A Socio-Technical Investigation of How Communication, Coordination, and Cooperation Shape the Developer Experience of ADHD Developers

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Abstract. *This paper presents a research design to investigate how collaboration conditions in software teams shape Developer Experience (DevEx) for developers with ADHD. Grounded in the 3C model of collaboration and guided by Socio-Technical Grounded Theory (STGT), the study examines how communication, coordination, cooperation, and awareness support relate to flow, cognitive load, and feedback loops across collaboration episodes. Data will be collected through iterative cycles of semi-structured interviews and analysed via constant comparison and memoing to build a socio-technical substantive theory and derive actionable implications for inclusive collaboration practices and tool support.*

Resumo. *Este artigo apresenta um desenho de pesquisa para investigar como condições de colaboração em equipes de software moldam a Experiência do Desenvolvedor (DevEx) de profissionais com TDAH. Com base no modelo 3C e guiado por Socio-Technical Grounded Theory (STGT), o estudo examina como comunicação, coordenação, cooperação e suportes de awareness se relacionam com flow, carga cognitiva e ciclos de feedback em episódios de colaboração. Os dados serão coletados por ciclos iterativos de entrevistas semiestruturadas e analisados por comparação constante e memos analíticos, visando construir uma teoria substantiva sociotécnica e derivar implicações acionáveis para práticas e suportes de colaboração inclusiva.*

1. Context and Motivation

Software development teams can be understood as collaborative systems in which people, practices, and technical artifacts co-produce outcomes through continuous interaction. In this view, collaboration is enacted through communication, coordination, and cooperation, as captured by the 3C model [Fuks et al. 2011]. In software engineering, these dimensions become visible in how teams negotiate intent, align tasks and dependencies, and work on shared artifacts such as code, tickets, and documentation [De Souza et al. 2011]. Developer Experience (DevEx) emerges from this interplay, capturing how developers think, feel, and value their work encompassing three core dimensions particularly sensitive to collaboration conditions: flow state, cognitive load, and feedback loops [Noda et al. 2023]

Communication and coordination shape how work is distributed and how progress becomes visible, especially in distributed and hybrid arrangements where distance affects information flows. Evidence from globally distributed development shows that distributed work items tend to take longer and involve more people, suggesting that coordination structures may introduce delays [Herbsleb and Mockus 2003]. Complementarily, recent work indicates that tool-mediated social interventions can improve communication practices, reinforcing that collaboration conditions can be deliberately shaped through tooling decisions [Clarke 2025]. Collaboration also entails cognitive demands, as sustained attention and context reconstruction are influenced by coordination routines, communication norms, and the latency of feedback from tools and peers. This is particularly relevant for neurodiversity, since collaboration conditions may support or hinder attention regulation and cognitive load management. Accordingly, this research design approaches inclusive collaboration as a system-level concern, focusing on how teams and organizations can shape conditions that support participation and effective feedback, rather than treating difficulties as exclusively individual.

2. Presentation of the Problem

There is limited empirical explanation of how socio-technical collaboration conditions in software development teams shape the ADHD Developer Experience, and how these effects unfold across collaboration episodes through communication, coordination, and shared work artifacts. The collaborative systems literature establishes that the 3C dimensions can be supported or constrained by collaborative environments and services, and that tool mediation plays a central role in shaping participation [Fuks et al. 2011, Pimentel and Fuks 2011]. When teams are distributed, communication and coordination demands can increase, involving more people and extending completion time for work items [Herbsleb and Mockus 2003]. In addition, emerging research examines how tool-mediated social interventions may guide teams toward improved communication and participation [Clarke 2025]. However, these bodies of work do not yet provide a grounded account of how collaboration conditions intersect with ADHD-related experiences during real teamwork episodes, including how developers enter, sustain, and lose flow, how cognitive load accumulates or is reduced [Sweller 1988], and how feedback loops are experienced through tools and social interaction.Existing research on neurodiverse technology workers has identified relevant workplace challenges such as difficulty with interruptions and context reconstruction [Morris et al. 2015], but has not yet examined these challenges through the lens of collaboration conditions and their socio-technical mechanisms. The gap is a missing explanatory model that connects collaboration conditions to Developer Experience mechanisms and consequences. Addressing this gap can support knowledge for inclusive collaboration design and inform team-level practices and tooling decisions.

