

Gendered Views on Computer Science in Secondary Education

Theepa Kalanathan - Kiel University, Felix Weißenrieder - Leibniz IPN Kiel



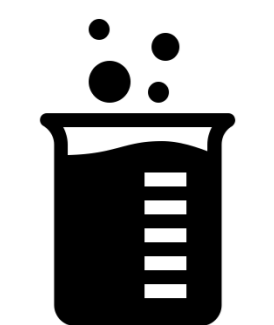
Introduction

CS programs in Germany are growing, but women make up less than 20% of students, creating a gender imbalance that affects diversity and innovation. This imbalance limits women's interest in CS and restricts diversity in the industry, hindering creativity and software inclusivity. This study examines gender-specific perceptions of mandatory CS education based on data from a pilot project in a German federal state.

Background



Men are driven by technical challenges and autonomy, while women value meaningful, socially oriented applications in CS.



Men tend to experiment and engage in tinkering, while women prefer structured learning.



Despite equal competence, women often underestimate their skills due to lower self-efficacy and less prior tech exposure – affecting confidence and persistence in CS.



Early-emerging stereotypes portray CS as male-dominated, discouraging women over time and reducing their interest in the field.

Methodology

436 **qualitative**
(199 ♂, 237 ♀)
342 **quantitative**
(146 ♂, 196 ♀)

Group



• conducted in 2022/2023 school years
• grade 5-9
• 82 schools

Survey



• Thematic analysis (Braun & Clarke)
• Mann-Whitney U test

Methods



Mixed-methods design with a focus on thematic analysis (Braun & Clarke, 2006). The student survey included two **open-ended questions** and a **Likert scale** to assess perceptions of CS.

How would you describe the subject of computer science?

What should be changed for the next cohort?

How well do the following terms fit into computer science lessons?

♂ exciting	○ varied	○ trying out
♂ logic	♀ unnecessary	♀ boring
♂ useful	♂ fun	○ complicated

♂/♀: significantly ($p < .05$) higher association for respective gender

○: No significant difference between gender

Questions and terms translated from German

Results

Male students express a preference for “real programming” over block-based programming languages

“Additionally, it’s a lot of fun because I have had a computer at home for almost three years, so I’m pretty familiar with it.”

Male students also reference **prior knowledge**

Female students criticize the **lack of practical relevance**

“I would like it if we were shown more clearly where we can later apply the things we learn in class.”

“I don’t understand the subject at all. In tests, you basically just have to memorize everything to get the answers right.”

Female students find CS **complex** and **unengaging**

Female students highlight the demand for more comprehensive **teacher guidance**

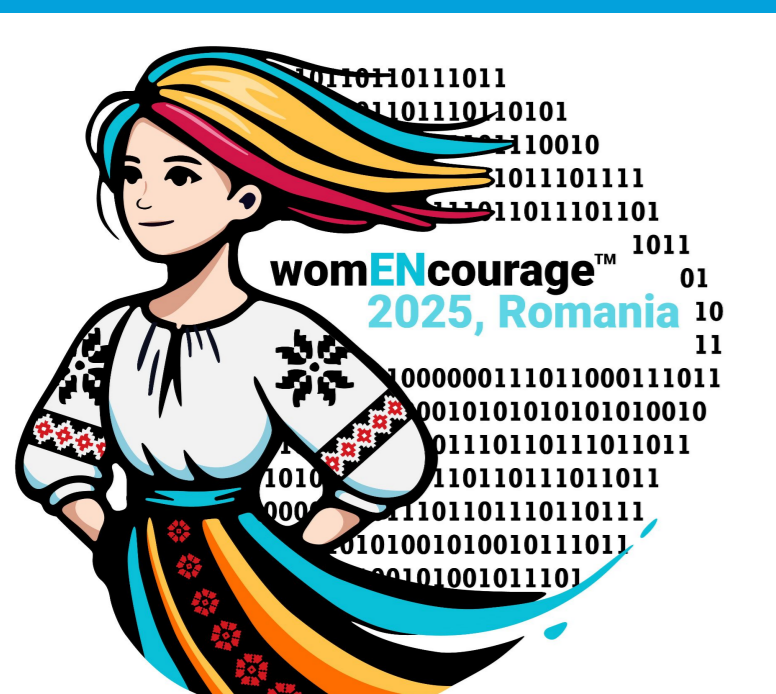
“Topics should be covered for a longer time because some people don’t understand them and struggle to keep up with the material.”

All quotes were translated from German

The findings suggest that gender-specific differences in students' perceptions of the subject become evident early in school, emphasizing the need for gender-sensitive teaching and targeted teacher training to promote equal opportunities in CS education.

References

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