Diversity and inclusion: training activities of SoBigData EU Research Infrastructure

Antinisca Di Marco ■■■ **antinisca.dimarco@univaq**
University of L'Aquila, Italy

Diversity & Inclusion in Education Workshop @ECSS2024

INFORMATICS EUROPE

What is SoBigData RI

A distributed, Pan-European, **multi-disciplinary** research infrastructure aimed at using **social mining** and **big data** to understand the complexity of our contemporary, globally interconnected **society**

| COUNTRIES	INSTITUTIONS	RESEARCHERS
14	**32**	**250**

Why SoBigData RI

Responds to the rising demand for cross-disciplinary data-driven research and innovation

- **Democratising** the benefits of **data science and Big Data within an ethical framework** that harmonizes individual rights and collective interest

- Focus on Social Mining to **understand and model complex social phenomena**

- **Open Data ecosystem**: adequate means for accessing big social data together with algorithms for extracting knowledge from them
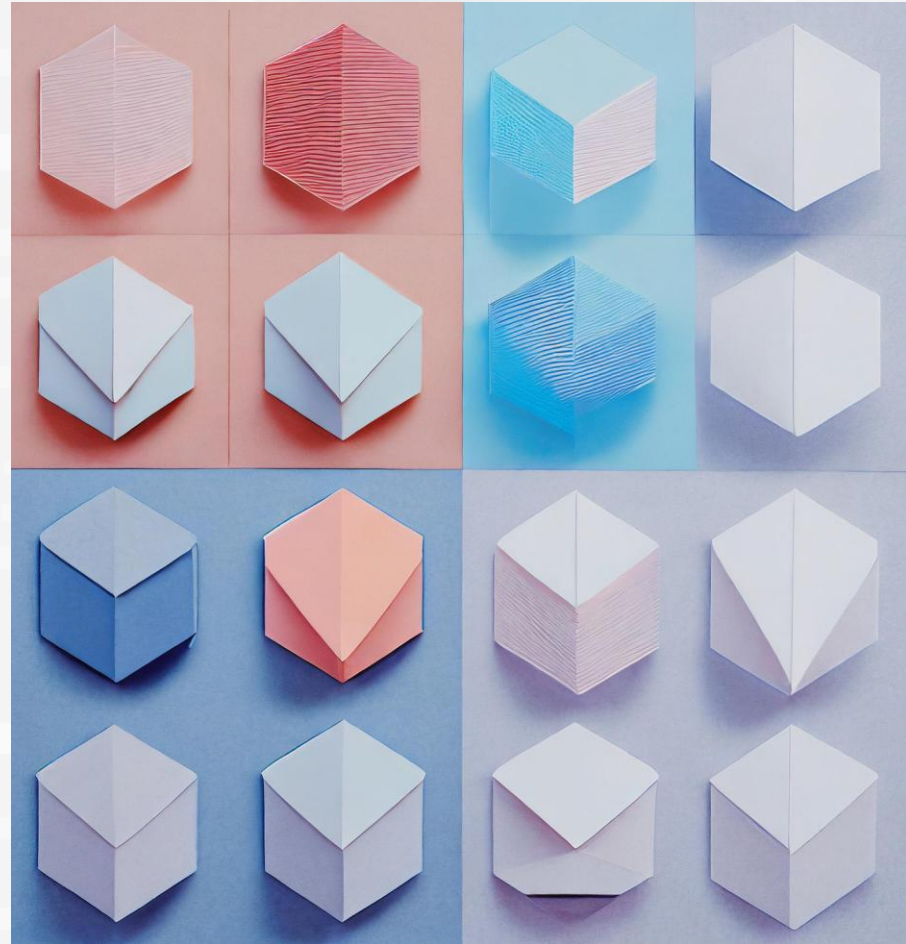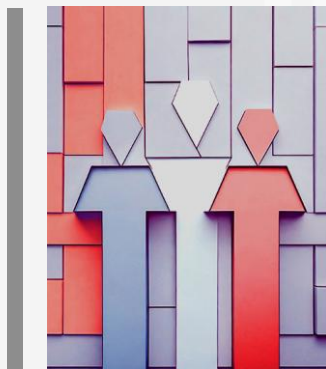
SoBigData RI **Overview**
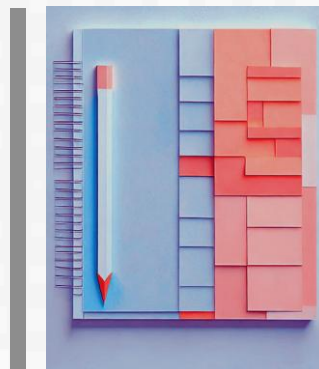
INFRASTRUCTURE
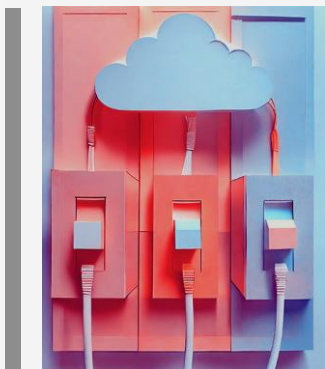
- Computational Power
- Open Science tools
- Resources
- Datasets
- Methods
- Technologies
- Training Materials

