Are Primary School Computer Science curricular reforms achieving equity goals? Impact on student perception

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Early exposure to Computer Science (CS) & Computational Thinking (CT) is important

To broaden participation in the field & promote equity, two types of barriers need to be addressed (Wang & Hajazi Moghadam, 2017)

- **Structural barriers**: lack of access to Computer Science and Computational Thinking experiences
- **Social barriers**: often stereotype induced, arising despite equal access and similar socio-economic status
  - Lead to under-representation in the field
  - Require a system-wide implementation of Computer Science and Computational Thinking curricula for all students starting early foundational years (Ottenbreit-Leftwich & Yadav, 2022; Bers et al., 2022)

Early CS & CT experiences can help address perception gaps

Perception biases cause disparities and under-representation w.r.t:

- **Gender** (Wang & Hajazi Moghadam, 2017; Rachmatullah et al., 2022)
- **Under-represented minorities** (Lishinski et al., 2022; Warner et al., 2022)
  - Due to stereotype threat (i.e., knowing that a stereotype exists is enough to induce it, Plante et al. 2013) which can start as early as 2-3 years old
  - The consequence is that CS-related stereotypes are identified in young children (Master et al., 2021, and kindergarten, Sullivan & Bers, 2016)
  - Girls perceive CS more negatively, have lower sense of belonging, self-efficacy, and interest, which affects performance and career decisions (Master and Meltzoff, 2020; Plante et al., 2013; Vandenberg et al., 2021)

But are curricular reforms contributing to improving perception & reducing gaps?

- Many initiatives are introducing CS & CT into formal K-12 education
- Curricular reforms and professional development programs are seldom evaluated at the student-level (Mason & Rich 2019; Kong & Lai 2022),
- The effectiveness of CS-curricular reforms in terms of student perception and perception gaps must be established to
  i) improve the proposed curricula and PD programs (Hickmott & Prieto-Rodriguez al. 2018)
  ii) sustain the changes in teachers’ practices
  iii) alleviate concerns of funding agencies and government bodies (Hickmott & Prieto-Rodriguez al. 2018)
  - We evaluate the implementation of a regional CS-curricular reform with two student perception datasets from 4077 grade 3-6 students from 9 schools through structural equation modelling

Interest, and perception of robotics, increase with access to CS-instruction

Some gender gaps close while others increase with access to CS-instruction