



Gender in ICT research

Webinar IDEALIST2018

27 March 2018

Contact Yellow Window: gender@yellowwindow.com

**GENDER
ACTION**



YELLOW WINDOW

Basic Concepts

SEX refers to the biologically determined characteristics of men and women in terms of reproductive organs and functions based on chromosomal complement and physiology. As such, sex is globally understood as the classification of living things as male, female, or intersex.

GENDER refers to the social construction of women and men, of femininity and masculinity, which varies in time and place, and between cultures.



Natural or constructed competences?

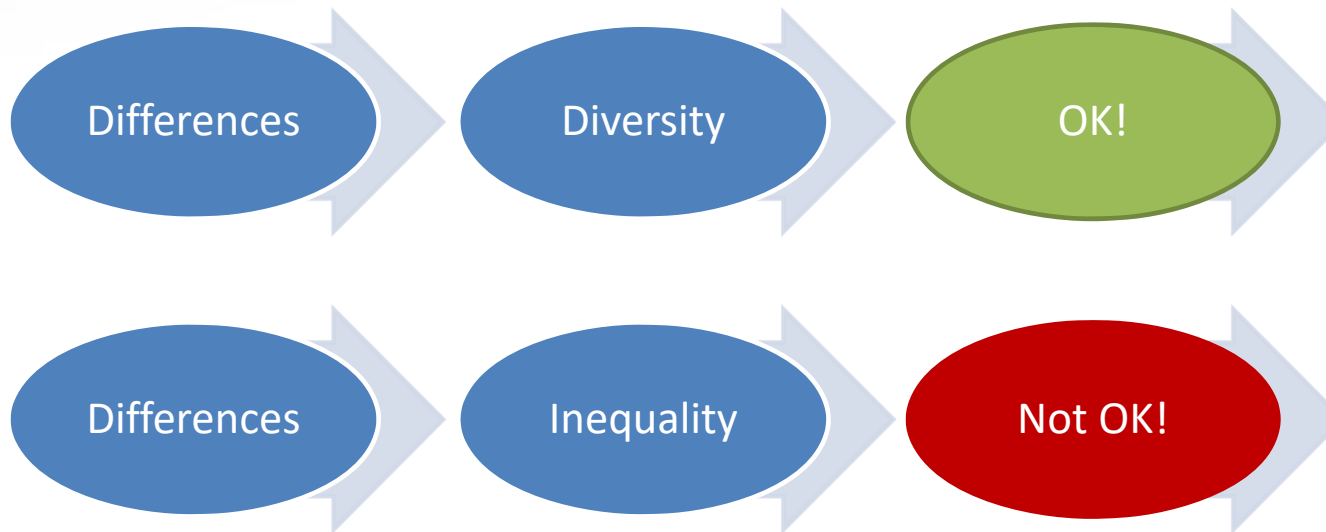


A colorful promotional flyer for 'Queenie Home' toys and cleaning equipment. The flyer features several images of children playing with toys and using cleaning equipment. Text on the flyer includes 'Queenie Home', 'BART'S TIP', 'ALLEEN BIJ BARTSMIT', 'WERKT ECHT', and 'Nét echt'. Prices are listed for various items, such as a vacuum cleaner for 24.99 and a toy car for 19.99. A central slogan reads 'Zo goed zijn als mama, dat wil je ook!'. The logo 'bart smit' is visible at the bottom right.



NOTE THAT:

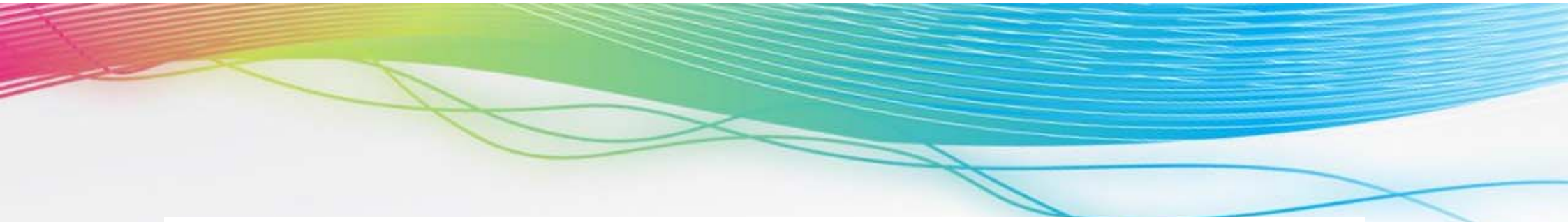
- The problem is not the difference between men and women as such, but the difference in how they are valued
- Certain aspects associated with 'masculinity' still tend to be valued more highly
- The result is inequality of opportunities, segregation & discrimination



GENDER EQUALITY

A situation where individuals of both sexes are free to develop their personal abilities and make choices without the limitations imposed by strict gender roles. The (possibly) different behaviours, aspirations and needs of women and men are considered, valued and favoured equally.