COMMUNITY BUILDING

- Researcher communities
- Industries and PA involvement
- Connecting side projects
- Connecting to other realities

GUIDELINES

- Ethical aspects
- Legal Aspects
- Open Science

Research **Spaces**

Vertical contexts fostering tangible progress towards grand societal challenges

Societal Debates
and Misinformation Analysis

Demography, Economy and
Finance 2.0

Sustainable
Cities for Citizens

Social Impact of AI
and explainable machine
learning

Health Studies

Societal and Industrial
Impact of Next-Gen.
Internet & beyond 5G
Networks

Pervasive Intelligence in
Cyber-Physical Systems for
Future Society

Disaster response
and recovery

TNA
Transnational access

GRANTS FOR SOCIAL SCIENTISTS, RESEARCHERS AND STUDENTS FOR VISITING OUR NODES CONTINUOUS OPEN CALLS

- Funding for a short-term scientific mission (2 weeks to 2 months) is available up to 5000 euros per participant (to cover the cost of daily subsistence, accommodation, and economy flights/train).

- The goal is to provide researchers and professionals with access to big data computing platforms, big social data resources, and cutting-edge computational methods.

- Results will be part of the SoBigData Catalogue and the experience reported in the Blog section

http://www.sobigdata.eu/transnational-access

Virtual Access

SoBigData Catalogue

- Methods,
- Libraries,
- Applications,
- Data

SoBigData Lab

- Jupyter Hub
- Data Space
- Execute an Experiment

SoBigData RI initiatives for inclusion
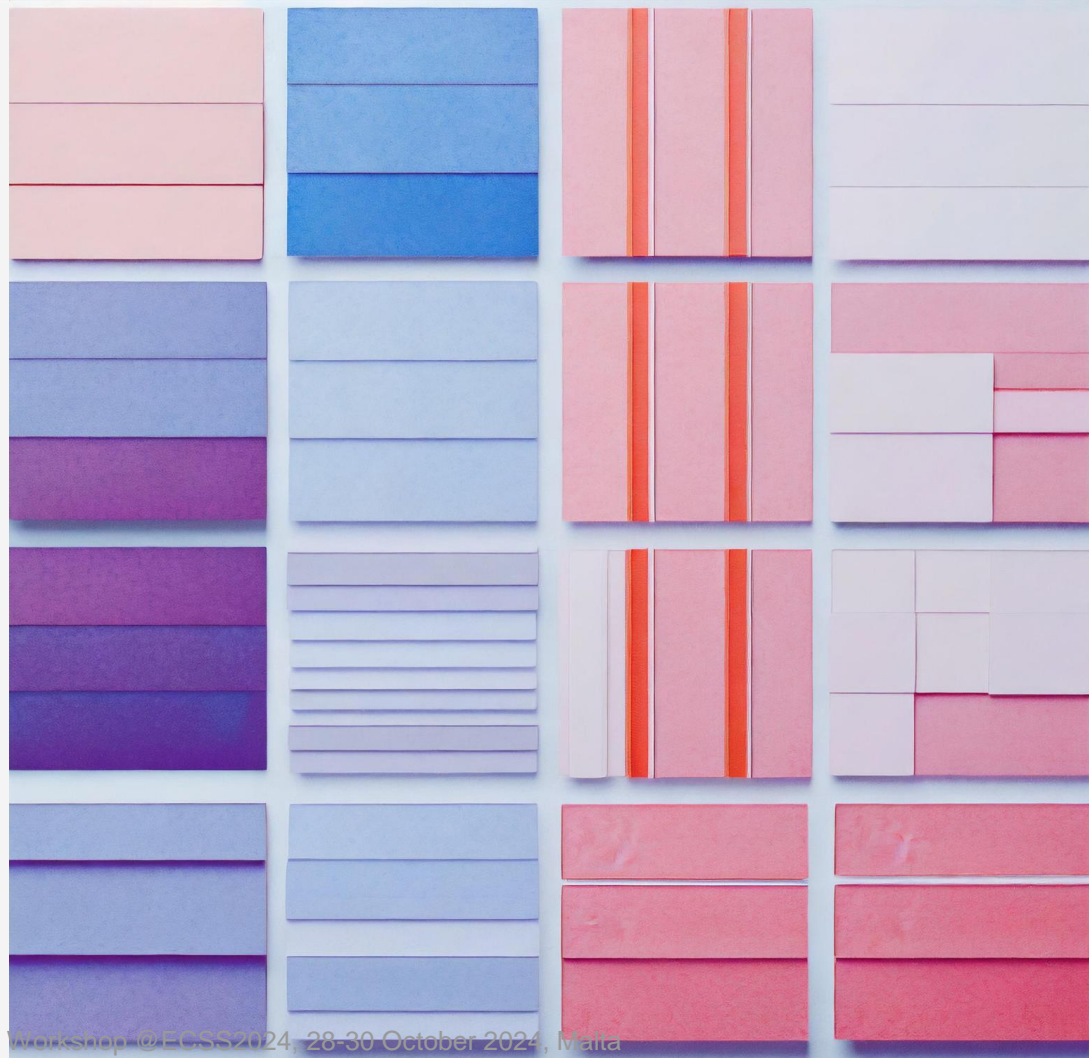
SoBigData RI **Objectives**

Promoting diversity and inclusion in data science. The aims are:

