



How to improve gender diversity in ICT?

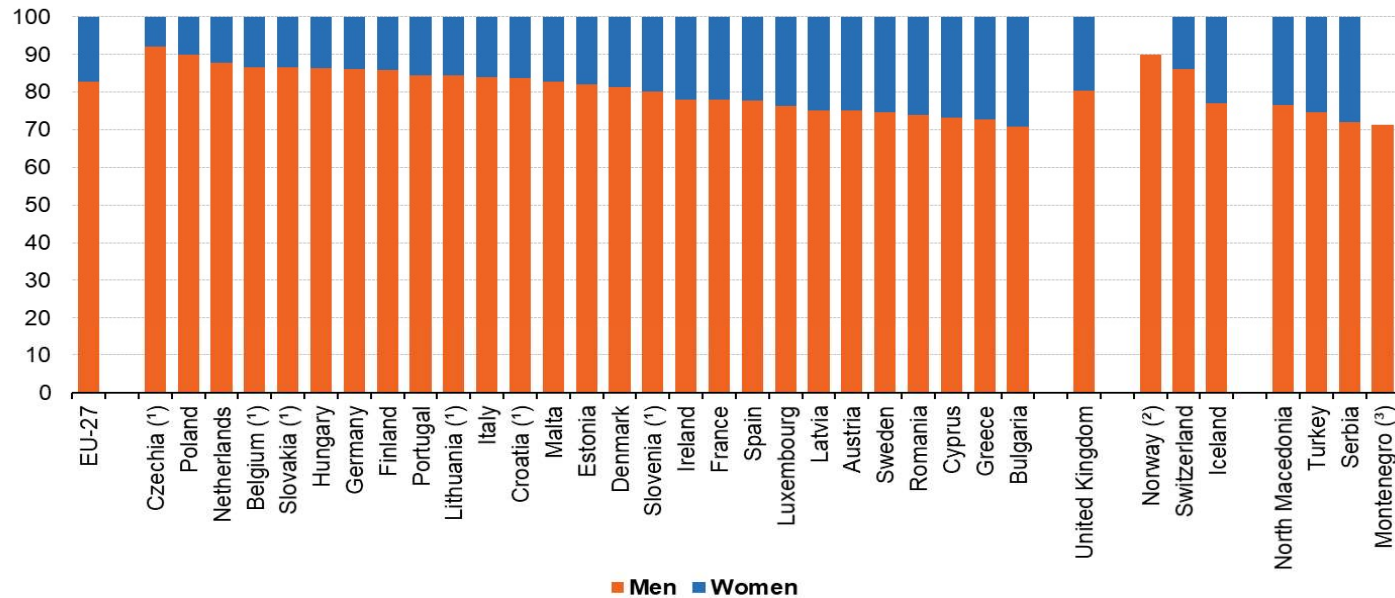
Informatics Europe 2020

Vivian A. Lagesen

The Norwegian University of Science and Technology (NTNU)

The Digital Gender Gap

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



(¹) Women: low reliability.

(²) Women: low reliability and not available.

(³) Men and women: low reliability.

Source: Eurostat (online data code: isoc_ski_itsex)



