

Fostering Psychological Safety for Interpersonal Learning in Neurodiverse Software Teams

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Abstract

In software engineering, psychological safety is the shared belief that team members feel safe to take interpersonal risks in the workplace [1]. Psychological safety plays an essential role in communication, especially in tightly coupled team activities like mob programming (i.e., mobbing), in which three or more team members develop software together [6]. Mobbing requires members to play different roles while suggesting and digesting new ideas, which makes them particularly vulnerable to interpersonal risk. Autistic software engineers can struggle with mob programming, as they experience high levels of anxiety and stress when communicating with others due to their different cognitive and communication styles [3]. A collaborative space that allows autistic team members to flexibly communicate in neurodiverse teams can increase the psychological safety and accessibility of collaborative software development.

To identify tools and practices that foster psychological safety in neurodiverse collaborative mob programming, I will conduct a series of mixed-method, design-based studies. First, I conduct a survey and interview study to uncover the relationship between neurodivergent cognitive and communication traits and psychological safety in teams. Second, I generate design principles for psychological safety through the iterative design and evaluation of a neuroinclusive digital collaboration space. Third, I evaluate the impact of these design principles through an experiment with majority, minority and all neurodivergent teams.

My work makes the following contributions to accessible software engineering education and practice: 1) Novel descriptions of psychological safety relating to neurodivergent cognitive and communication attributes; 2) design principles for fostering psychological safety in collaborative software development teams; 3) a software development tool that scaffolds psychologically safe mobbing in neurodiverse software teams.

CCS Concepts

• **Human-centered computing** → **Empirical studies in HCI**; **Empirical studies in accessibility**; **Accessibility systems and tools**; • **Applied computing** → **Collaborative learning**; **Distance learning**; • **Software and its engineering** → **Programming teams**.

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Keywords

collaborative learning, accessibility, autism, software engineering

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1 Questions and Connections

I am a Ph.D. student in Human-Computer Interaction at Carnegie Mellon University. I research psychologically safe collaboration in neurodiverse software teams. I aim to discover design principles for collaborative software development tools that enable equitable collaboration between software developers of different neurological profiles. This can increase team satisfaction, well-being, and software quality [7].

I have published in top-tier venues such as ACM CHI and LAK. My previous work focuses on supporting students in rural Africa in distance STEM learning by describing the relationship between student demographics, behavior, and learning outcomes [2, 5].

As a Ph.D. student, my goal is to produce knowledge that supports novice software developers in developing skills for collaborative software development. I focus on the neurodivergent developer experience with distributed software teams to uncover design principles and develop novel systems for socially accessible collaboration, which require psychological safety and social-emotional skills [4, 7]. Upon graduation, my goal is to acquire an applied industry research position to introduce new tools to support the career advancement of novice software developers.

I would like assistance with the following key questions under investigation:

- RQ1** What is the relationship between autistic traits and psychological safety in software teams?
- RQ2** What collaborative software design principles scaffold psychological safety for autistic software team members?
- RQ3** How do collaborative software design principles scaffold psychological safety in majority, minority, and all autistic software teams?

Key connections that would aid my dissertation research include introductions to: 1) collaborative learning researchers; 2) psychological safety researchers; 3) a potential external committee member.

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