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...new RCIS... how can IS help with fairness, diversity, non-discrimination ?*

0. Some context

1. Why me? « I'd blush if I could » (Siri)

2. Digital biases

3. The « macabre » pipe

* *Sorry, don't have an answer*



0. Some (local) context

- Seen fom Catalunya, from Spain,...



Open doors, school meetings, coding tea parties,...



DISCOVER BSC RESEARCH & DEVELOPMENT MARENOSTRUM TECH TRANSFER JOIN US EDUCATION NEWS

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Past Events

Open Doors: Women in Computer Science @ BSC for female students

OTHERS

VENUE: BSC building
Pl. Eusebi Güell 1-3
DATE: May 25th, 2022
TIME: 14:00-16:00 CET



Are you a student? Do you like the world of Computer Sciences?



A DEBATE

Las bajas por menstruación, una rareza en Europa y una realidad en Asia

- La baja por menstruación dolorosa ha existido desde el siglo pasado en algunos países asiáticos, entre ellos Japón, Corea del Sur e Indonesia
- La Seguridad Social pagará las bajas por reglas dolorosas desde el primer día, según Igualdad



Spain offers menstrual leave to women who suffer severe period pain with up to three days off a month

Quizz!

Toothpaste
gender
drilled
Matilda
floor
sticky
opting out
glass
effect
tube
gap
cliff
ceiling
impostor
bias
pipe
stereotype
syndrome

Toothpaste tube

Gender gap

Matilda effect

Sticky floor

Glass ceiling

Impostor syndrome

Stereotype

Bias

Drilled pipe

NEW!

Opting out

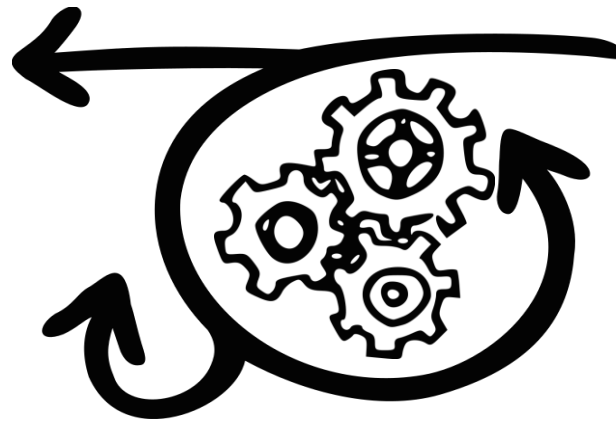
Glass cliff

1. Who am I? Why me?

- <https://www.irit.fr/~Florence.Sedes/>



... and why did I push the door?



Cybersecurity
Trust
IoT
SNA
Adversarial learning
...
(Meta)data, context



Femmes&Sciences
Femmes@Numerique
EPWS
WIE IEEE
Informatics Europe WIRE

FEMMES & SCIENCES
association

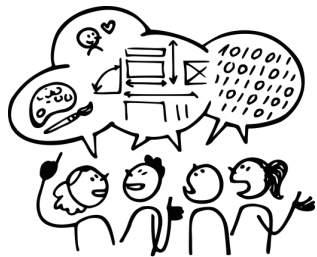


« Half of the humanity is not a minority! »

Laws and administrative rules have been addressing disability and accessibility, through quotas and financial penalties, like *DI (Disparate Impact)* indicator in US or students' social criteria assessment on French national ranking platforms. Such official measures enable minorities and other discriminated groups to be represented.

As half of the humanity does not constitute a minority, no quota policy is supposed to be applied, leaving gender imbalance as a potential issue.

D&I is the new *non-discrimination...*
and ***positive action*** !

