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The Systems Approach to Rethinking the Gender-Equality Paradox in STEM in the Context of Norwegian Educational System and Workforce

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Evelina Anita Iversen

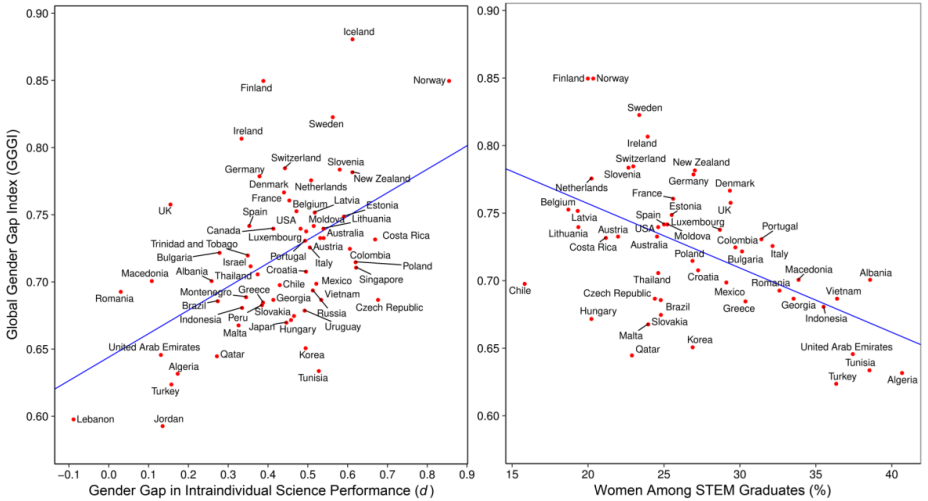
Evelina Anita Iversen received a bachelor's degree in mechanical engineering from the University of South-Eastern Norway in 2020. She is a part-time industry-based master's student majoring in systems engineering at the University of South-Eastern Norway (Kongsberg).

She is currently working at Brudeli Green Mobility (Norway, Hokksund) as a design engineer. The company's goal is to bring electrified transmission solutions to the market and thereby significantly reduce the time needed to get the transportation industry into compliance with the sustainable development goals set forth by the United Nations.

Her research interests lie in system mapping and systemic issue identification, particularly for sustainable transport solutions and significant socio-economic problems.

Introduction

- Understanding of gender parity issues in STEM might lay in a systemic analysis of underlying mechanisms contributing to women's career choices.
- It is believed that reasoning might be both socio-economic and evolutionary in nature.
- Complex dynamic multidisciplinary problems require a collaborative approach, hence the need for a flexible tool, that can be understood and used by many.



Scatterplots showing the relationships between gender equality and sex differences [9]

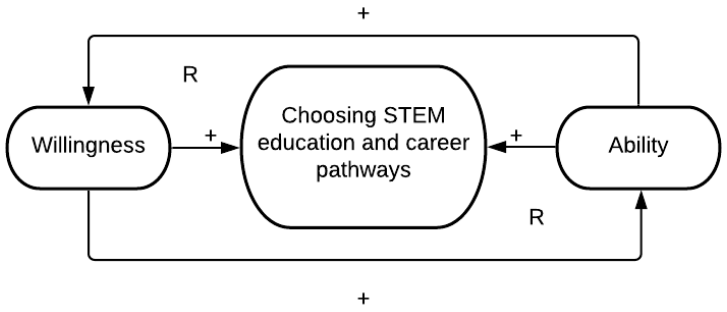
Aims and contributions

The goal of this paper is to show that it is possible to assess and organize the dynamic behaviour of the agents influencing the mechanics of women's career choices using the systems thinking approach.

The paper also suggests that relatable female representation can increase gender parity in STEM.

Causal Loop Diagram - mapping of dynamic systems

- Multistakeholder system requires contextual assessment.
- Understand the issue and its agents with systems thinking approach.
- Mapping influence: reinforcement and balancing.
- Casual Loop Diagram is not a deliverable but a process.



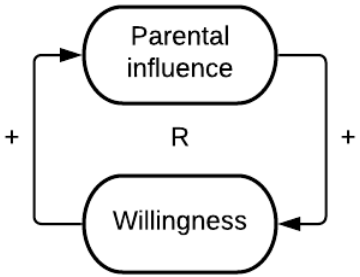
Context and agents' definition

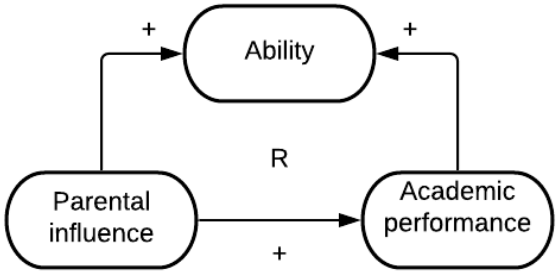
- College enrollment
- Norwegian STEM-related higher education
- Students living in Norway
  - Multicultural background

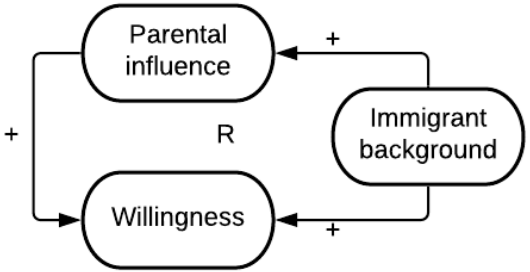
- Parental influence
  - Immigrant background
- Peer influence
- Gender bias
- Governmental support