- Raise awareness about data science job opportunities, focusing on women in **STEM** fields

- Plan dedicated initiatives to map **under-represented** categories

- Address **positive actions** at diverse levels of the education path (high school, undergraduate, graduate, and PhD students)

SoBigData Award for Diversity and Inclusion

It aims at promoting a **more diverse participation** to computer and data science events **sponsoring the registration** for selected data science conferences for:

- **Individuals** that identify with a **minority group**, following the European Commission's definition.

- **Individuals** who are either **PhD students** or have obtained their **PhD** and are **Early Career Researchers**.

Two female awardees @ ECML PKDD in Turin, one PhD student and the other early career researcher, originally from India but studying in the US

Two male awardees at the International Conference on Data Science and Advanced Analytics in Greece belonging to a minority ethnic group in Nepal.

Colorful Seminars series: Enhancing Diversity and Inclusion

- UNIPI initiative to boost **diversity representation**, bridging equity gaps for marginalized groups

- Invite diverse international experts to conduct seminars on SoBigData.it topics, fostering inclusive participation in computer and data science events.

- The seminars are hosted by the Department of Computer Science (also with streaming) or exclusively online

Colorful Seminars: Enhancing Diversity and Inclusion

Organization of events

For scientific communities

- PD4DS&ML-2023 | Promoting Diversity in Data Science and ML for Msc and PhD programs at Sapienza – 2023