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

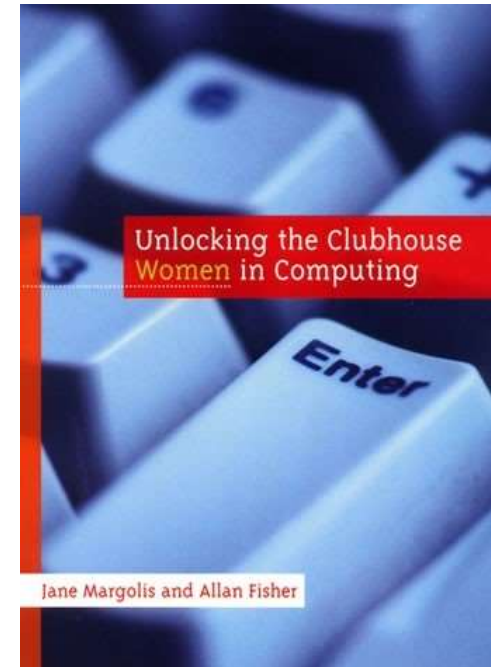
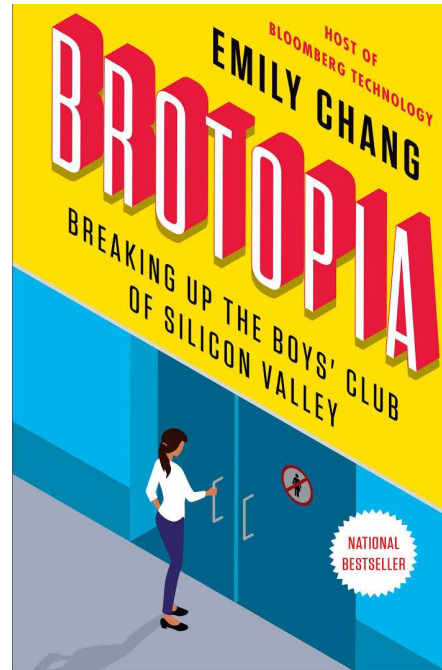
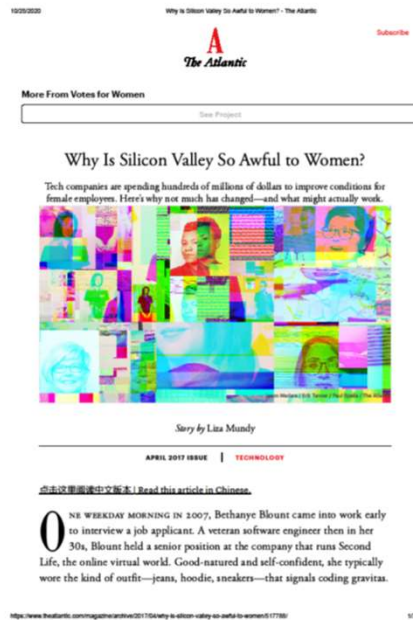
- EU study SIGIS (Strategies of inclusion: Gender in the information society)
 - 48 case studies about across five European countries: UK, the Netherlands, Ireland, Italy and Norway
- A comparative study of women informatics students and faculty in Norway and Malaysia
- A study of men and women in ICT 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?

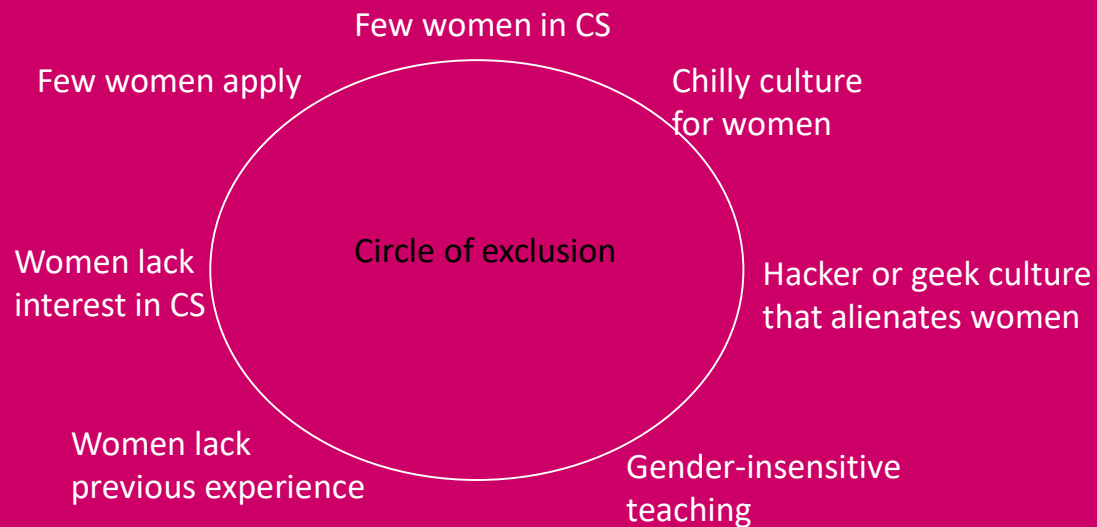
Lesson #1 Inclusion strategies should be based on inclusion thinking rather than exclusion thinking