European
Commission



HORIZON 2020

European Commission



Three objectives underpin the European Commission's strategy on gender equality in research and innovation policy:

- *Fostering equality in scientific careers;*
- *Ensuring gender balance in decision-making processes and bodies;*
- *Integrating the gender dimension in research and innovation content, i.e. taking into account the biological characteristics and the social features of women and men.*

Equal
Opportunities
in research at
all levels



Gender and
sex variable in
the research
content



Gender
in
research

Equal
Opportunities
in research at
all levels

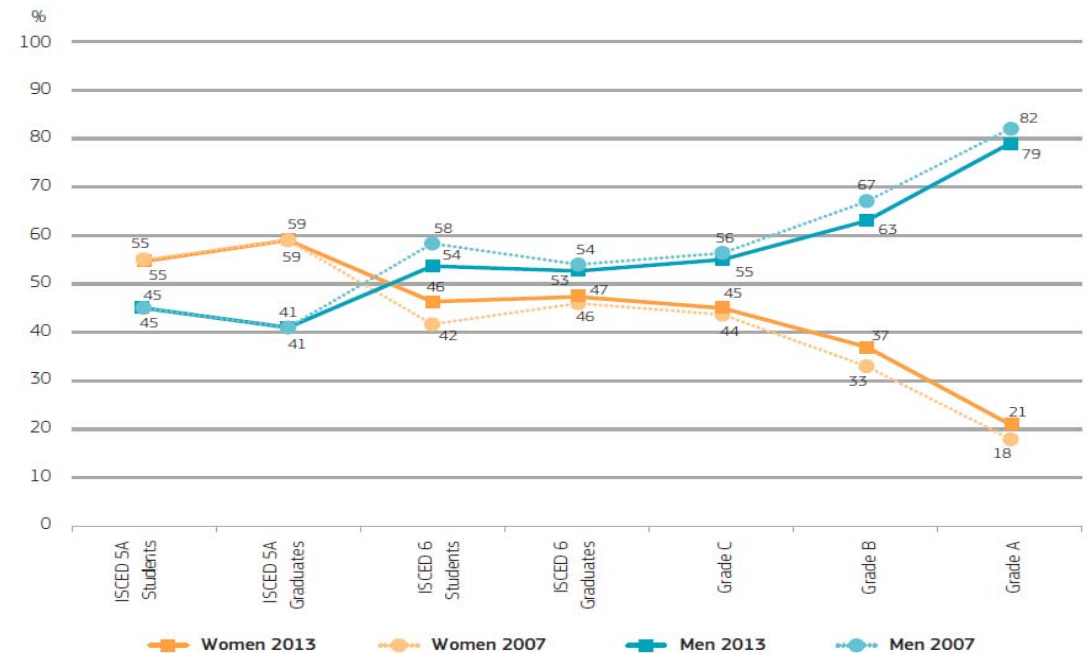
Gender and
sex variable in
the research
content

Gender in
research

SHE – figures – 2015: The scissors - diagram

- In only eight out of 28 EU Member States did women account for more than 40 % of researchers.
- Women in the EU have a stronger presence amongst researchers in the higher education and government sectors. In the business sector, they make up close to one in five researchers (2011)."

Figure 6.1. Proportion of women and men in a typical academic career, students and academic staff, EU-28, 2007–2013



Notes: Reference years Eurostat data: 2007–2012; Reference years for Women in Science (WIS) data: 2007–2013; Exceptions to the reference years (WIS): AT: 2007–2011; BE (FR), LV, RO: 2010–2013; CY, PT: 2007–2012; DK, LU (Grade A and B, C not available): 2009–2013; ES, IE: 2008–2012; BE (FL), NL, FI: 2011–2013; PL, SK: 2012–2013; FR: 2012; HR: 2014; MT: 2015; EE: 2004 (She Figures 2012); LT: 2007 (She Figures 2012); UK: 2006 (She Figures 2012); Data unavailable for: (Eurostat) ISCED 5A Students: LU (2007); ISCED 5A Graduates: FR (2012), LU (2007); ISCED 6 Students: DE (2007), LU (2007); ISCED 6 Graduates: FR (2012), LU (2007).

Source: Women in Science database, DG Research and Innovation and Eurostat – Education Statistics (online data code: educ_grad5)

- The gap is even bigger if we look at the proportion of women and men in the areas of science and engineering.

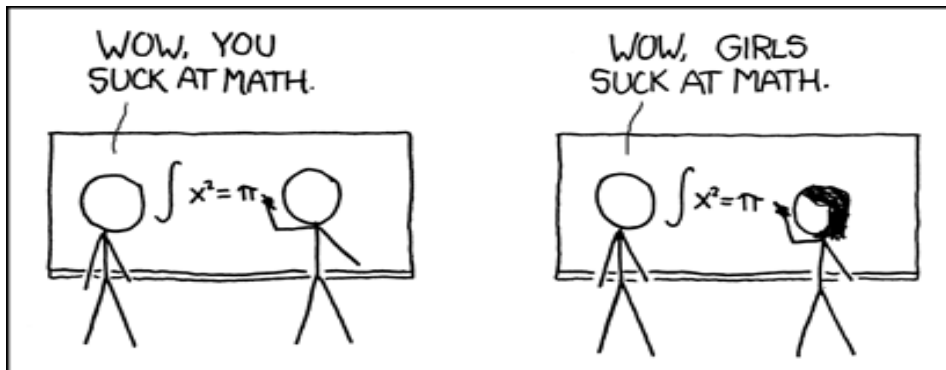
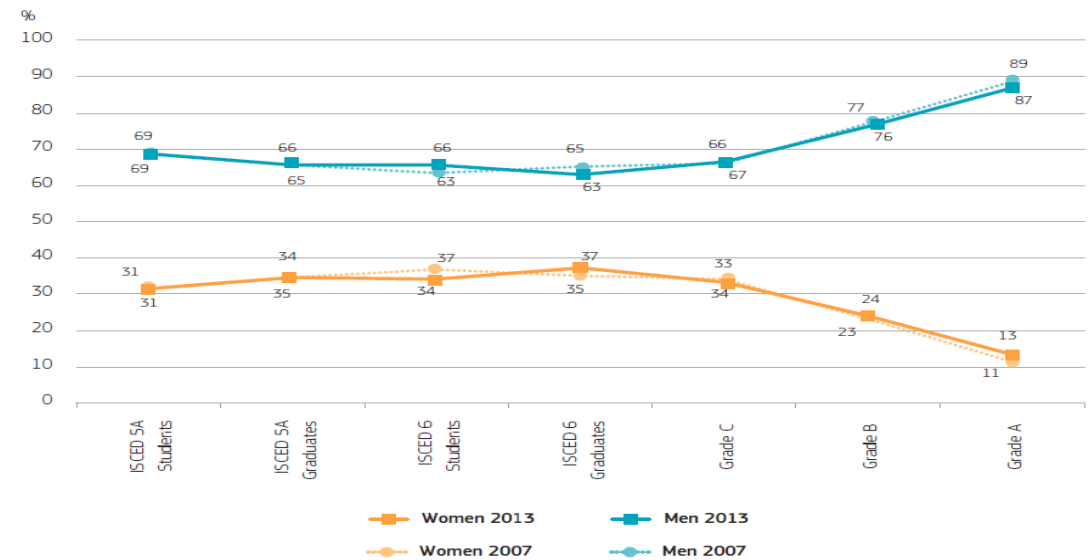