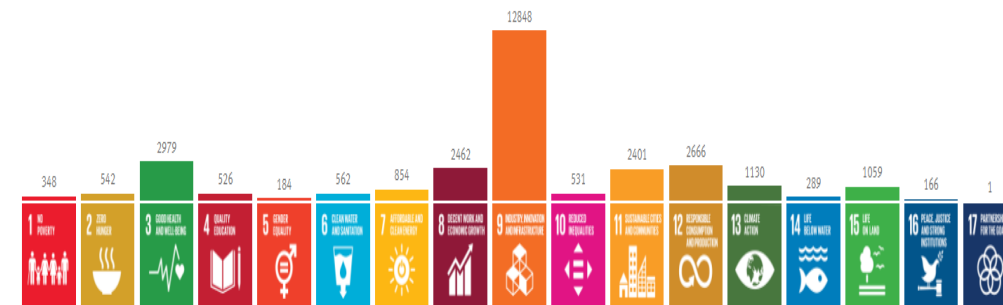


17 SDG United Nations



ISO CONTRIBUTES TO ALL OF THE SUSTAINABLE DEVELOPMENT GOALS

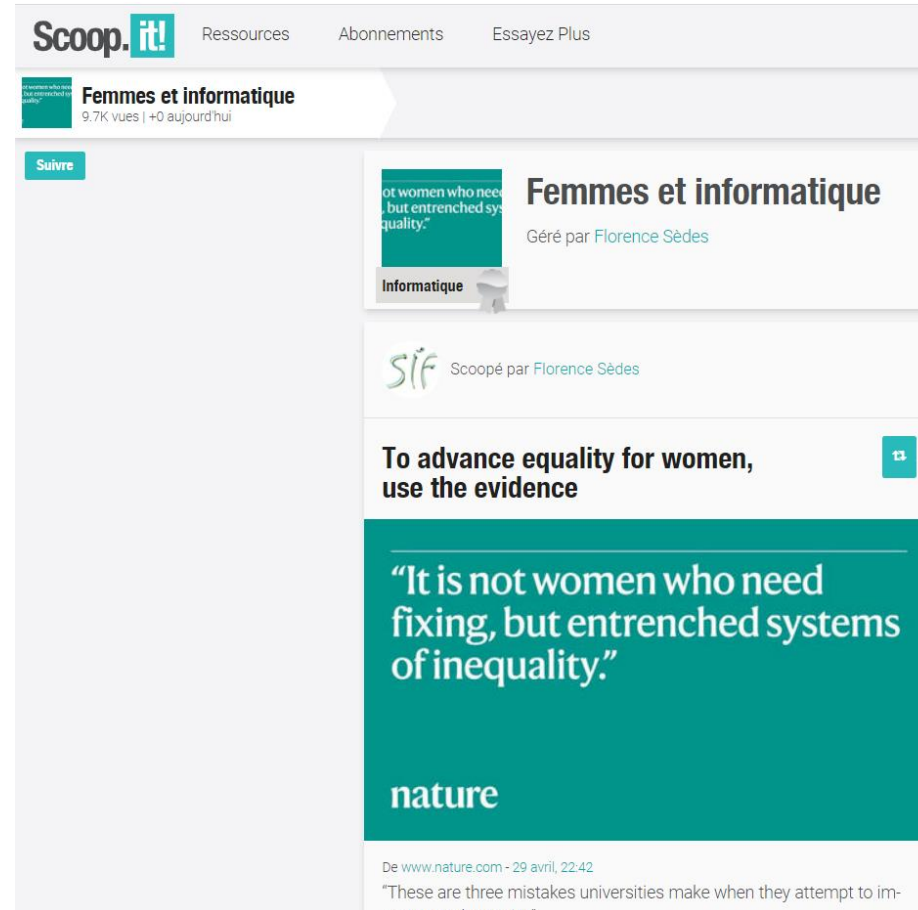
Here you can see the number of ISO standards that apply to each Goal.





Scoopit

<https://www.scoop.it/topic/femmes-informatique>



The screenshot shows the Scoop.it website interface. At the top, there's a navigation bar with the Scoop.it logo and links for 'Ressources', 'Abonnements', and 'Essayez Plus'. Below this, the main header for the 'Femmes et informatique' topic is displayed, showing '9.7K vues | +0 aujourd'hui'. A 'Suivre' button is visible on the left. The main content area features a post titled 'Femmes et informatique' managed by 'Florence Sèdes'. Below this, there's a section for 'SIF' (Scoopé par Florence Sèdes). The featured article is titled 'To advance equality for women, use the evidence' and includes a quote: '“It is not women who need fixing, but entrenched systems of inequality.”' from 'nature'. The article source is cited as 'De www.nature.com - 29 avril, 22:42'.



Diversity and Inclusion Activities in EGC – A 2022 Report

Sihem Amer-Yahia (CNRS, Univ. Grenoble Alpes), Angela Bonifati (LIRIS, Univ. Lyon 1), Cécile Favre (ERIC, Univ. Lyon 2), Elisa Fromont (IRISA, Univ. Rennes 1), Nicolas Labroche (LIFAT, Univ. Tours), Guy Melançon (LABRI, Univ. Bordeaux), Florence Sèdes (IRIT, Univ. Toulouse 3), Arnaud Soulet (LIFAT, Univ. Tours), Alexandre Termier (IRISA, Univ. Rennes 1)



Figure 1: The authors.



2. Digital biases

«We used to talk about garbage in, garbage out ; now, with AI, we talk about bias in, bias out»- W. Hall



....« BIASES » ☠ !!!

