The Leaky Pipeline

At what stage does one intervene

Loss of female talent

Julia Lee – Harvard SEAS & UTEC

2017 Report from the Scottish Parliament

The "leaky pipeline"

By primary school, the idea of "girl jobs" and "boy jobs" are already established. These stereotypes can impact on both boys' and girls' future choices.

Early Years and Primary School

Girls and boys study STEM subjects at equal rates at school. But only 27% women who graduate with a STEM degree leave the industry, citing "cave fear" and a lack of female role models.

Secondary School and University

Women enter the STEM workforce at lower rates and earn, on average, lower salaries with fewer promotions, leading to fewer women in senior positions. This helps create a negative environment for female students.

The Motherhood Penalty

Women who postpone or delay childbearing are stigmatized and face fewer job opportunities as a result. Many women choose to return to work at a later stage, which is often challenging and can come with a loss in experience and confidence from time not in work. Furthermore, in two-earner households, women are more likely to reduce their hours of work as women throughout their careers.

Women in Science, Engineering, Medicine and Beyond

Julia C. Lee (Harvard)
Setting Context

• What I am NOT
  • A Sociology Expert / Social Scientist / Psychologist …
  • An education expert in the traditional sense …

  • Someone with official academically sanctioned credentials to speak with authority on the matter 😊

• Career roles (as relevant to this conversation)
  • Research in Astrophysics (PhD: U.Cambridge UK; Postdoc: MIT; Prof: Harvard)
  • Executive Director for Research & Education (Harvard SEAS)
  • Executive Vice Provost: Universidad de Ingenieria y Technologia, Peru
  • Africa … (in December)
  • Lead for an international SDG based curriculum with universities and industries
  • Committee: Royal Academy of Engineering (World) Study on university advancement based on teaching effectiveness
  • A mother of young children (my most important role)
Assumes everyone benefits from same supports

Equal access achieved through necessary targeted supports

Cause of Inequity addressed Supports no longer needed

**Education – The Great Equalizer**

**UN Report: The World’s Women 2015**

- “Education is a core human right”
  (United Nations General Assembly of Human Rights 1948)

- “… essential tool for sustainable development”

- “… indispensable for closing the gap between women and men in respect to social and economic opportunities .. Key to empowerment”

- “… improves women’s chances of leading a healthy life and passing on the benefits to future generations” (UNESCO)
Gender Parity for Gross enrollment
Trends toward increased enrollment

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“Most countries have reached gender parity in primary education, but in those that have not, disparities to the disadvantage of girls are stark”

PROBLEMATIC COUNTRIES
1. Africa
2. Latin America
3. Caribbean
4. Western Asia
5. South-Eastern Asia
Learning Achievement of Boys & Girls

Results from the Organization for Economic Cooperation (OECD) & Development for International Student Assessment (PISA)

2012 survey of 15-year olds (with minimal 8 years) schooling

Large disparities in learning achievement among countries: low-income countries lagging far behind high-income countries

Within countries: disparities between lowest and highest-performing students large and can be tracked closely to wealth distribution
Learning Achievement of Boys & Girls
Results from the OECD Program for International Student Assessment (PISA)

• Girls outperform boys in reading skills in every country
  • Average Score: Girls (515) vs. Boys (478) – 38 pt difference ~ year in schooling
  • Differing attitudes towards reading (fiction/non- vs. comic books)

• Boys did slightly (5-10 pts) better in mathematics in most (52/65) countries
  • Difference not significant

• Gender difference in science performance not statistically significant

So why the notable decline in females graduates at the University level?
Tertiary Fields of Studies in Science & Engineering

The World’s Women 2015 – UN Report on Education
Women *more likely* to graduate in fields related to Education, Health-Welfare, Humanities, Arts


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Women *less likely* to graduate in fields related to Science and Engineering


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A disturbing picture
Women in Sciences and Engineering

Influences: Negative Attitudes in the workplace and/or something else ??

This problem further exacerbated with kids

Women in Research and Development

The World’s Women 2015 – UN Report on Education

Julia C. Lee (Harvard)

Women in research and development
Natural Sciences, Engineering & Technology, Medical Sciences, Agricultural Sciences, Social Sciences, Humanities

• Less than 1/3 of the world’s researchers are women

• Men dominate in all fields of research globally
Globally, women’s participation is lowest in engineering and technology (17%).

- The Global share of women is close to parity.
Women in research and development

Medical Sciences and Humanities

- The Global share of women is close to parity
- Women better represented in countries with traditionally large disparities for girls attending primary/secondary educations

Gender Parity ≠ Gender Equality/Equity

Total Researchers by Region, 2011

- Men far outweighed women
- Strangely, % of women researchers are higher in regions with traditionally large disparities for girls

UNESCO Institute for Statistics 2014
Data based on full and part-time researchers, including staff
My overly simplified Conjectures (I)

… for further group discussion

Sub-Saharan Africa, Latin America, South East Asia
For Natural Science and Engineering in Gender Parity Enrollment Countries

For Medical Sciences & Humanities

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For Universities … issues of maternity leave etc.

Increasing female enrollment in STEM

Workplace retention: maternity leave issues
good female role models

??
A diverse world needs diverse assessments & supports

- Different cultural norms
- Different thinking norms (between men & women, e.g.)
- Unconscious bias
- ??

Paraphrasing from the Suzuki Music School of Thought

Talent is nurtured, much more than it is innate

Quoting from my son’s first grade teacher, Sarah Dawe

Diversity is when you are invited to the party.

Inclusion is when you’re asked to dance