Figure 6.2. Proportions of women and men in a typical academic career in science and engineering, students and academic staff, EU-28, 2007–2013



Notes: Reference year for Eurostat data: 2007–2012; Reference year for WIS data: 2007–2013; Exceptions to the reference years (WIS): AT: 2007–2011; BE (FR): 2010–2013; BE (FL), NL, FI: 2011–2013; CZ: 2007–2008; DK: 2009–2013; IE: 2008–2012; CY, PT: 2007–2012; EL, MK: 2012; PL, SK: 2012–2013; BA, SI: 2013; HR: 2014; LT: 2007 (She Figures 2012); UK: 2006 (She Figures 2012); Data unavailable for: WIS Grade A, B and C; AT, BG, EE, FR, HU, LU, LV, RO; Eurostat: ISCED 5A Students: LU (2007), ISCED 5A Graduates: FR (2012), LU (2007), ISCED 6 Students: DE (2007), LU (2007), NL (2007), ISCED 6 Graduates: FR (2012), IT (2007), LU (2007), PL (2012); Others: SET fields of education = Science, maths and computing + Engineering, manufacturing and construction; SET fields of science = Engineering and technology + Natural sciences.

Source: Women in Science database, DG Research and Innovation and Eurostat – Education Statistics (online data code: educ_grad5)

(Un)conscious biases influence job segregation



Ada Lovelace: British mathematician: laid foundation for software programming

Margaret Hamilton wrote entire software package that sent Apollo rockets to the moon



Female 'computers' doing astronomy research and making groundbreaking discoveries



Gender based bullying in computer games

When girls/women threaten the male hierarchy, they tend to be bullied by males losing the game.



Gender Equality Plan

As defined by the European Commission, a gender equality plan consists of a set of actions aiming at:

- Conducting impact assessment / audits of procedures and practices to identify gender bias.
- Identifying and implementing innovative strategies to correct any bias.
- Setting targets and monitoring progress via indicators.



European Commission Communication
on 'A Reinforced European Research Area
Partnership for Excellence and Growth' (COM(2012) 392 final)

Good practice examples - Areas of intervention:

- Organisational culture:
 - Organise gender training
- Reconciliation of work and private life:
 - Parents to Parents coaching
- Recruitment, selection and career progression:
 - Anonymise certain steps to avoid unconscious bias
- Leadership and decision-making:
 - Quota for women in all decision making commissions and other bodies
- Sexual and gender-based harassment:
 - 'Special Point of Contact Person' for sexual harassment



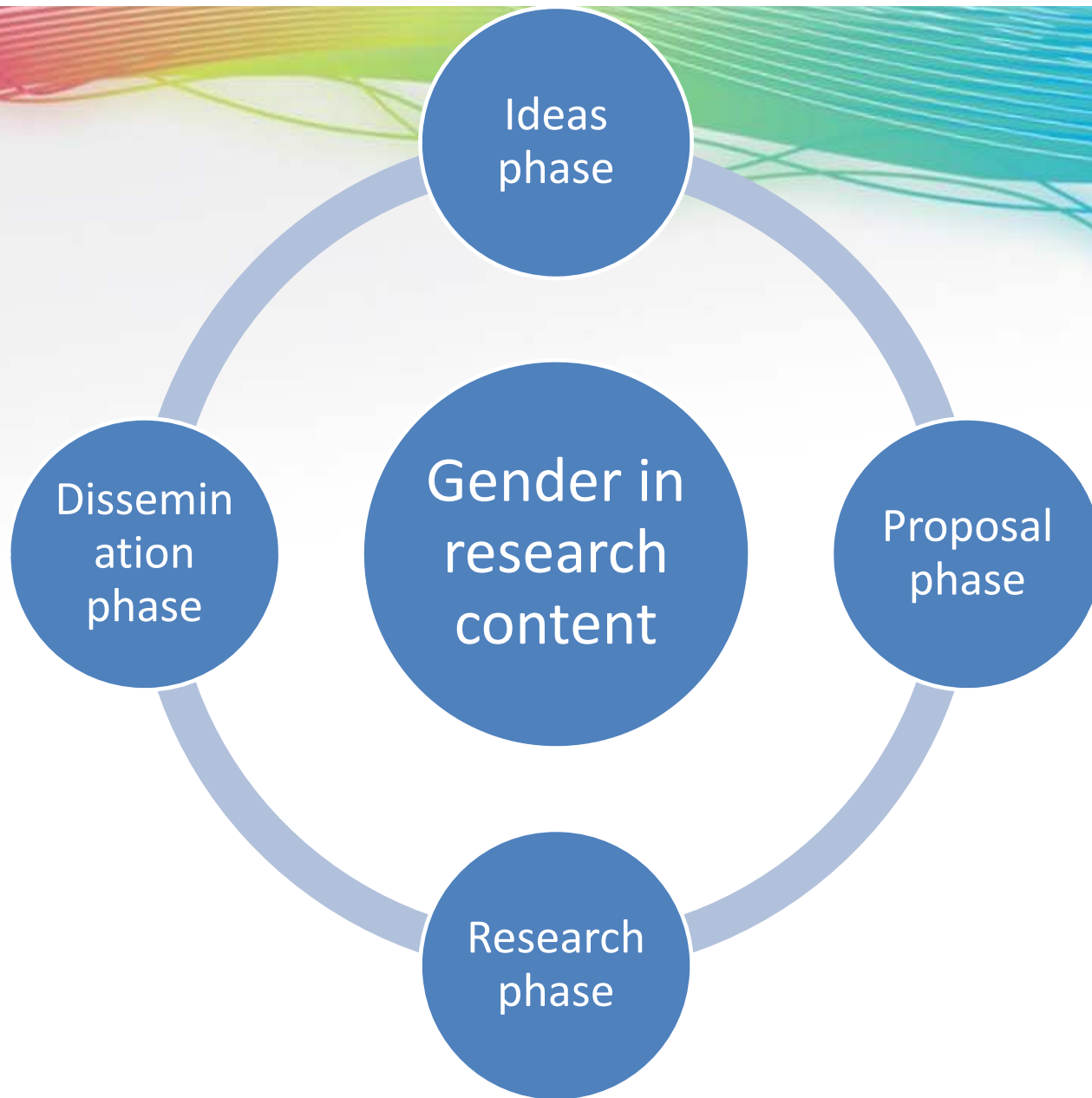
Equal
Opportunities
in research at
all levels