- After the Big Data era....
- ... exclusion, discrimination, invisibilisation...
 Amazon hiring, COMPAS (Correctional Offender Management Profiling for Alternative Sanctions), credit rating, chinese prisoner facial recognition, racialisation,...
- ... what are the phenomena?
 - ⇒ automatic learning abusive or unadapted use in services decision making
 - ⇒ risk of propagation and even amplification of discrimination, under-representation,...
 - ⇒ cognitive, economic, statistic...

Invisibilisation in AI (feeding)

Striking example is the risk with gender and minority “invisibilisation”
⇒ the social representation biases are emphasized:

- few entries in Wikipedia
- Matilda effect
- lack of historical figures and illustration
- rare “role models” in science, ...

with unbalanced learning data (open data)

Dual issue: how rule-based systems and by whom, if any bias here also, are encoded to be aware of all the diversity any decision implies.

"Algorithmic decisions are not more objective than human decisions"

MACHINE:

double : DATA // ALGO

⇒ quality metrics for data sets

ex. web data vs. clinical ones

⇒ ~~Algorithm neutrality~~ impossible ! loyalty at the best ?

written by human with their own cognitive biases, conscious or not

=> bias of human decisions...

HUMAN:

explainable => acceptable

interpretability, transparency, accountability, sustainability

Testing

- individual discrimination: direct
- group discrimination: indirect

according to cultural, legislative, legal frameworks + field :
access to employment, credit, insurance, housing, health,...

⇒ "Replay": testing (individual) vs. disproportionate effect

✂ Modality of the sensitive variable tested (gender, ethnic origin,...)

Ex. statistical indicator: DI (Disparate Impact)

favorable decision for discriminated group % favored group

$DI < 0.8$ (4/5° rule) discrimination (even unintentional) deemed statistically significant (penalties)

Levels of bias

3 levels of bias :

- ✓ disproportionate effect: historically disadvantaged group (e.g., income)
- ✓ prediction error rate: group - represented, decisions - reliable (e.g. facial recognition, health app.)
- ✓ asymmetric errors: + of false+, - of false- (ex. COMPAS)



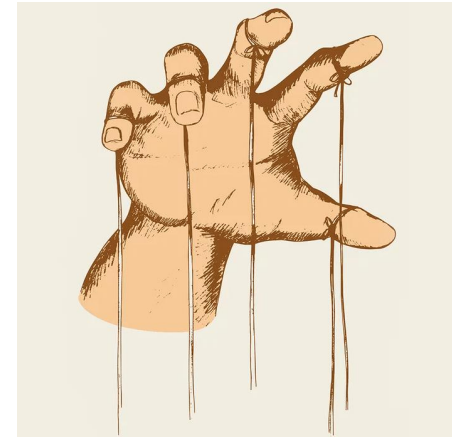
Data bias: data quality, result quality

- ✓ GIGO (Garbage In, Garbage Out) eg. CV Amazon, reco faces
 - ✓ Bias of omitted variables: e.g. softskills
 - ✓ Selection bias (e.g. credit scoring): Big Data, no repeated observations on all the individuals in the population studied (the available observations do not have the same properties as the missing observations)
- =>reinforcement learning (e.g. Tay MS assistant)
- ✓ Endogeneity bias (e.g. Google eCommerce) => product lines (e.g. FB)

Stereotypes

Stereotypes biases (usually negative)

- algo fed with "click" data
- word embedding, co-occurrences (e.g. translation of F/H jobs)
- again and again, side effects (e.g. sexual orientation detection by face...)



Implicit gender biases

- Implicit (or unconscious) gender biases refer to a cognitive phenomenon that takes place automatically and without our knowledge when assessing people and situations, influenced by our background and socio-cultural environment.
- Implicit gender biases based on gender stereotypes can affect both men and women and influence behaviour and decision making, and should be taken into account when carrying out evaluations.



“We do not have an adequate level of control and explainability over how our systems use data,” Facebook engineers say in leaked document.

Auditing Offline Data Brokers via Facebook’s Advertising Platform

Giridhari Venkatadri Northeastern University Piotr Sapiezynski

Northeastern University Elissa M. Redmiles University of Maryland Alan

v. Grenoble Alpes,
iversity of Maryland

Facebook Doesn’t Know

What It Does With Your

brokers-

Data, Or Where It Goes:

Leaked Document

Solutions, recommendations?

assessing biases and discriminations risks upstream, very early
complying when building the DB and while learning for correction,
amendement (else risk of being unable to offset)