- fAIrness for more inclusive algorithms @ EDGE-glbt.it

- Awareness Panel on Ethical aspects of data science

- Second International Conference on Gender Equality and AI

Involving schools

- SoBigData Training @ High-School

- Soccer Data Challenge @ Sport Festival, Trento 2019

- Pinkamp
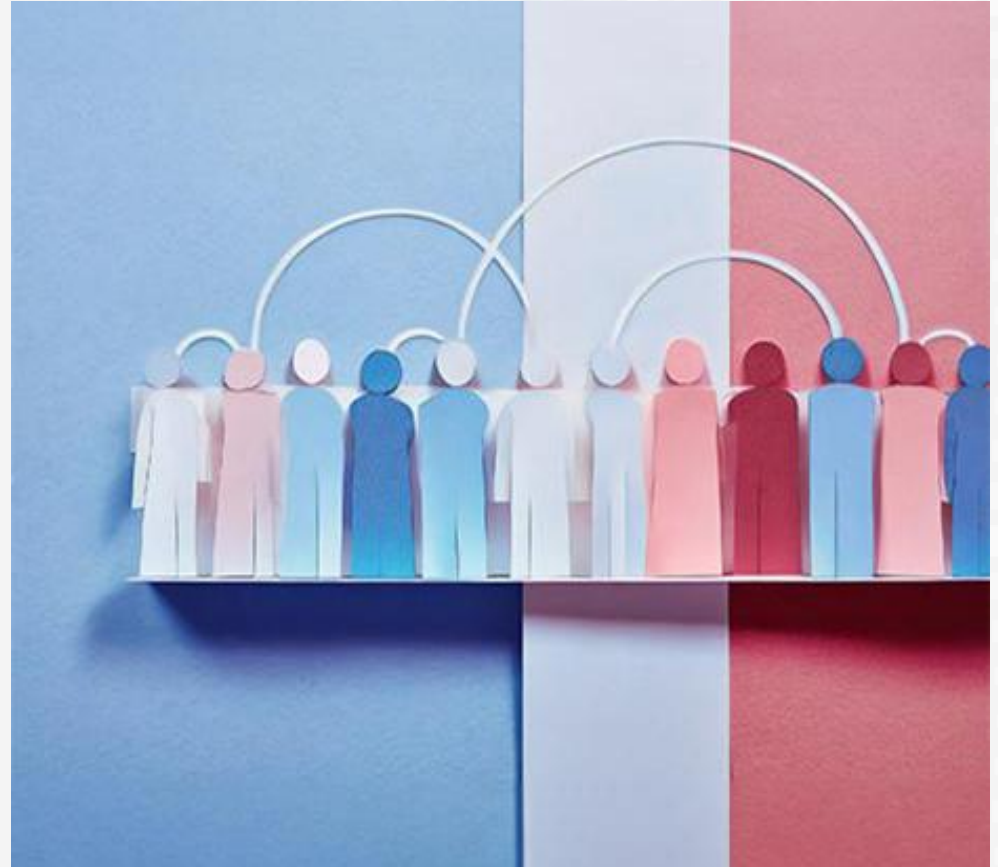
Women career in the Italian university

Analysis of the gender equality among researchers in the University panorama in Italy

- Time series on the research staff of the Universities over time disaggregated by positions.

- Percentage distribution of the research staff according to their role and gender among years
⇒ **Leaking Pipeline**

Using the data from the CINECA database of research personnel we constructed a simple dashboard for helping in visualizing the Italian situation.

Cerca Università

Dashboard

--→ LINK TO THE DASHBOARD

Designed by Eleonora Cappuccio, Daniele Fadda & Michela Natilli
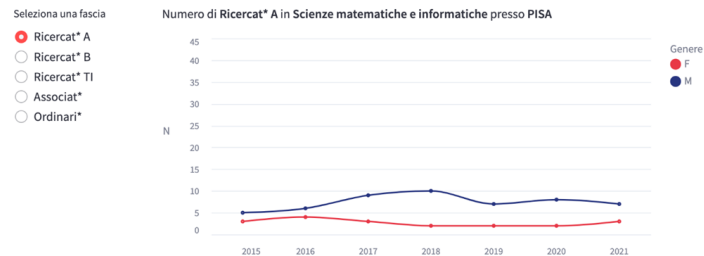
Uncovering gender gap in academia: A comprehensive analysis within the software engineering community

Andrea D'Angelo *, Giordano d'Aloisio, Francesca Marzi, Antinisca Di Marco, Giovanni Stilo

Department of Information Engineering and Information Sciences and Mathematics, University of L'Aquila, Via Vetoio, L'Aquila, 67100, Italy

ARTICLE INFO

ABSTRACT

Gender gap in education has gained considerable attention in recent years, as it carries profound implications for the academic community. However, while the problem has been tackled from a student perspective, research is still lacking from an academic point of view. In this work, our main objective is to address this unexplored area by shedding light on the intricate dynamics of gender gap within the Software Engineering (SE) community. To this aim, we first review how the problem of gender gap in the SE community and in academia has been addressed by the literature so far. Results show that men in SE build more tightly-knit clusters but less global co-authorship relations than women, but the networks do not exhibit homophily. Concerning academic promotions, the Software Engineering community presents a higher bias in promotions to Associate Professors and a smaller bias in promotions to Full Professors than the overall Informatics community.