Gender and
sex variable in
the research
content



Gender
in
research



**Remember:
Both the variables
sex AND gender can
be relevant**



EQUALIST

Gender Equality in Information Sciences and Technology

Gender and ICT Research

**Maria Sangiuliano, Università Ca'
Foscari**

27/03/2018

GenderAction Webinar

The challenge

Women are underrepresented in the ICT sector

In EU, **only 29** out of **1000 women** with a degree have a specialization in Information and Communications Technologies (ICT).

For men, this number is 95 out of 1000.

In Engineering and Technology Faculties in EU, women comprise **only 9.3%** of academic staff members (**full professors**)



Women are far more likely than men to leave the ICT sector during their mid-careers, **not reaching higher positions.**

The project at a glance

Gender Equality Plans

For Information Sciences and Technology Research institutions



The **EQUAL-IST** project aims at introducing **sustainable** and **long-term structural changes** to enhance **gender equality** in seven (7) Information Sciences and Technology (IST) research institutions in Europe.

The project at a glance



- ▶ **7 Gender Equality Plans (GEPs)** (Finland, Germany, Italy, Lichtenstein, Lithuania, Portugal and Ukraine)

- ▶ **1 Crowdsourcing platform** to enable participatory co-design of tailored GEPs

- ▶ **6 Main goals**
 - Investigate and analyse **good practices** on GEP implementation in research institutions
 - **Design and implement** the crowdsourcing platform
 - **Design and implement** the GEPs
 - **Evaluate** the GEP implementation at partner institutions in order to ensure its effectiveness, efficiency, and sustainability
 - **Increase the number of female researchers**, improving their careers and mobility, thus contribute to research intensity
 - **Spread the gained experience**, providing long-term solutions to other IST institutions and increase number of RPOs implementing Gender Equality Plans

**TOOLKIT
FOR GENDER
EQUALITY IN
ICT/IST
RESEARCH
ORGANIZATIONS

(UPCOMING BY
JUNE 2018)**

**GOOD PRACTICES OF GENDER
EQUALITY IN ICT/IS RESEARCH
INSTITUTIONS**

- A collection of good practices, examples, tips and resources to implement gender equality actions in Computer Sciences and Information Systems Departments/Faculties
- Gender in: recruitment, selection, career progression, leadership and decision making, research and education content, attracting girls to ICT studies, institutional communication

ON LINE INTERACTIVE TOOLKIT

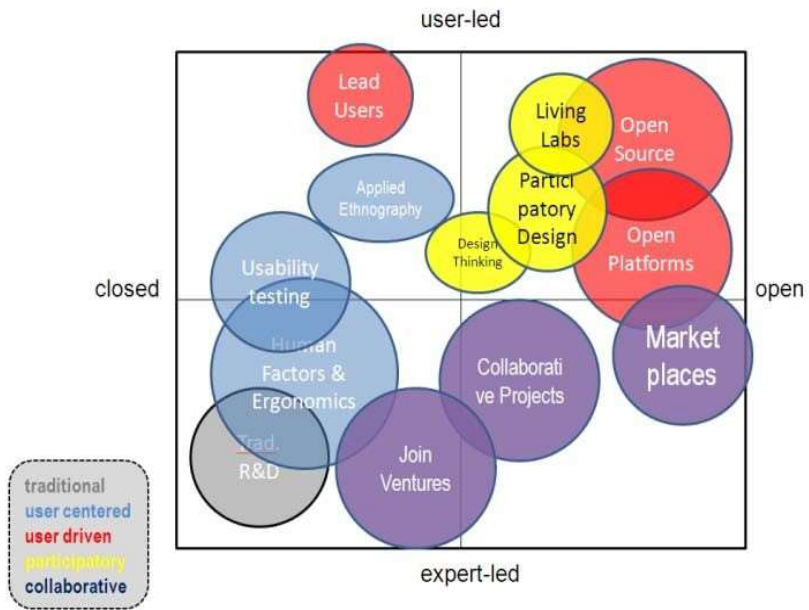
- Content management system + interactive functionalities to collect feedback from users and facilitate interaction on the implementation of good practices as well as ongoing collection of good practices
- Accessible via the EQUAL-IST website www.equal-ist.eu
- In progress: compatible and interoperable with the EIGE GEAR Toolkit