Deficits in the culture and image of ICT

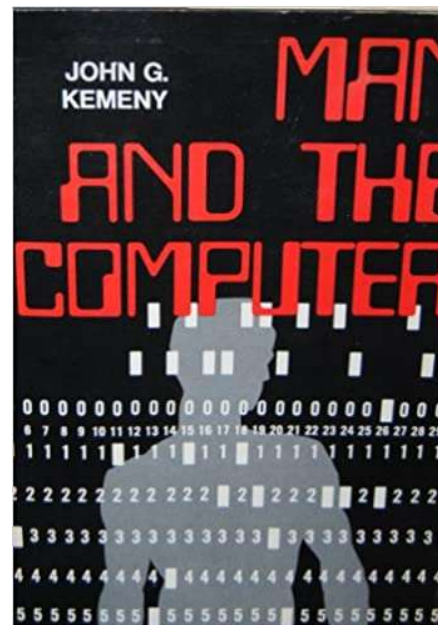
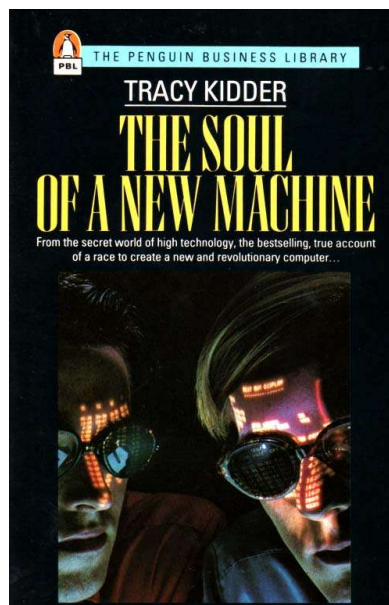
- “bright young men of disheveled appearance, often with sunken glowing eyes (...) their unwashed and unshaven faces, and their uncombed hair all testify that they are oblivious to their bodies and to the world in which they move (...)" (Weizenbaum, 1976 in Hannemyr 1999:1

Narrative of women and ICT - negative circle of exclusion



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

(Source: Othman and Latih 2006, March 2006/Vol. 49, No. 3, COMMUNICATIONS OF THE ACM)

Session	B. CS				B. IT			
	Female		Male		Female		Male	
	Number	%	Number	%	Number	%	Number	%
2005/2006	61	45	74	55	41	71	17	29
2004/2005	96	48	105	52	82	71	34	29
2003/2004	86	59	60	41	82	56	65	44
2002/2003	169	62	104	38	100	55	82	45
2001/2002	167	52	156	48	130	67	64	33
2000/2001	246	55	201	45	197	69	89	31
1999/2000	127	46	147	54	88	59	60	41
1998/1999	144	51	137	49	107	61	67	39

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)

ICT as women-friendly

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.

Azizah: Exposed, yeah. More dangerous.

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

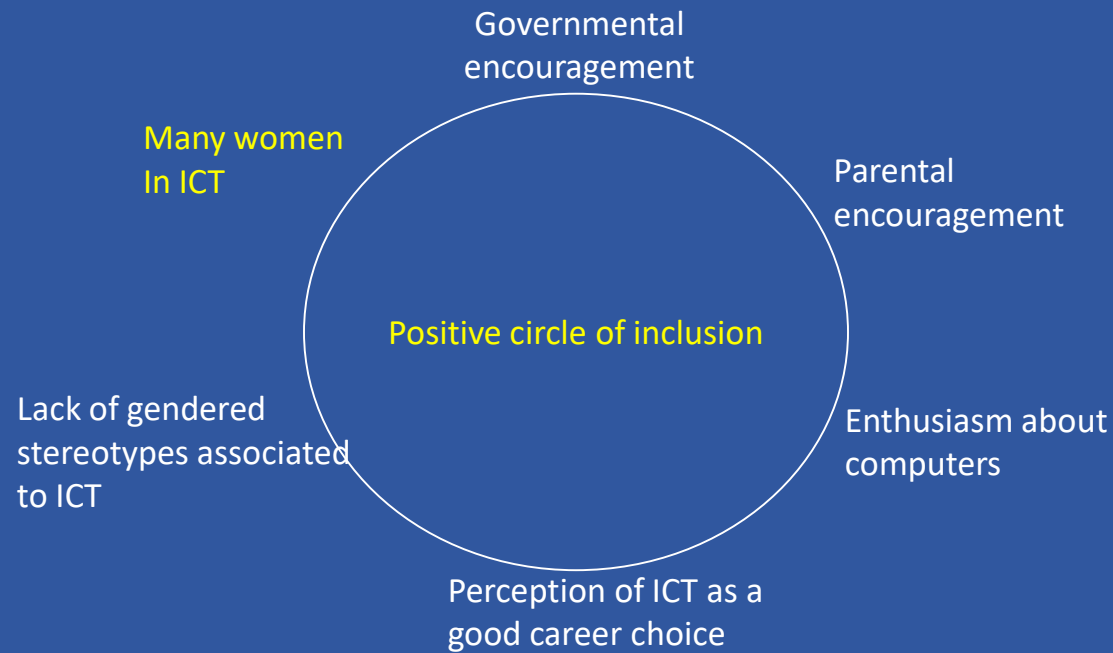
(Maimunah and Azizah, bachelor students)