3. Objectives

This study aims to develop a socio-technical substantive theory explaining how collaboration conditions (3C and awareness support) influence Developer Experience (DevEx) for developers with ADHD in team-based software development, and to derive actionable implications for interventions in practices and tool support. The main research question is: **How do socio-technical collaboration conditions interact to influence Developer Experience for developers with ADHD in team-based software development?**

- **SRQ1.** Which collaboration conditions are perceived as influencing DevEx across flow, cognitive load, and feedback loops?
- **SRQ2.** Which mechanisms explain how these conditions affect DevEx across activities and collaboration episodes?
- **SRQ3.** Which interventions, and which forms of evidence, indicate improvement in DevEx?

4. Research Design and Methodology

Building on the 3C framework [Fuks et al. 2011, Vivacqua and Garcia 2011], this study operationalizes socio-technical conditions through communication, coordination, and cooperation, with awareness as a cross-cutting support that helps individuals and teams perceive and act on relevant collaboration cues [Pimentel and Fuks 2011, Raposo et al. 2011]. Tool mediation, cognition, and interaction are treated as interdependent concerns, following the understanding that collaboration in software development must be studied at the team level [De Souza et al. 2011].

The study follows an iterative qualitative strategy guided by Socio-Technical Grounded Theory (STGT) [Hoda 2022], used to build a socio-technical substantive theory grounded in empirical accounts of collaboration episodes and to derive actionable implications for interventions in practices and tool support. Data will be collected through iterative rounds of semi-structured interviews with software developers who perform team-based work and present ADHD-related symptoms, whether formally diagnosed or not. Participant selection will be supported by the Adult ADHD Self-Report Scale (ASRS-18), a WHO-validated 18-item instrument widely used in research and occupational settings [Kessler et al. 2005, Adler et al. 2006]. The ASRS-18 captures symptom frequency across two domains (inattention and hyperactivity-impulsivityaligning with this study's focus on lived experience rather than clinical diagnosis; participants scoring above the established threshold will be eligible regardless of formal diagnostic status. A pre-interview questionnaire will collect contextual descriptors (role, work arrangement, team size, and collaboration tools) to support purposeful sampling and cross-context comparison.

Interviews will elicit detailed reconstructions of collaboration episodes, including triggers, breakdowns, coping strategies, and perceived consequences across flow, cognitive load, and feedback loops. Optional brief mini-reflections may be collected to capture recent episodes and support recall. Figure 1 summarizes the interview rounds and interleaved analysis until theoretical saturation. Data collection and analysis will be interleaved, starting with purposeful sampling to ensure variation across roles, experience levels, and work arrangements, followed by theoretical sampling to refine category properties and address emerging analytic gaps [Hoda 2022]. Analysis will use iterative coding, constant comparison, and memoing to guide updates to the interview guide and sampling decisions, continuing until theoretical saturation is documented through analytic memos and stability of category properties. When needed, supplementary interviews with other team members may be conducted as contextual evidence.

In accordance with STGT guidelines, emerging findings will be periodically presented to practitioner groups to assess resonance with practice and identify remaining theoretical gaps [Hoda 2022], supporting the relevance and credibility of the emerging