Users and citizens centrality in ICT /IST Design

Since the late 1980s, the paradigm in design theory has shifted from technology-oriented/driven design to user-oriented design

Main arguments:

- Fairness and just ICT Design
- Citizens empowerment
- Accountability
- Pro-sumerism
- Acceptance of ICT innovations
- Marketability

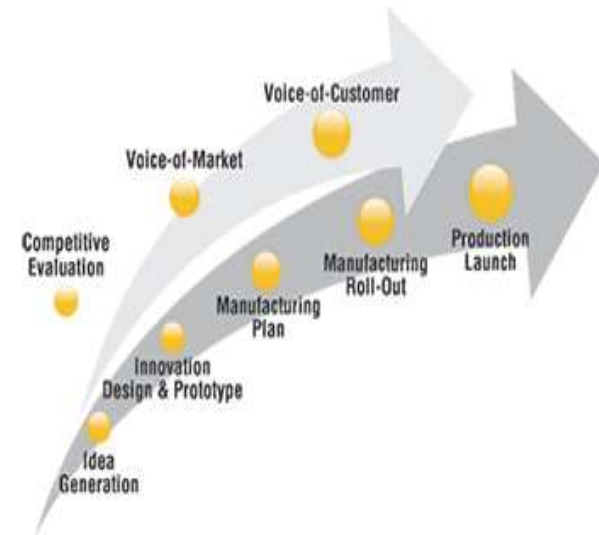


Mapping User innovation. (Almirall et al., 2012, pag. 16)

H2020 Programme and EU Policies are more and more attentive to users and citizens centrality (most recent examples: Tallin Declaration on e-government)

Barriers to adopt user/ centric approaches

- ▶ The “I-Methodology” (unconscious reliance on personal experience, whereby the designer replaces his professional hat by that of the layman" (Akrich, 1995).
- ▶ Fast paced processes and need to bring (ICT) innovations swiftly to market
- ▶ IPR and secrecy issues: revealing proprietary technologies during co-design events might lead to loss of competitive advantage
- ▶ **Typical phenomenon:** user/citizen centric design methods are brought about only after prototyping, with reduced possibilities for intervening on systems/structures/services and allowing for superficial changes only



- **What gendered representation of future users do actors involved in the development of technologies have in mind?** By delegating and distributing specific responsibilities, skills, and tasks to users, programmers can reinforce existing gender divides/stereotypes or challenge them
- Feminist scholars from STS (Science and Technology Studies) explained well how barriers affects design cultures to account for the diversity of users from a gender perspective, analyzing two case studies (**Digital City of Amsterdam and a TV based videogame by Phillips Research**) of the design of electronic virtual cities developed in the private and the public sector: prevailingly **male dominated developers' teams programmed based on implicit gender-scripts** imagining the typical users as male/middle class/young -middle aged, with advanced digital skills (Oudshoorn, Rommes & Stienstra, 2004)

Open issue: can more balanced teams of ICT technologists make a difference?

Design for women ?

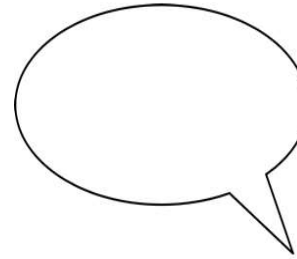
IT products designed for women only: **the risk of reasserting stereotyped versions of femininity is high:**

Cooking, fashion, beauty oriented products among the

Bloomberg list “18 best apps every modern woman should have”

A gender inclusive ICT design acknowledges gendered behavioral patterns that shape male/female users’ approaches and needs

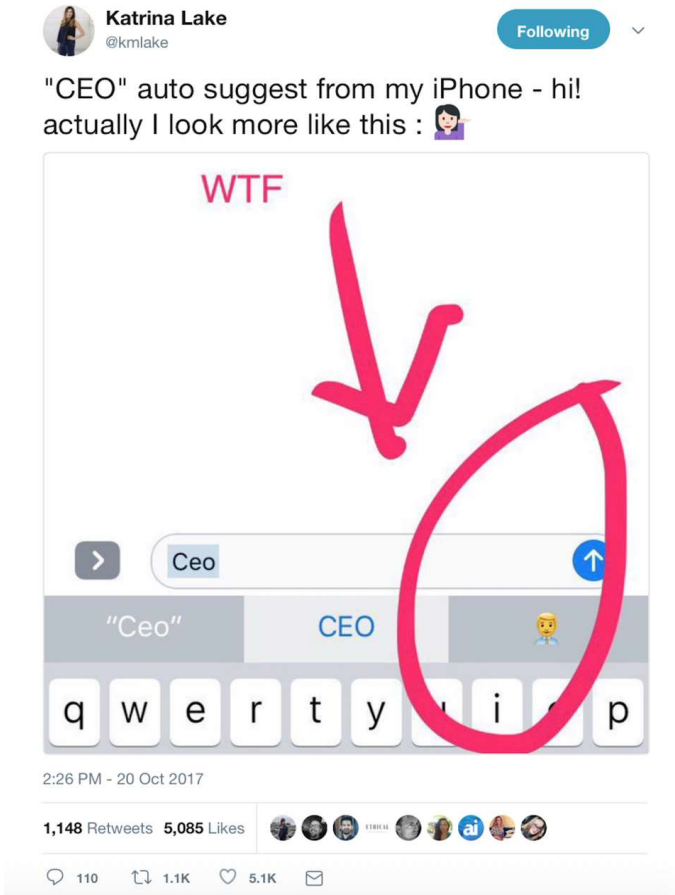
at the same time it is able to scrutinize how **gender is interrelated to other variables (class, age, ethnicity, disability, sexual orientation etc.)**



