Practical and Project Work in Computer Science Education

Funded by Chalmers’ Genie - Program Chalmers | Gothenburg University

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Women in SE programs report to be:

- **more stressed** and report a worse balance between studies and private life than their male peers

- **more socially isolated:** lack of social contact is named the main hinderance for studying by women on master level (while it plays rarely a role for the men)

- Fewer women perceive their study environment as free of discrimination (compared to men)
Motivation 2: Research

• **a) Biases in teamwork: perception and behavior:**
  – Different ways of working in OSS (Catolino et al. 2019)
  – Women tend to perform less technical tasks in OSS (Robles et al. 2016)
  – Gender-typical communication differences lead to lower perceptions of women’s qualification and ability to contribute to group work among engineering students (Wolfe & Powell 2009)
• **b) Need for sense of belonging and working harder:**
  – Women in STEM1 higher education feel pressure to work harder to be accepted and succeed (Blackburn 2017)
• **c) Limited access to online resources:**
  – Stackoverflow: women engage less and have lower reputations than men (Vasilescu et al. 2012)
• **d) Limited participation in open source software projects:**
  – Women still contribute less to open source software (OSS) projects (Robles et al. 2016)
  – Likely reasons: avoidance of competitive situations and lower confidence (Wang et al. 2018)
Concerns

• **C1**: Women are likely to benefit less from team and project-based learning in computer science.

• **C2**: Women are likely limited in their access to online learning resources (impacting the benefit of project-based learning).

• **C3**: Women are likely to make limited use of outer curricular learning opportunities, especially in context of OSS.

But, project courses present
- *more than half of the credits* in core software engineering courses in Master’s courses
- *4 out of 5* core software engineering courses in the Bachelor
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Project

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• 2 Universities, 2 Bachelor and 2 Master’s Programs

Goal:
• Identify how our students are affected by mechanism known from literature
• Develop interventions to support teachers and female students to *mitigate the concerns C1-C3*

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Phase 1: Exploration & Replication

Tool 1: Questionnaires to students and teachers participating in project courses
  • First iteration: Spring-term 2020

Tool 2: Interviews
  • Volunteers are interviewed over the course of one year
  • About to start soon
Early Results Questionnaire

- Part 1: 70 answers (send to 556 students, 12.5% response rate)
- Part 2: 49 answers (send to 381 students, 12.8% response rate)

- Female and male students aim for different tasks at the beginning of a course
  - Male students report having done more quality assurance
  - Female students report having done more coding
  - Both is contrary to the aims formulated during the course start

- Online Resources:
  - More male students report to use manual and static online resources (youtube, tutorials, wikis...)
  - No significant difference in the reported use of online communities, e.g. stack overflow
**Summary**

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- C2: Women are likely limited in their access to online learning resources (impacting the benefit of project-based learning).
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References