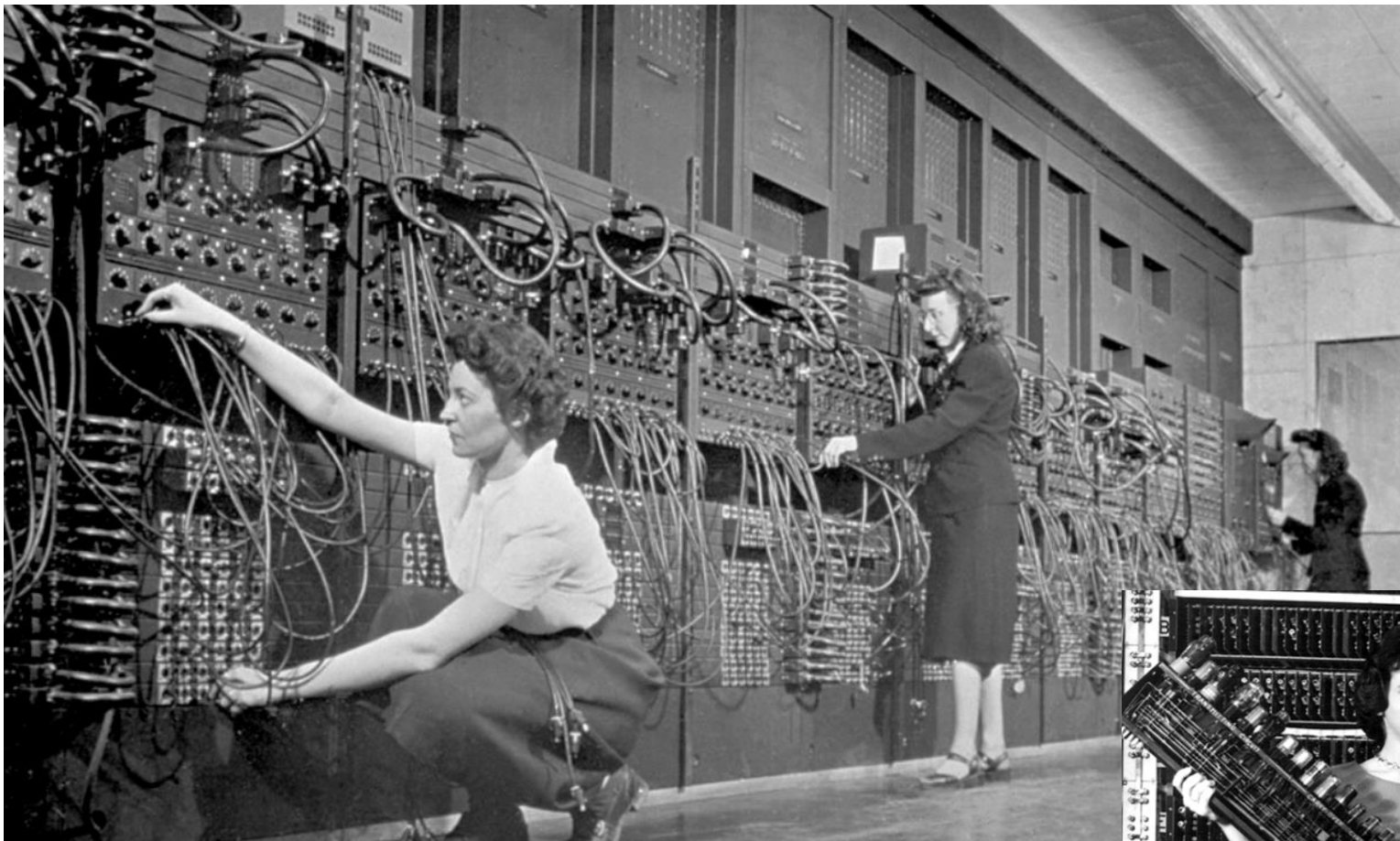
fairness by design: opaque to any basic interpretation and to any
decision explanation

normalisation (not only qualitative, and not only for financial, economic
considerations)

fair learning

3. The « macabre » pipe





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Lenna



Fabio is the new Lenna!

(a) (b) (c)

Figure 1: (a) Original 256×256 Cameraman image and its reconstruction from 20% of its Fourier coefficients using (b) total variation minimization and (c) ℓ_1 minimization of its bivariate Haar coefficients.