Mike Lavigne, founder of fertility app Clue

“Ultimately, the vast majority of women-focused apps out there are flat-out embarrassing. They’re embarrassing because they reinforce an offensive, out-dated stereotype of femininity... It’s time we designers stop pandering to cultural norms, start disassembling our stereotypes, and get in touch with how people – who have a huge amount of variability – actually feel about themselves.”

Gender (and not only) bias in Machine Learning and AI



Word embedding works by linking words to a vector of numbers, which algorithms can use to calculate probability.

By looking at what words tend to be around other words, like “engineer,” the model can be used to figure out what other word fits best, like “he.”

Translation algorithms are working off these biases, and so are other services like Google Search, as well as Netflix, Spotify recommendations.

Man is to Computer Programmer as Woman is to Homemaker? Debiasing Word Embeddings

- Proves how even word embeddings trained on Google News articles exhibit female/male gender stereotypes to a great extent.
- Provides a methodology for modifying and removing gender stereotypes, such as the association between the words receptionist and female, while maintaining desired associations such as between the words queen and female.
- Define metrics to quantify both direct and indirect gender biases in embeddings, and develop algorithms to “debias” the embedding.

“One perspective on bias in word embeddings is that it merely reflects bias in society, and therefore one should attempt to debias society rather than word embeddings. However, by reducing the bias in today’s computer systems (or at least not amplifying the bias), which is increasingly reliant on word embeddings, in a small way debiased word embeddings can hopefully contribute to reducing gender bias in society. At the very least, machine learning should not be used to inadvertently amplify these biases, as we have seen can naturally happen.”

(Bolukbasi, T., K.W. Chang, J. Zou, V. Saligrama & A. Kalai, 2016).

Algorhythmic Justice?

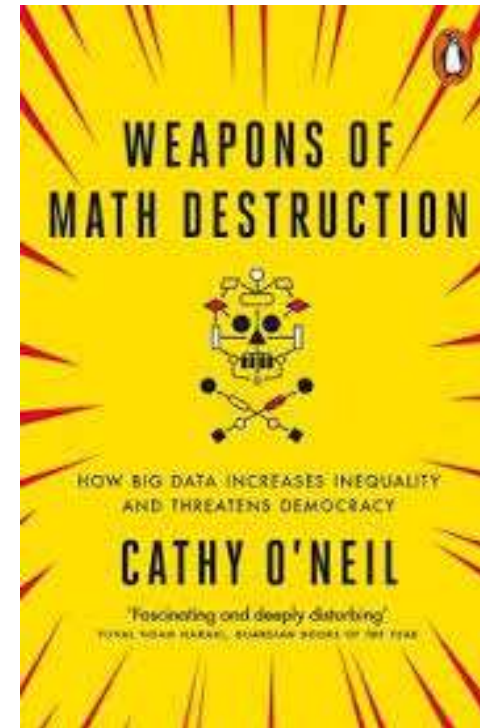
Correlations between co-occurring labels and visual input risk inadvertently encoding social biases found in web corpora. A **study on data and models associated with multilabel object classification and visual semantic role labeling** found that: (a) datasets for these tasks contain significant gender bias and (b) models trained on these datasets further amplify existing bias.

For example, the activity cooking is over 33% more likely to involve females than males in a training set, and a trained model further amplifies the disparity to 68% at test time.

Buolamwini studied the performance of three **leading face recognition systems** — by Microsoft, IBM and Megvii of China — by classifying how well they could guess the gender of people with different skin tones. These companies were selected because they offered gender classification features in their facial analysis software — and their code was publicly available for testing.

Joy Boulamwini founded the Algorithmic Justice League and she is raising the awareness on how algorithmic bias like human bias can result in exclusionary experiences and discriminatory practices

<https://www.ajlunited.org/>



Human Robot Interaction and Gender Bias

Gender stereotyping in HRI is widespread:

- Using gender cues in a multi-task robot can be beneficial in terms of user acceptance. A study modified the robot's voice and discovered users were more accepting of the 'female' version of the robot for social tasks (e.g., leading them in an exercise routine), while the male version was preferred for functional tasks (Rhim et al. 2014)
- Tendency of humans towards antisocial behaviors in machines interaction increases with humanlike and engendered interfaces;
- Agents with female gender cues are often subjected to unintended sexual attention and harassment (De Angeli et al., 2006)

 **Leah Fessler** @LeahFessler Follow

I spent weeks sexually harassing bots like Siri and Alexa—their responses are, frankly, horrific. It's time tech giants do something.