Data-Driven Analysis of Gender Fairness in the Software Engineering Academic Landscape

Giordano d'Aloisio, Andrea D'Angelo, Francesca Marzi, Diana Di Marco, Giovanni Stilo, and Antinisca Di Marco
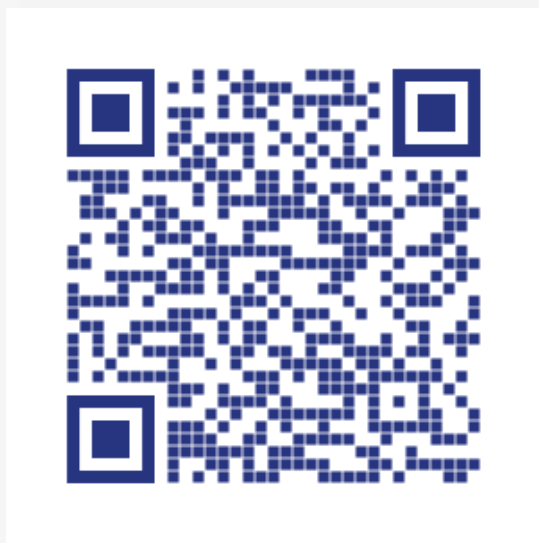
University of L'Aquila, L'Aquila, Italy
{giordano.daloisio,andrea.dangelo6}@graduate.univaq.it,
diana.dimarco@student.univaq.it,
{francesca.marzi,giovanni.stilo,antinisca.dimarco}@univaq.it

Abstract. Gender bias in education gained considerable relevance in the literature over the years. However, while the problem of gender bias in education has been widely addressed from a student perspective, it is still not fully analysed from an academic point of view. In this work, we study the problem of gender bias in academic promotions (i.e., from Researcher to Associated Professor and from Associated to Full Professor) in the informatics (INF) and software engineering (SE) Italian communities (we restricted to the Italian community since each country has specific and own promotion systems). In particular, we first conduct a literature review to assess how the problem of gender bias in academia has been

Publishing research papers

Educational level: PinKamP

Ethical and technical questions

- Is it ethical or acceptable that contemporary society is de facto designed by men?

- Which are the consequences in term of product quality, efficiency, and effectiveness?

- Is technology designed to really meet men's and women's need or is it rather conformant to the designers' stereotypical configurations of such needs

- What happens if the designers' anticipation of users' needs is combined with general cultural norms?

- Can the simple participation of women to the design process on the final utilizers' side be considered enough?

Our stand

The empowerment of girls and women has to rely **not only on access to technology on the utilizer side** but also – and maybe above all – on the **inclusion of women on the producer side since the design phase**

BUT

tons of prejudices and stereotypes to be dismantled

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Framing the problem

Official figures help to grasp the size of the problem and underline the importance and urgency of interventions.

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Modern ICT-based society is de facto designed and shaped by men

- **employment in STEM is definitely male-dominated:** women accounting for only **24%** of science and engineering professionals and only **15%** of science and engineering associate professionals