(a) (b) (c)

Figure 2: (a) Original 256×256 Fabio image corrupted with Gaussian noise and its reconstruction from 20% of its Fourier coefficients using (b) total variation minimization and (c) ℓ_1 -minimization of its bivariate Haar coefficients

1.2 Contribution of this paper

We show that there are choices of underdetermined linear measurements (constructed from RIP matrices) for which the total variation minimization program (TV) is guaranteed to recover images stably and robustly up to the best s -term approximation of their gradient. The error guarantees are analogous to those of (3) up to a logarithmic factor, which we show can be removed by taking slightly more measurements (see Theorem 5 below). Precisely, we have

Theorem A. Fix integers m, N , and s such that $m \geq C_1 s \log(N^2/s)$. There exist linear operators $\mathcal{M} : \mathbb{C}^{N \times N} \rightarrow \mathbb{C}^m$ for which the following holds for all $\mathbf{X} \in \mathbb{C}^{N \times N}$. Suppose we observe noisy measurements $\mathbf{y} = \mathcal{M}(\mathbf{X}) + \boldsymbol{\xi}$ with noise level $\|\boldsymbol{\xi}\|_2 \leq \varepsilon$. Then the solution

3 miles stones

holistic



- Educational and vocational advice, guidance: role models- usual figures- mentoring



=> *no talent pool*

- Hiring: quotas? biases?

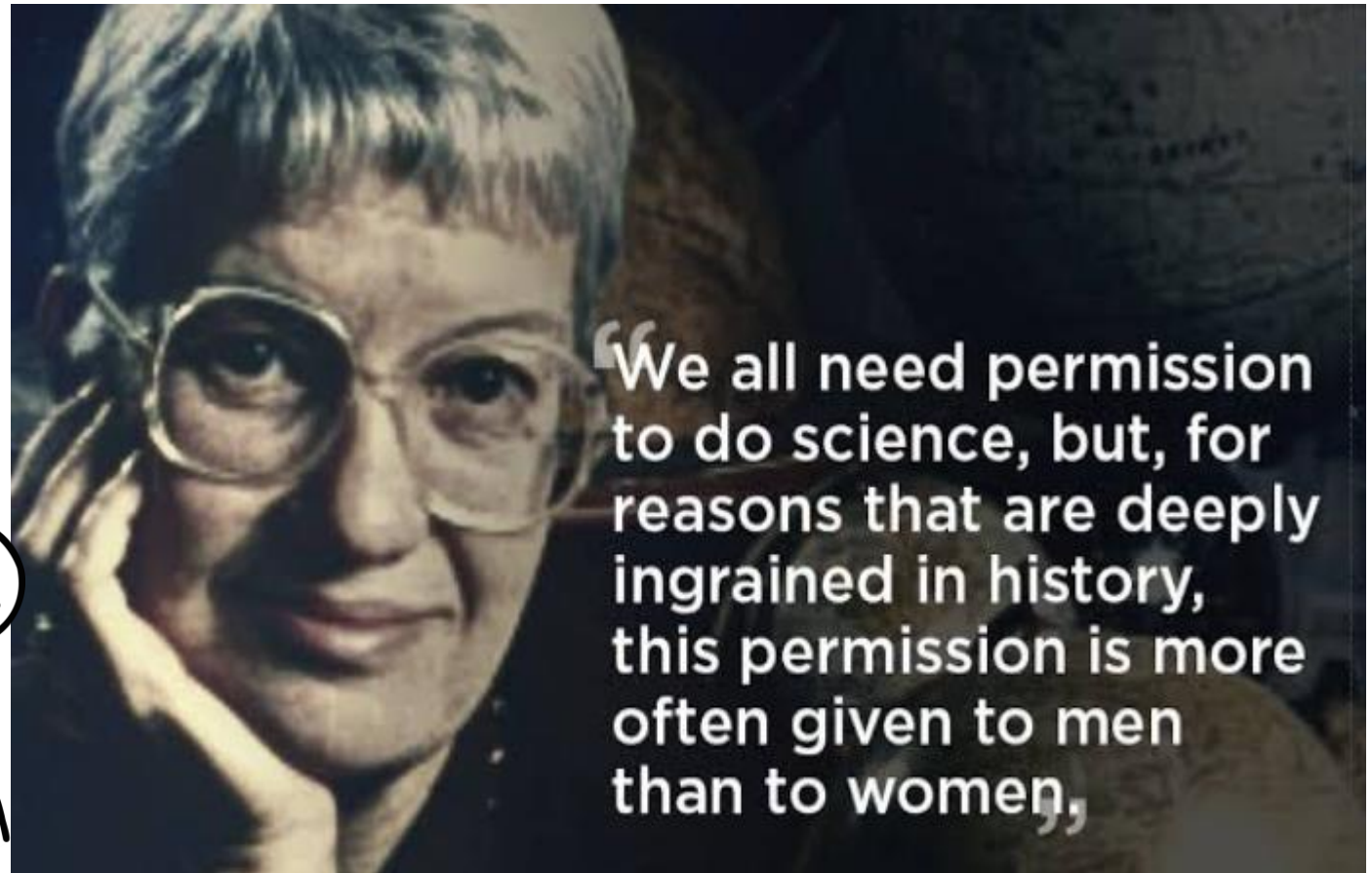
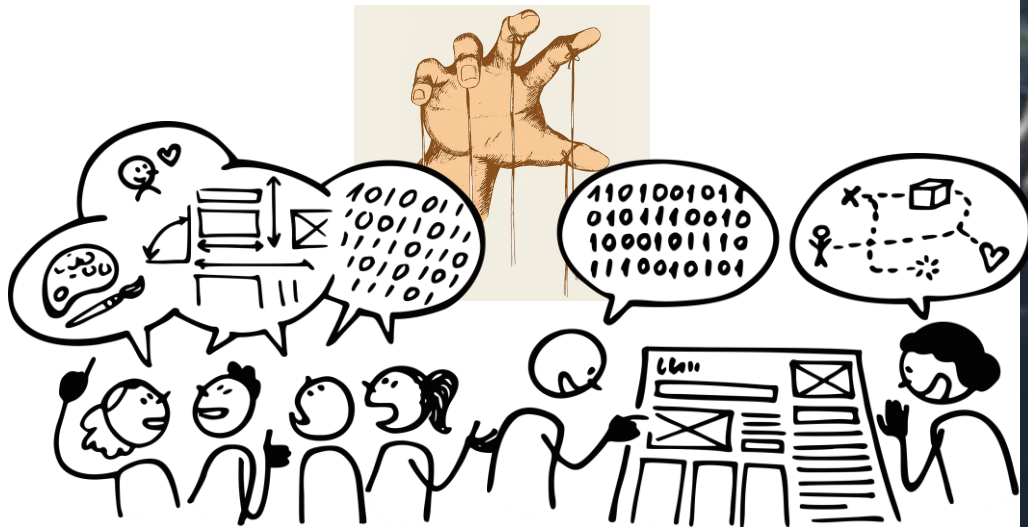
- Pursuing a career: drilled pipe- opting out

