEAM in ILE - ASTC

Maloka at School

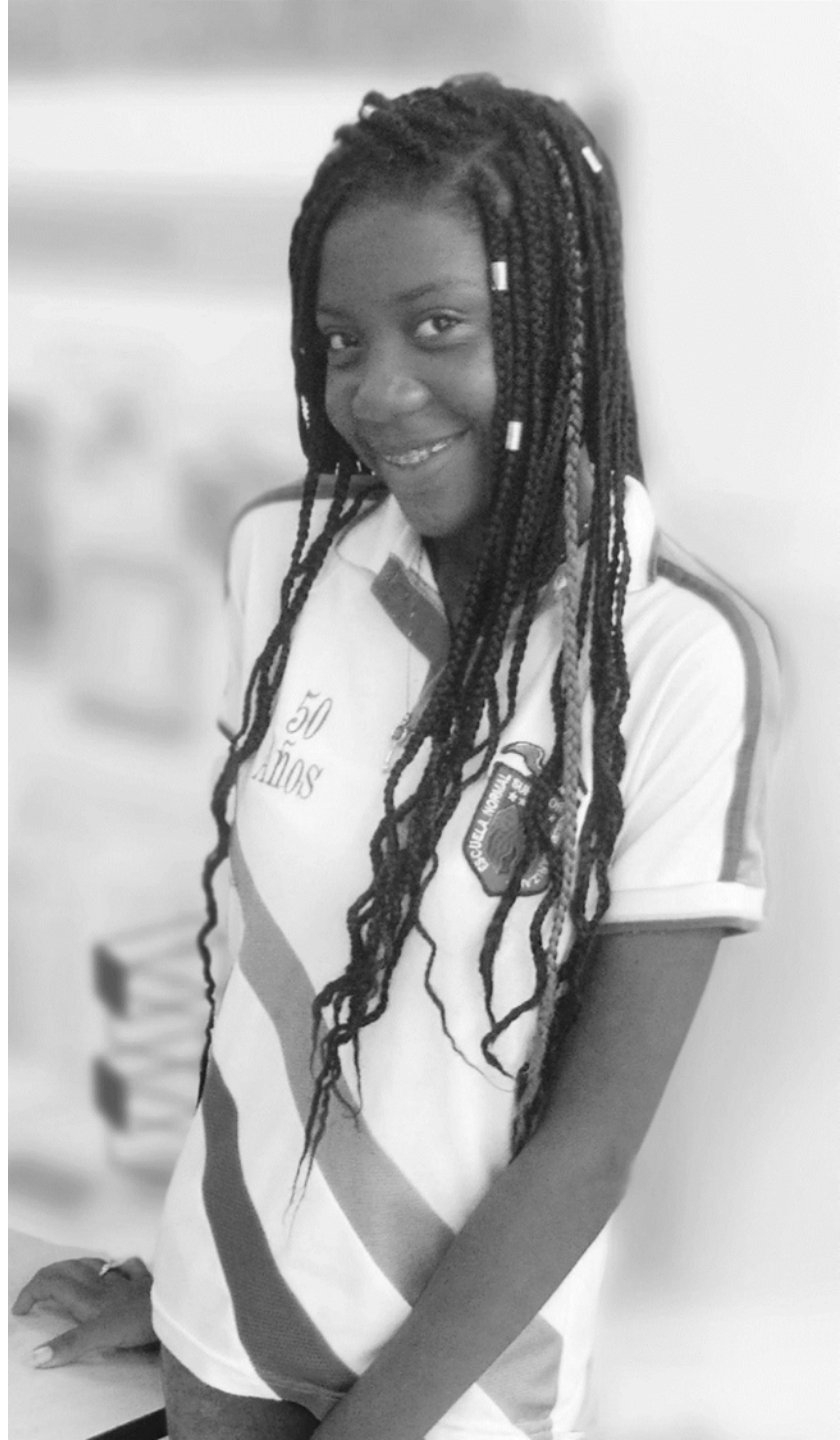
Project based activities mediated by facilitators of Maloka as part of the extended school day

Boys and girls work in teams

First moment of experimentation around different disciplines (5 to 8 sessions)

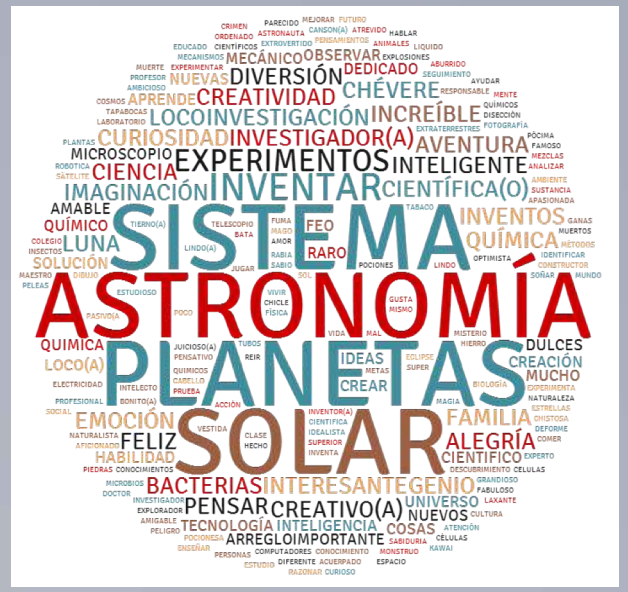
Second moment of self designed project (6 to 8 sessions)

Third moment of project communication (3 to 4 sessions)



Represetation of gender in schools
Draw a Scientist Test

16% to 29% in girls



Maloka 2016, 2017

The National Girls Collaborative Project

Vision

The National Girls Collaborative Project **brings together organizations** committed to informing and encouraging girls to pursue careers in science, technology, engineering, and mathematics (STEM).

Project Goals

- **Maximize** access to shared resources
- **Strengthen** capacity of existing programs
- **Collaborate** to create the tipping point for gender equity in STEM

NGCP Model Activities

Virtually:

- Content Rich Project Website
- The Connectory – *Collaboration Tool*
- FabFems – *Mentor and Role Model Tool*
- E-Newsletter and Social Media
- Webinars – *Exemplary Practices*

Local Collaboratives:

- Professional Development: *Conferences and Forum*
- Incentives to Collaborate: *Mini-Grants*
- Newsletters and Local Resources

Karen Peterson
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and Founder

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