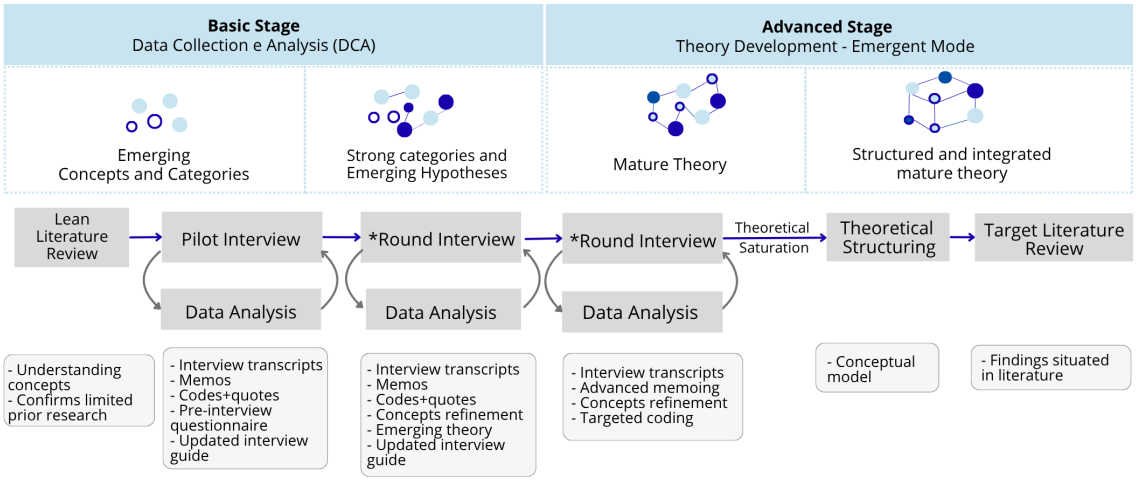

Figure 1. Interview Study Research Plan Guided by Socio-Technical Grounded Theory

Note. The figure summarizes the plan for interview design and analysis across basic and advanced stages. Grey rectangles represent the main planned steps, and the rounded boxes summarize the expected outputs. The asterisk in *Round Interview* indicates that one or more interview rounds may be conducted, with interim analysis informing updates to the interview guide until theoretical saturation is reached.

theory. The study has been approved by the institutional ethics review board [1]; participant confidentiality, voluntary participation, and anonymity will be maintained throughout, with care taken in interview design given that sessions may involve reconstruction of difficult collaboration episodes.

5. Expected Output

The study is expected to deliver: (i) a grounded characterization of how flow is entered, sustained, disrupted, and recovered during collaboration episodes; (ii) a characterization of cognitive load sources and reductions associated with collaboration conditions, including information fragmentation and context reconstruction; (iii) a characterization of feedback loops specifying when feedback becomes effective or ineffective and how tool mediation and team routines shape feedback uptake; and (iv) a socio-technical substantive theory integrating these findings into an explanatory account of how collaboration conditions shape DevEx for developers with ADHD. As a practical outcome, the study will derive actionable implications for decisions about routines, communication norms, coordination practices, and tool-mediated feedback that may foster inclusive collaboration [Fuks et al. 2011, Vivacqua and Garcia 2011].

6. Conclusion

This research design uses STGT and iterative interview cycles to build an empirically grounded explanation of how collaboration conditions shape DevEx mechanisms for developers with ADHD. Prior evidence reinforces the need to study collaboration as a socio-technical system [Herbsleb and Mockus 2003, Clarke 2025], and the proposed approach, centred on the 3C model [De Souza et al. 2011, Fuks et al. 2011]], aims to inform inclusive collaboration as a collective outcome supported by practices and tool mediation.

[1]Approved by the Ethics Committee of the Universidade Federal do Rio Grande do Sul (UFRGS). CAAE: 88054525.1.0000.5347.

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Authors' Contribution

NG led the conception and writing of this work. SM and KK contributed to the supervision and guidance of the research design, and to the review and editing of the text. TC and GV contributed to discussions on the research design through interactions within the research group. All authors read and approved the final manuscript.

Use of Generative Artificial Intelligence

Generative Artificial Intelligence tools were used in this work in the following stages: ChatGPT (Extended Thinking mode) was used for sentence reduction and synthesis, focusing on decreasing character count and text length, during the writing refinement stage; Claude Sonnet 4.6 (Anthropic) was used for synthesis and polishing of the final version of the research summary, also during the writing refinement stage. All generated content was critically reviewed and validated by the author, who assumes full responsibility for the originality and accuracy of the final text, in accordance with CNPq Ordinance No. 2.664/2026.

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