ageing- long illness, sick leave return



« There is no pb in science that can be solved by a man that cannot be solved by a woman »

Véra Rubin, 1928-2016

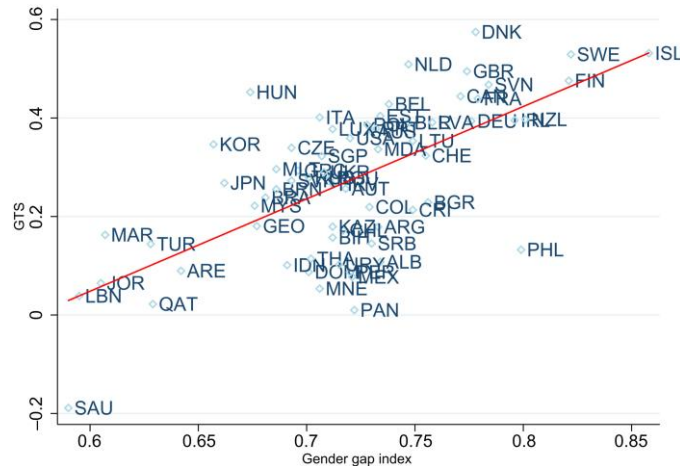


Scandinavian paradox

Hypothesis?

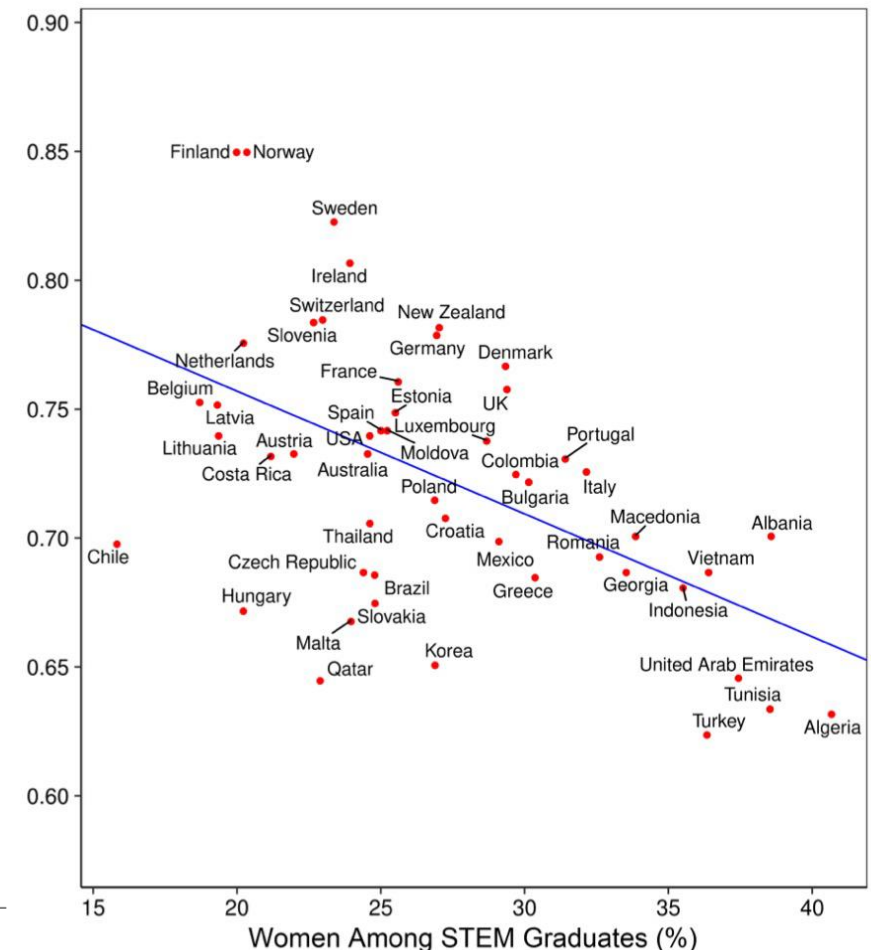
The increase in career, educational and life choices tends to allow for a given gender expression.