Quartz @qz
We tested bots like Siri and Alexa to see who would stand up for herself in the face of sexual harassment: qz.com/911681

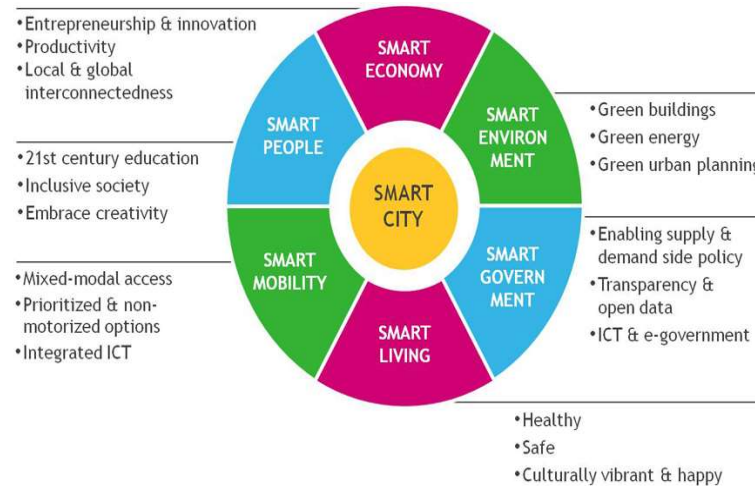
RETWEETS 57 LIKES 76 

10:48 AM - 22 Feb 2017

 **James Woods** @RealJamesWoods · 5h
The End Times have finally arrived... pic.twitter.com/yH7XuSPNbb
266 1.0K 3.0K

Smart Cities_ a gender perspective

- Embedding social dimensions in smart cities policies and research to compensate a strongly tech driven environment (Townsend, 2013)
- Women represent half of the urban population but are poorly represented in cities town halls, 26,65% in the EU (Sundstrom, 2013)
- Lack of women's participation as active citizens impacts also on web based forms of civic consultation and engagement in smart cities initiatives: case studies from e-town meetings (Garramone & Aicardi, 2011) and Living Labs (Horelli 2013)

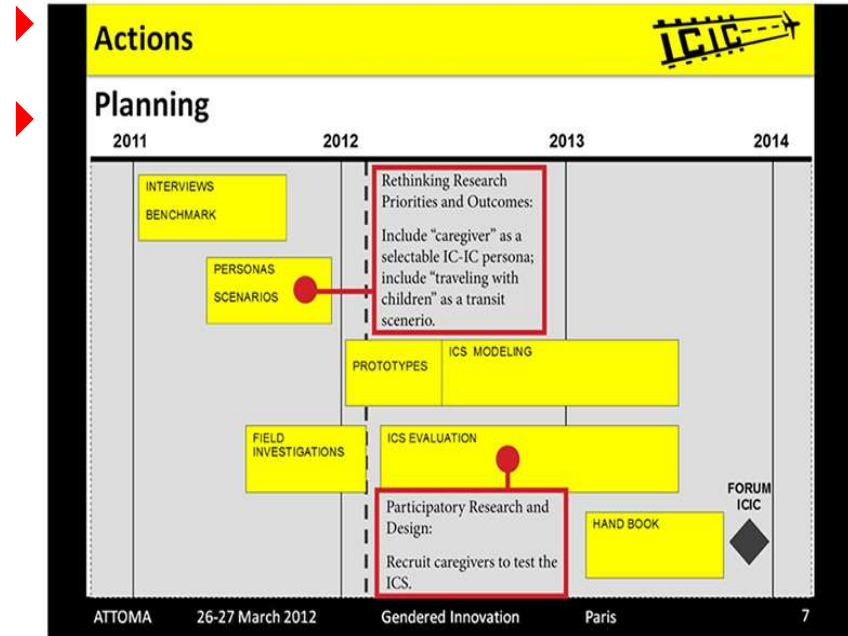


Smart Cities_ a gender perspective: mobility

The EC commissioned a gendered evaluation of an FP7th project named **IC-IC (Interconnectivity through Info-connectivity)**

The overall aim of IC-IC was to meet air travellers' needs when accessing and transiting to/from and through airports in several EU capital cities by way of increasing their access to information

The evaluation demonstrated how including “care givers” among the thousands of interviewed airports' customers adding different types of care givers to the already employed ‘personas’ in the app design phase would have allowed to make the info mobility application richer and better able to provide tailored sets of information to air travellers (men and women) with dependents



Smart Cities_a gender perspective: people and welfare

- ▶ Digital social innovation to involve local communities of parents in participatory co-design of an on line platform to foster time-sharing for childcare and provide affordable work life balance solutions in times of austerity and welfare cuts in 7 EU cities
- ▶ Focus on gender equality and inclusive approach towards low income, migrant, single parents and same sex parents



Contacts

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EQUAL-IST

Join the LinkedIn Group



@EQUALISTproject

Link up with us on Twitter

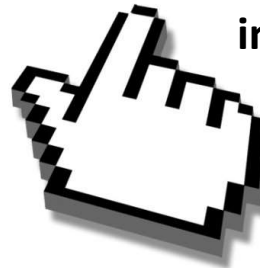


EQUAL-IST

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www.equal-ist.eu

info@equal-ist.eu



Project reference: 710549 (H2020) **Type of action:** CSA **Topic:** Support to research organizations to implement gender equality plans (GERI-4-2015) **Duration:** 1st June 2016 - 31st May 2019 (36 months)

Informatics Europe Working Group

Women in Informatics Research and Education



Prof. Dr. Erika Ábrahám,
RWTH Aachen University, Aachen, Germany

Gender & ICT Webinar
March 27, 2018

- Represents the academic and research community in Informatics in Europe and neighbouring countries
- Brings together over 120 university departments and research laboratories across 30 countries
- Promotes, shapes and stimulates quality research, education, and knowledge transfer in Informatics in Europe

Women in Informatics Research and Education (WIRE)