- With current trends, gender parity in Computer Science authorship will be reached around 2200
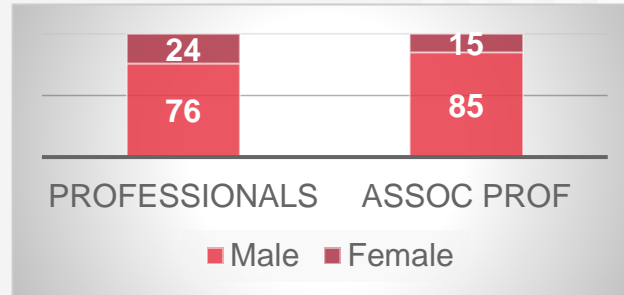
European Parliament, Encouraging STEM studies for the labour market, 2015
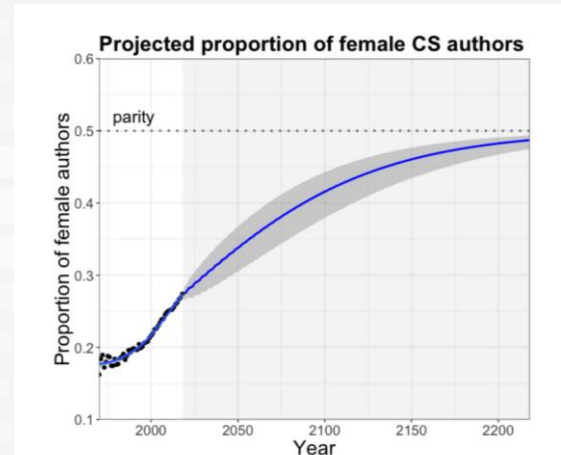
L. L. Wang, G. Stanovsky, L. Weihs, and O. Etzioni, "Gender trends in computer science authorship", Communications of the ACM, 64 (2021) 78-84.
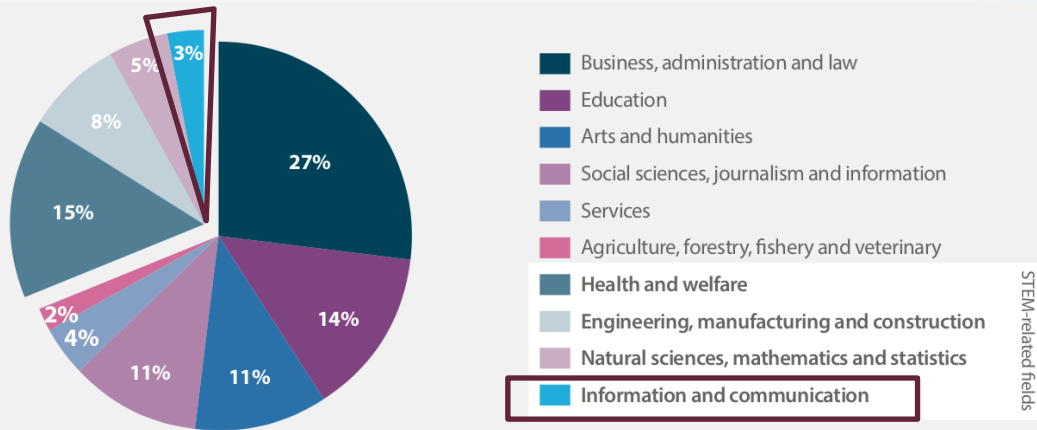
Distribution of female students enrolled in higher education by field of study

Legend:
- Business, administration and law
- Education
- Arts and humanities
- Social sciences, journalism and information
- Services
- Agriculture, forestry, fishery and veterinary
- **Health and welfare** *(STEM-related fields)*
- **Engineering, manufacturing and construction** *(STEM-related fields)*
- **Natural sciences, mathematics and statistics** *(STEM-related fields)*
- **Information and communication** *(STEM-related fields)*

Pie values: 27%, 14%, 11%, 11%, 4%, 2%, 15%, 8%, 5%, 3%

Only around 30% of all female students select STEM-related fields in higher education.
110 countries and dependent territories.

Data source: UIS 2014-2016[25]

Student expectations on science careers, by sub-field of study, out of those who choose science careers, 15-year-olds

Females: 22 | 74 | 2 | 3
Males: 48 | 24 | 20 | 8

Percentage of students

- Expecting to work as science and engineering professionals
- Expecting to work as health professionals
- Expecting to work as ICT professionals
- Expecting to work as science-related technicians or associate professionals
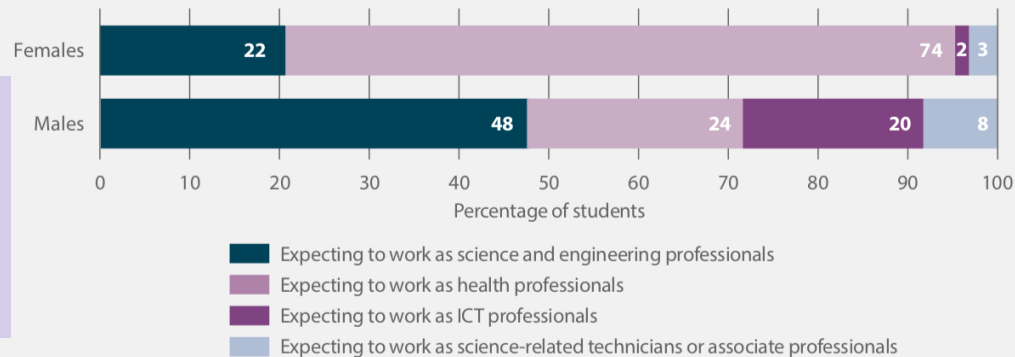
Most 15 year-old girls intending to pursue science careers expect to work as health professionals.
35 OECD countries.