Conversely, the economic constraint, pushes to a maximization of choices in an economic context favorable to science and technology.



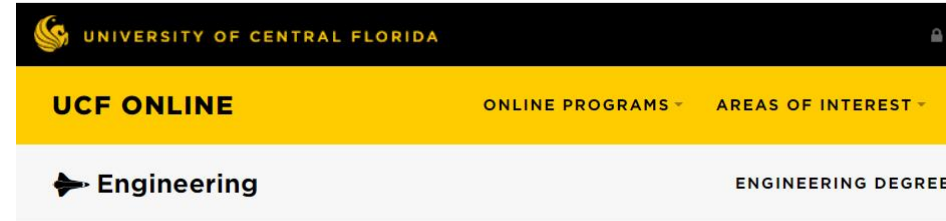
GGGI, Global Gender Gap Index: showing the relationship between gender equality and gender differences in the percentage of women among STEM graduates
=> inverse correlation between female STEM graduation rate and overall gender equality

STOET Gijsbert & GEARY David,
The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education,
Psychological Science, n°29, 2018, p. 581-593.



STEM vs. STEAM

Soft skills
Interdisciplinarity



COMPARING STEM VS. STEAM: WHY THE ARTS MAKE A DIFFERENCE



Brilliance



Contents lists available at [ScienceDirect](#)

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp





Adults and children implicitly associate brilliance with men more than women^{☆,☆☆}

REPORT

Daniel Storage^{a,*}, Tessa E.S. Charlesworth^b, Mahzarin R

^a University of Denver, United States of America
^b Harvard University, United States of America
^c New York University, United States of America



Expectations of brilliance underlie gender distributions across academic disciplines

SARAH-JANE LESLIE, ANDREI CIMPIAN, MEREDITH MEYER, AND , EDWARD FREELAND [Authors Info & Affiliations](#)

SCIENCE • 16 Jan 2015 • Vol 347, Issue 6219 • pp. 262-265 • DOI: 10.1126/science.1261375

2185 466



Women are underrepresented in careers where brilliance is valued. A stereotype associating brilliance with men may be part of the reason. We conducted the first investigation of this stereotype with implicit measures. Implicit Association Tests (IATs) revealed a robust *male-brilliant* association. This association was observed across a range of stimuli, cultures, and ages.

RELATED PERSPECTIVE

Gender inequality in science

Women's participation and attitudes to talent

Pr. Dr. Florence Sèdes- UTIII Paul Sabatier- IRIT- VP RSU-
Some scientific disciplines have lower percentages of women in academia than others. Leslie *et al.* hypothesized that general attitudes about the discipline would

D&I

Women considered better coders - but only if they hide their gender

Researchers find software repository GitHub approved code written by women at a higher rate than code written by men, but only if the gender was not disclosed



📷 A 2013 survey found only 11.2% of software developers are women. Photograph: Antonio Zazueta Olmos/Antonio Olmos

When a group of computer science students decided to study the way that gender bias plays out in software development communities, they assumed that coders would be prejudiced against code written by women.

CAREER FEATURE

When mentoring matters: a French mentoring program for women in science

[Julie Batut](#), [Marina Kvaskoff](#) & [May C. Morris](#) ✉

[Nature Biotechnology](#) 39, 776–779 (2021) | [Cite this article](#)

3261 Accesses | 86 Altmetric | [Metrics](#)

An innovative program addresses the need for support, encouragement and guidance on the part of women scientists in the early years of their career, during their PhD.