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



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:

- Carnegie Mellon University (Margolis and Fisher 2002, Frieze and Quenesberry 2015)
- 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/capability and empowerment

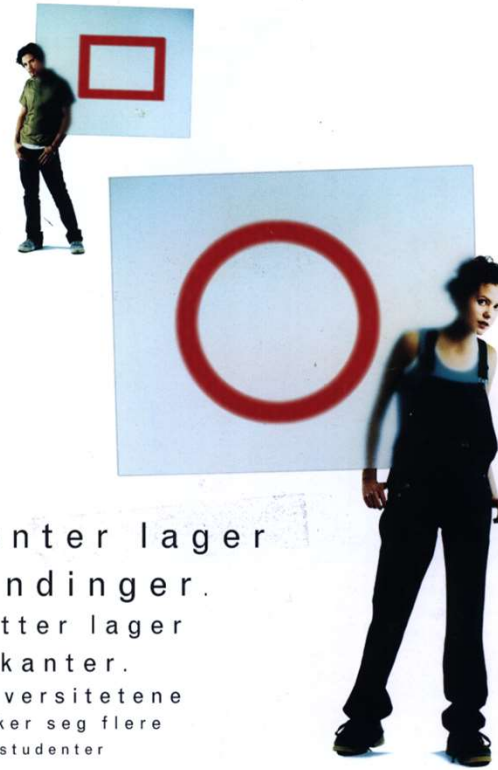
- Increasing the quality of the teaching
- Courses tailored toward a more diverse student population
- Introductory courses and hands-on workshops

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.»



Jenter lager
rundinger.
Gutter lager
firkanter.
Universitetene
ønsker seg flere
datastudenter
som lager
rundinger.

Who do you think will get the job of making a system that makes everyday life easier for patients and doctors?



Hvem tror du får jobben med å lage et system som gjør hverdagen lettere for både pasienter og leger?



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 spesific 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

- Lagesen, V.A., Petter, I. and L. Berg (forthcoming) Efforts to improve gender balance in ICT engineering benefit both men and women students. *Science and Public Policy*
- Lagesen, V. A. (2019). Making positive circles of inclusion: women in computer. *Gender and Culture in Asia*. vol. 3, 25-40.
- Lagesen, V. A. (2015) Gender and Technology: From Exclusion to Inclusion?. *International Encyclopedia of the Social & Behavioral Sciences*, 2nd Edition. 2nd edition, Vol 9. Oxford: Elsevier. pp. 723–728.
- Lagesen, V. A (2011): Getting women into computer science. In Faulkner, W., Rommes E. and K. H. Sørensen: *Technologies of inclusion: Gender in the Information Society*, Trondheim: Tapir Akademiske.
- Lagesen, V. A. (2008): A cyber feminist utopia? Perceptions of gender and computer science among Malaysian women computer science students and faculty. *Science, Technology and Human Values* 33 (1): 5-27
- Lagesen, V. A. (2007): The strength of numbers. Getting women into computer science. *Social Studies of Science*, 37 (1): 67-92
- Lagesen, V. A.(2006) The woman problem in computer science. *Encyclopedia of gender and information technology*.
- Lagesen, V. A. (2005) Extreme make-over? The making of gender and computer science. 2005. PhD dissertation, *STS-report 71*. Trondheim: NTNU.