Data source: PISA 2015 (OECD countries)[17]

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Human centered

Technology/system centered

(does this dichotomy really exist?)

ICT women in movies: typically a little "wierd" and/or "losers"

Virtuous chain (circle)

- **family and society** favor the interest of girls in ICT and their engagement in ICT studies

- **education professionals** prepare girls for ICT careers

- the **scientific/technology community** not only avoids prejudicial discrimination against women but **clearly acknowledges the beneficial role of women in a multi-gender design/research processes**

Explicit actions at all levels are necessary to realize the vision

SOCIETAL LEVEL

EDUCATIONAL LEVEL

SCIENTIFIC COMMUNITY

Explicit actions at all levels are necessary to realize the vision

SOCIETAL LEVEL

After the "career dolls" and the "Barbie Inspiring Women™ Series", the "Women of Science" initiative is part of the more general Dream Gap Project: "Imagining she can be anything is just the beginning. Actually, seeing that she can, makes all the difference"

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Explicit actions at all levels are necessary to realize the vision

SOCIETAL LEVEL

EDUCATIONAL LEVEL

SCIENTIFIC COMMUNITY

PinKamP

Completely free UNIVAQ initiative for high schools girls (16-17 years old) passionate about digital tech, exploring computer science, information engineering, and math.

Target Audience:

- Creative and motivated girls

- Interested in digital technologies

- Eager to explore computer science, information engineering, and mathematics

Project Purpose:

- Introduce girls to the disciplines of the digital society

- Overcome gender stereotypes

- Remove barriers and prejudices

- Showcase women's role in shaping future tech via creativity and problem-solving.

To work on *vocational aspects* and *personal appropriation of technology*

Challenges
- harmonizing *short time* and *ample overview*
- setting up a *gender-balanced curriculum* taking account of girls' personal interests, to help increase girls' interest in ICT

LEARNING SIDE

we single out a number of selected *diverse example technological platforms* representative of the ICT realm and explore them within a multidisciplinary approach touching related subjects and methods

VOCATIONAL SIDE

the activities of "Pinkampers" are focused on *building and telling a story*:

- girls are stimulated to use the assigned technological platform to invent and enact a "story" that creatively encompasses and interprets the learned technological contents, working in team

- in a final contest, each team is required to make a short presentation illustrating the story and demonstrating the acquired abilities

The PinKamP format

Socialization

Selected example technological platforms		Soft skills	Role model witnesses
Pleanary theoretical lectures	Parallel team project-based laboratories		Social debates and women's rights
Final contest			