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In the European Union in 2017, 44.4% of the knowledge-intensive workforce was female.

Diversity And Inclusion

Research: How Ranking Performance Can Hurt Women

by Klarita Gërxhani

December 13, 2021

Nov 01, 2021

Women are more reluctant than men to ask for deadline extensions

Concern about burdening others plays a major role, study finds



Jeff Grabmeier

Ohio State News
grabmeler.1@osu.edu

Women are less likely than men to ask for more time to complete projects with adjustable deadlines at work or school, new research finds.

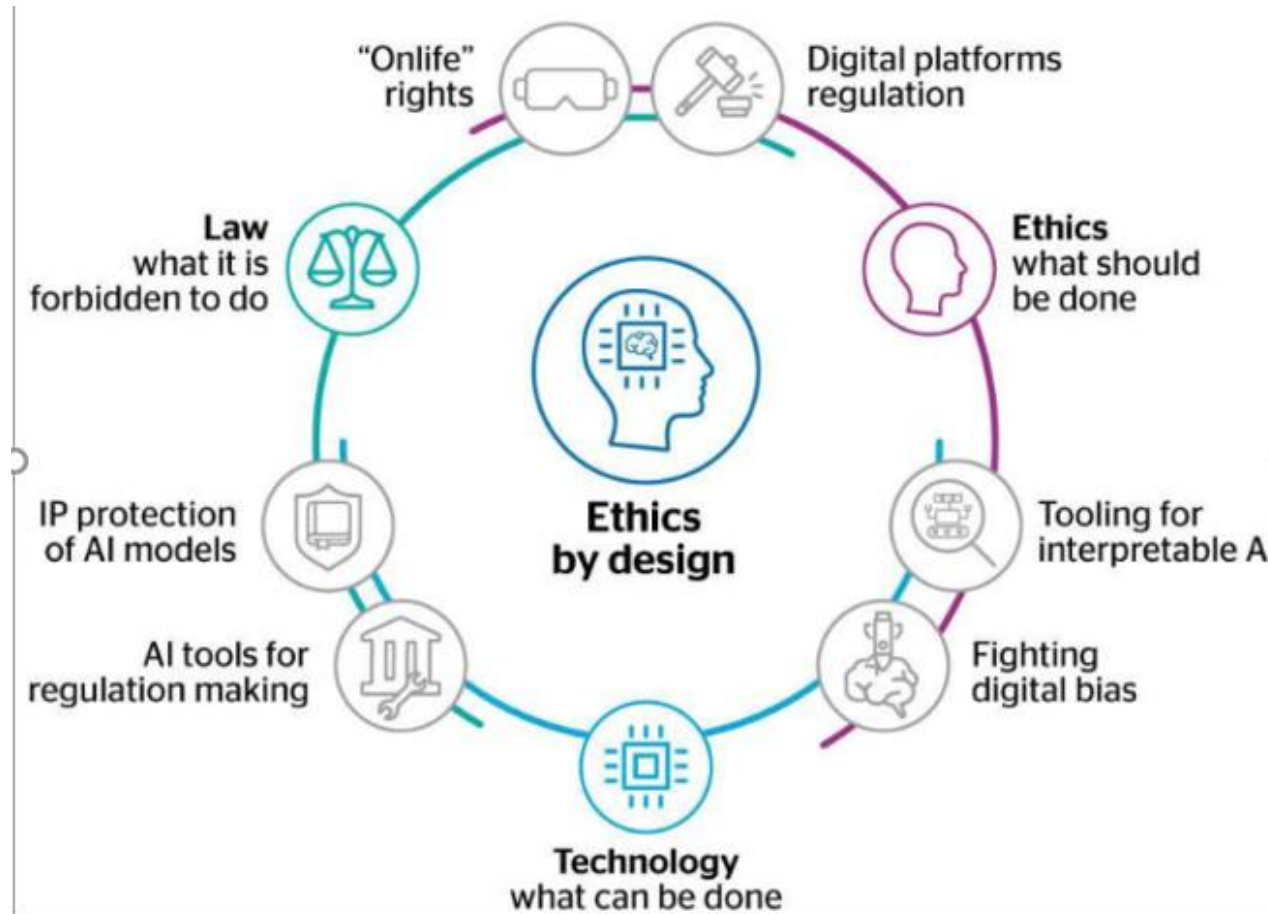
Guidelines and good practices (TBD?)

- Holistic approach
- Continuous improvement
- Empowerment
- Commitment

...belief, faith



Ethics-by-design... by-evolution (RE)



Diversity Equity & Inclusion