- **WIRE** is a working group of Informatics Europe
- **Purpose:** to promote actions that help improve gender balance at all stages of the career path in Informatics
- **Current members:**
 - **Erika Ábrahám**, RWTH Aachen University, Germany (Chair)
 - **Tibor Bosse**, Vrije University Amsterdam, the Netherlands
 - **Gyöngyi Bujdosó**, University of Debrecen, Hungary
 - **Juliette Chabassier**, Inria, France
 - **Lynda Hardman**, CWI and Utrecht University, the Netherlands
 - **Jane Hillston**, University of Edinburgh, UK (past Chair)
 - **Maria Letizia Jaccheri**, NTNU, Norway (ERCIM representative)
 - **Cristina Pereira**, Informatics Europe, Switzerland
 - **Alexandra Silva**, UCL, UK

- Best practice booklet [More Women in Informatics Research and Education](#)
- Annual [Minerva Informatics Equality Award](#)
- Measures to increase the percentage of female keynote/invited speakers
- Creation of a communication network for European gender-related organisations and activities
- Supporting the womENCourage conferences
- Active advocacy on the topic through interviews and publications

The screenshot shows a web browser window with the URL www.informatics-europe.org/publications.html. The Informatics Europe logo is in the top left, and navigation links for ECSS, Publications, Services, Awards, Working Groups, Membership, and About are in the top right. A breadcrumb trail shows 'Reports' > 'Best Practice Booklets' > 'Articles'. The main content area features a vertical 'Follow us' button on the left and a section titled 'More Women in Informatics Research and Education'. This section includes a booklet cover image, a paragraph of text, and two buttons: 'Details' and 'Download'. Below the buttons is a link to the PDF file. On the right side of the page, there are three links: 'Commission in Brussels', 'Call Open for 2018 Best Practices in Education Award', and 'Call Open for 2018 Minerva Informatics Equality Award'. At the bottom right, there is a 'Join us' section with a map of Europe.

Informatics Europe

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More Women in Informatics Research and Education

Now in its second edition, this compact resource is published by the Informatics Europe Working Group "Women in Informatics Research and Education" and endorsed by the European Commission. It provides deans and department heads clear and simple best practices to increase the participation of women in their institutions, both as students and as employees. Many tips were gathered directly from colleagues in leading academic positions who have successfully implemented actions that attract and retain more women in their organisation.

[Details](#) [Download](#)

[more-women-in-informatics-research-and-education_2016.pdf](#)

[Commission in Brussels](#)

[Call Open for 2018 Best Practices in Education Award](#)

[Call Open for 2018 Minerva Informatics Equality Award](#)

[Now available: Informatics Education in Europe - Key Data 2011-2016](#)

Join us

TABLE OF CONTENTS

FOREWORDS	02
INTRODUCTION	06
01 RECRUITING FEMALE STUDENTS	09
02 RECRUITING WOMEN	11
03 INTERVIEWING WOMEN	13
04 KEEPING WOMEN	15
05 PROMOTING WOMEN	19
06 SUPPORT MEASURES	21
SOURCES	23

From “Keeping women”:

- Provide support for the creation of a women’s network within the department/institute, including secretarial support and a budget for holding events such as lunches.
- Distribute welcome packages with a booklet that lists childcare options as well as other useful info provided by faculty/institute members.
- Hold annual discussions with representatives of the women’s network and the head of the HR department.
- Encourage senior members of staff in the department to act as mentors. This will create a community where knowledge is passed on to new members, keeping women interested in the department/organisation and in the field.
- Count the hours spent on female support and network issues in the same way as all other departmental commitments and duties. Do not assume that female employees can deal with this extra load in their “spare” time.

Minerva Informatics Equality Award

- First issued in 2016
- Recognises best practices in departments or faculties of European universities and research labs that encourage and support the careers of women in Informatics research and education
- On a three-year cycle, the award focuses each year on a different stage of the career pipeline:
 - Developing the careers of female faculty
 - Supporting the transition for PhD and postdoctoral researchers into faculty positions
 - 2018: Encouraging female students to enroll in Computer Science/Informatics programmes and retaining them
- <http://www.informatics-europe.org/awards/minerva-informatics-equality-award.html>

Current WIRE activities

- Best practice booklet [More Women in Informatics Research and Education](#)
- Annual [Minerva Informatics Equality Award](#)
- Measures to increase the percentage of [female keynote/invited speakers](#)
- Creation of a communication network for [European gender-related organisations and activities](#)
- Supporting the [womENCourage](#) conferences
- Active advocacy on the topic through [interviews](#) and [publications](#)

Aside from WIRE: Gender Equality in Software Engineering

GE@ICSE2018

Home Keynotes Program Call for Papers Organization

GE@ICSE2018

First Workshop on Gender Equality in
Software Engineering

May 28th, 2018, Gothenburg, Sweden

This is an [ICSE 2018](#) workshop

ICT is pervasively influencing all human activities. In this context, more and more people of any age, gender and culture is exposed to such technologies and has to acquire some ability and skill in this context.

For reasons that are still being studied, the engagement of genders with ICT is not uniform. This gap is occurring at all levels and it is evident, for instance, in the small percentage of women covering top positions in professional and academic activities in the field.

At the same time, the community is realising that diversity, when it does not assume the negative aspects of discrimination, plays a key role to a successful and competitive context for software development and research. Such diversity is not only related to gender aspects but refers also to the combination of culture, religion and geographical distribution.

In this context, the purpose of this [ICSE 2018](#) workshop is to discuss about the role, difficulties and opportunities concerning people of different gender in the field of software engineering, in research, education and industry.

The workshop will include some invited speeches from experts in the areas mentioned above, the presentation of accepted position papers and open discussion sessions.

A joint publication will be planned at the end of the workshop to make the community aware of our findings.