- Andersen, Ida Marie. *“Diversity in the Academy - Higher education in the face of a complex reality. Oslo: Oslo and Akershus University College” (2014).*

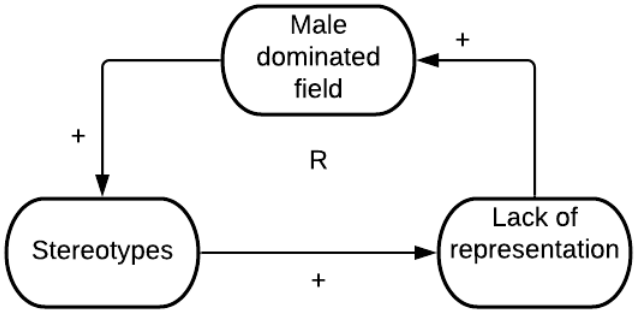
Parental influence

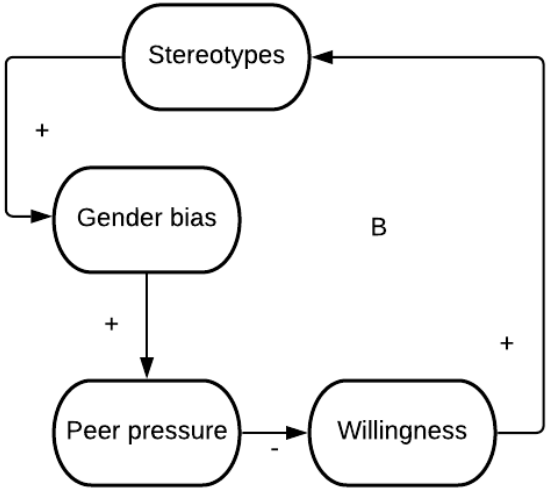




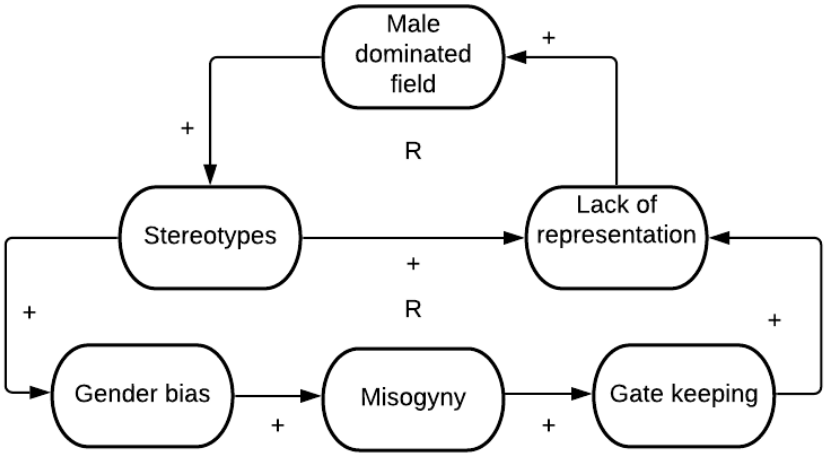


Peer influence

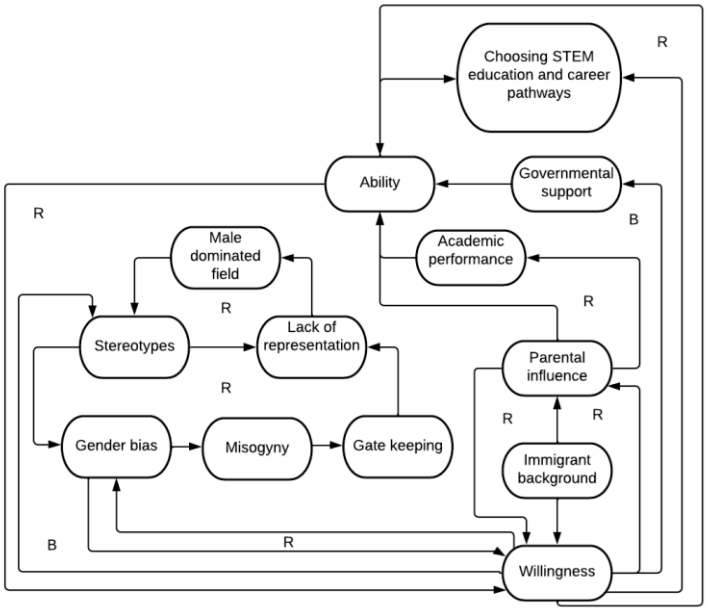


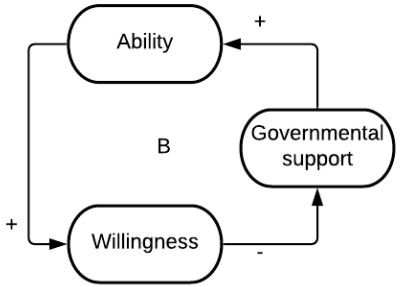


Gender bias


Male dominated field
+
+
R
Stereotypes
Lack of representation
+
R
+
+
Gender bias
Misogyny
Gate keeping
+
+

Loops' superposition





Conclusion and future work

- Engineering mindset is applicable for solving systemic issues in the multistakeholder domain. This method can become a middle ground for communication between neuroscientists, economists, policymakers, and engineers.
  - The paper suggests that relatable female representation can increase gender parity in STEM
  - The willingness factor might cast sight on other systemic issues – challenging role-based society.

- Stepping out of the reduced models of this paper and widening the diagram scope.

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