How to improve gender diversity in ICT?

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The Digital Gender Gap

Share of employed persons with an ICT education by sex, 2019 (%)

(*) Women: low reliability.
(*) Women: low reliability and not available.
(*) Men and women: low reliability.
Source: Eurostat (online data code: isoc_ski_itsex)

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Science and Technology
Three main concerns

- Economic concern – Annual productivity loss for the European economy is €16.2 billion (SMART 2016/0025)
- Scientific concern - reduces the pool to harvest talents from and makes for less innovative scientific outcomes (e.g, Nielsen et al. 2017)
- Political concern – legitimizes and supports the hierarchical relation between men and women in society (Fox et al. 2017, Sonnert and Holton 1995, Xie and Shauman 2003).
"It is easier to put man on the moon than to get women to enter computer professions"

(Dame Wendy Hall, Former president of the British Computer Society, in a workshop at the Oxford Internet Institute in 2004)
Five lessons learned

1. Inclusion strategies should be based on inclusion thinking rather than exclusion thinking
2. Inclusion measures should aim to create positive circles of inclusion
3. Quantity and quality are important inclusion instruments
4. Gender stereotyping is a pitfall and should be avoided
5. Gender balance and gender balance measures benefits everyone
Research data

- EU study SIGIS (Strategies of inclusion: Gender in the information society)
  - 48 case studies about across five European countries: UK, the Netherlands, Ireland, Italy and Norway
- A comparative study of women informatics students and faculty in Norway and Malaysia
- A study of men and women in ICT companies in Silicon Valley, Malaysia and Norway
- Longitudinal study of inclusion initiatives at the Norwegian university of science and technology, the NTNU
- Research literature on other inclusion initiatives in Informatics
What are inclusion strategies?

Activities aimed to recruit people into, and/or retain and socialize them within some system

How may we best design for better inclusion?
Lesson #1 Inclusion strategies should be based on inclusion thinking rather than exclusion thinking
Deficits in the culture and image of ICT

- “bright young men of disheveled appearance, often with sunken glowing eyes (...) their unwashed and unshaven faces, and their uncombed hair all testify that they are oblivious to their bodies and to the world in which they move (...)” (Weizenbaum, 1976 in Hannemyr 1999:1)
Narrative of women and ICT - negative circle of exclusion

- Few women apply
- Women lack interest in CS
- Women lack previous experience
- Few women in CS
- Chilly culture for women
- Hacker or geek culture that alienates women
- Gender-insensitive teaching
The narratives of men and ICT

Positive circle of inclusion
It could be otherwise

What may we learn from the Malaysian case?
### University of Malaya

- All Heads of Departments were women
- The Dean was a woman


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<th>Session</th>
<th>B. CS Female</th>
<th>B. CS Male</th>
<th>B. IT Female</th>
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What was it that attracted women to CS in Malaysia?

Enthusiasm

V: So, why did you choose to study computer science?
Salina: Because I’m very interested, actually since I was in sixth grade, I used to sit and tell my mum: ‘I am going to be a system analyst or I’m going to be someone who is an expert in computers’.

(Salina, master student, UM)
Instrumental interest (job prospects)

“Also, I think this [CS] is a very good subject, a very wide range. After I finished this course, I’m sure that I can get something. I mean, it’s a job for me...”

(Maimunuah, bachelor student)
Parental encouragement

“Actually, computer science is not my main interest, it’s my dad’s main interest, you see (laughing). Actually, I was very interested in chemical engineering. But then (...) my dad kind of talked me out of it (...). So, my dad kind of … should I say ‘brainwashed’, talked me into it, saying that this is the computer era, whatever … So, okay, since it is a new thing, why not give it a try?”

(Wanda, first year student)
Governmental encouragement

It is because of my father’s advice. Because during that time period it was, that was in early in 1990s, when the government start to urge Malaysian people to study IT. And that’s why made my father advised me to do so, choose this field, especially IT. So I just follow this advice, and I am quite satisfied in this field. I want to be a professional in computing, on IT and computer related fields.

(Supryia, master student)
Maimunah: You can say that computer science … this computer science course is meant to be for women instead of guys. I mean, guys usually go for engineering, architecture, contractors, that kind of jobs.

V: Why?

Azizah: Out. Because it is out, not in the office, they’re doing outside.

Maimunah: They get exposed a lot.


Maimunah: Except for us, for girls, they expect us to stay in the office, to do that kind of work.

(Maimunah and Azizah, bachelor students)
Cultural constructions of computers

- The funny thing about the computer is, that me and my mother we will race to the computer and we play games. Because she is in her fifties you see, so you know, women in this age … hardly get sleep, you see. So, sometimes she will sit up at night just to play computer games.

- My dad likes playing golf, you see, he likes outdoor-activities. While my mum is really an in-door person. (…) She prefer something in-door, like making cakes, baking, computers … all those in-door stuff.

(Wanda, bachelor student in CS)
The positive circle of inclusion of women to ICT in Malaysia

- Many women in ICT
- Lack of gendered stereotypes associated to ICT
- Governmental encouragement
- Parental encouragement
- Enthusiasm about computers
- Perception of ICT as a good career choice
Gender balance produce different (and better) cultures and less gender stereotypes

• The high proportion of women made computer science become constructed as a discipline well suited for women,
  – Computer science was perceived as a women-friendly space
  – Lack of a notions of hackers or geeks
  – Thus, it became attractive for both men and women
Lesson # 2 Inclusion measures should aim to create positive circles of inclusion

- SIGIS project: Initiatives should meet as many as possible of three inclusion needs (Sørensen et al. 2011)
  - Access
  - Motivation
  - Capability/empowerment

Examples from two successful projects:
  - Norwegian University of Science and Technology (Lagesen 2007, 2011, 2018, 2019)
How to provide better access/getting more women in?

• Changing admission criteria
• A quota for women
• Hawthorne-effect (increased awareness and attention makes women feel invited)
• The effects of a critical mass of women were:
  – Creating a peer-supportive community among women
  – The gender mix created a better culture also for men and reduced probability for drop-out
  – Influence the symbolic interpretation of computer science to make it less (masculine) gendered
Improving quality as an instrument for increasing motivation/cability and empowerment

- Increasing the quality of the teaching
- Courses tailored toward a more diverse student population
- Introductory courses and hands-on workshops
Lesson # 3 Quantity and Quality are important inclusion instruments

• Quantity
  – How we measure success
  – Reduces minority problems
  – Increase well-being of all students - benefits both men and women
  – De-gender the symbolic property of the field (cf. Malaysia-case)

• Quality
  – Improving quality is a point of departure or developing inclusion strategies (e.g., SIGIS computer games)
  – Improving quality is likely to benefit everyone, but especially those who belong to a minority or are on the margins
Stereotyping

«Women make circles and men make squares. The universities wants more computer science students that makes circles.»
Who do you think will get the job of making a system that makes everyday life easier for patients and doctors?
Lesson # 4 Avoid gender stereotypes

• Because it does not work well – it target too narrow
• For political and long-term reasons: it contributes to conserve gender stereotypes rather than dismantle them
• Better alternatives: target specific sub-groups of women
• Knowledge is an important anti-dote to stereotyping
Lesson # 5 Inclusion measures and gender balance benefit both men and women in ICT
Sources