Key actors (organizers, teachers, tutors, role models)
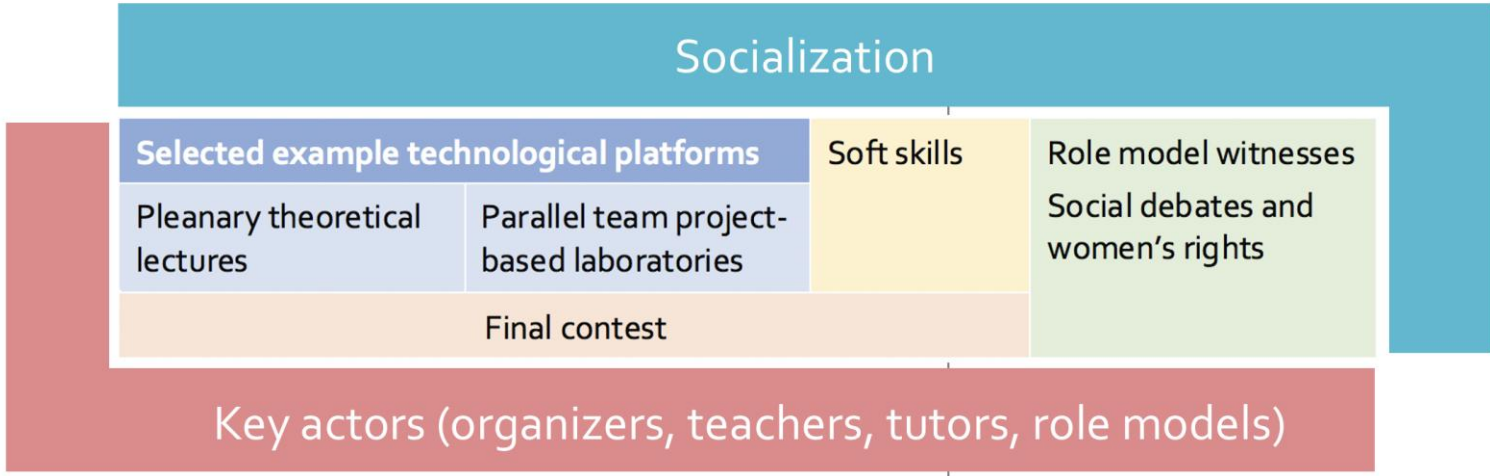
2019
- 50 pinkampes
- *in presenza dal 17 al 28 giugno 2019, contest finale il 28 giugno 2019*
- Piattaforme: droni, robots Lego, realtà virtuale

2020
- 32 pinkampers
- *online* dal 22 giugno al 3 luglio 2020, contest final il 25 settembre2020
- Piattaforme: *BioMath, droni, siti web*

2021
- 40 pinkampers
- *online* dal 21 giugno al 1 luglio 2021, contest finale il 24 settembre 2021
- Piattaforme: *BioMath, droni, siti web*

2022
- 40 pinkampers
- *Ibrido* dal 20 giugno al 1 luglio 2022, contest finale il 30 settembre 2022
- Piattaforme: *matematica delle bolle, realtà virtuale, siti web*

2023
- 42 pinkampers
- *Ibrido dal 19 al 30 giugno 2023, contest finale il 29 settembre 2023*
- Piattaforme: *matematica delle bolle, realtà virtuale, siti web intelligenti*

2024
- 45 pinkampers
- *Ibrido dal 17 al 28 giugno 2024, contest finale il 28 giugno 2024*
- Piattaforme: *immagini e matematica, robotica mobile, siti web e generative AI*

www.pinkamp.disim.univaq.it
www.facebook.com/pinkamp
pinkamp@strutture.univaq.it

Assessment

- *Engagement*: > 95% of Pinkampers completed the program

- *Learning achievement*: evalution of projects by an external jury

- *Vocational interest*: about 90% of Pinkampers participated to follow-up initiatives (additional contests, books, video)

Insights from Pinkamp

- from the testimonies of parents and teachers, the pinkampers have changed in their attitude:

  - they have shown greater determination, greater participation and exposure in class.

  - Before they were shy, not very active in dialogue and in expressing themselves in groups,

  - After the camp instead they appeared much more inclined to express their opinion and will, to face a omparison more serenely.

The need for explicit address

- Steps forward must be embraced since **inequalities are not dismantled if they are not *explicitly* addressed**.

- We already experienced it for other design-related issues, such as multi-disciplinarity, that is now explicitly recognized and advocated for example by human design methods.

- The same should hold for gender issues.

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Going back to the virtuous circle

Barbie "science dolls" help girls to *see* that they can be anything

Initiatives like PinKamP help them to *prove* that they can effectively succeed

Design principles, approaches, and methodologies explicitly stating the crucial role of women in the production of technology could make an even bigger difference, making girls *feel "waited for"*

SOBIGDATA

It is not a question of ability;
it is rather a question of empowerment and self-determination;
it is a question of rights, the right to take a place in the world
believing it is correct.

In other words, we need to act a cultural revolution

info@sobigdata.eu

www.sobigdata.eu

SOBIGDATA
RESEARCH INFRASTRUCTURE

Coordinator: *Roberto Trasarti*
Management team: *Valerio Grossi and Michela Natilli*
Communication team: *Daniele Fadda, Katia Genovali, Beatrice Rapisarda*
Institute of Information Science and Technologies (ISTI),
National Research Council (CNR), Pisa, Italy