

2020 ACM SIGCSE Special Projects Final Report

Student communication during group projects: Reporting on gender bias language

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PROJECT SUMMARY

Software development is a collaborative process that has people working together in groups to produce software applications and services [7]. Collaboration involves conflict resolution, decision making, problem solving, negotiation, and communication skills [6]. When students collaborate, poor communication sometimes becomes an emerging issue that can impact the group work [5]. The SIGCSE Special Project Grant funded a study that examined students' communications during software development. The study was designed to identify differences in the communication approaches used by female and male students working together on a software project. The study sought to answer the following research question:

- **RQ1:** How is gender influence communication initiated within student groups?

RESEARCH ACTIVITIES

The study was conducted with eight groups of 4-6 Software Engineering (SE) students (39 students: 9 female, 30 male). The groups contributed to large open-source software project, where the groups were comprised of all-female, all-male, and predominately male mixed-gendered groups. The groups worked together for eight weeks contributing to a project's source code, and collaborating over Slack, an online messaging platform, to complete their work. This study used a mixed methods approach to analyse the collected data, which included thematic content analysis [3]. Pre-post surveys were used to collect students' experiences with group work. The groups' Slack communications were analysed using conversation analysis [4], and processed through a text analyser, gender-bias [2], that identified and summarised the communications for any gendered language.

SUMMARY FINDINGS

The students participating in the study had positive experiences (92.31%, n=31) collaborating on the open-source project. The pre-post survey results showed no significant differences between the female and male students' group work experiences. When examining the groups' communications using conversation analysis, the results showed female students were more communicative, engaging more leadership and project coordination tasks to complete the work. The study also showed more help seeking from peers within the all-female group, where help seeking was an infrequent behaviour within the all-male and mixed-gender groups.

The application of gender-bias to the groups' Slack communications generated misleading results. The text analyser tool failed to recognise certain gendered terms which could be perceived as discriminatory to women and men. A potential reason for these results might be due to the application of the gender-bias tool to a different context. The tool was designed to identify gender-bias language in letter of recommendations for the medical field, and the tool might have overlooked language that appears in communications. The findings suggest improvements to the gender-bias tool, to better identify gendered language within other textual presentation of language.

FUTURE DISSEMINATION

Findings from this study are being submitted to Computer Science Education (CSE) conferences and journals. The first publication will appear in SIGCSE 2022, presenting a portion of our findings using conversation analysis on the group's communications. With more analysis on the collected data, the findings will be disseminated as a taxonomy, to explain how female and male students communicate during group work. This taxonomy will be made publicly available, targeting practitioners to help identify communication differences between the genders and how these differences may influence gender bias during students' group work. The first paper [1] showed a disparity of roles initiated by the male and female students, where the female students were assuming leadership, project coordination, and monitoring roles. Because of this disparity, the taxonomy will provide guidance for non-role group work to encourage shared responsibilities across the group members.

FINANCES

The budget for this study was USD\$3006, where it was used on participation incentives (USD\$60 voucher per student, USD\$2340 total), student researchers (USD\$144), and licensing for the Slack service. The cost for Slack was lower than budgeted because the cohort was smaller than anticipated. Payment for Slack service was USD\$192 for the three-month study (USD\$64 per month). The study received more volunteers than expected. The grant budgeted for eight students, but 39 students volunteered. All volunteers were accepted, providing a larger data set, where 49.37% of the cohort volunteered. The budget also allowed for another experiment, where the remaining balance (USD\$330) is supporting the evaluation of additional gender-bias text analysers. Evaluating different text analysers could identify tools more appropriate for automated detection of gendered language in asynchronous communications.

CONCLUSIONS

The project raised some interesting findings in how female and male students initiate communications during group work. More work is required to identify a text analyser that can better detect gendered language in online textual communications. The funding by SIGCSE helped initiate this work and I look forward to continuing the research from the findings produced so far. Thank you to the SIGCSE Board for the opportunity.

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