
Global Software Development in a CSCW Perspective

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Abstract

Global software development (GSD) has been an important research topic in the CSCW community for more than two decades. CSCW has helped identify a significant number of challenges and solutions for handling distances in time, space and culture in distributed software engineering environments. However, no comprehensive collected body of knowledge concerning research on GSD from a CSCW perspective exists yet. The goal of this workshop is to bring together researchers and practitioners who have studied GSD from a CSCW perspective, and provide an overview of current findings and future challenges. In the workshop, we will facilitate group discussions across the diverse groups of researchers coming from ethnographic studies of software development practices *and* design studies of CSCW tools and processes for GSD. The goal is to provide an overview of current research, which in turn may form the basis for joint publications or an edited book.

Author Keywords

Global software development; GSD; invisible work; articulation work; design

ACM Classification Keywords

H.5.3 Group and Organization Interfaces, computer-supported cooperative work

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Introduction

At the core of CSCW research is the study of collaborative work practices involved in software development and the design of collaborative technologies supporting such work. Software development is a highly complex, interlinked practice, in which multiple participants are mutually dependent upon each other, which creates a wide variety of intertwined collaboration challenges. Thus, as an object of study, software development provides many opportunities for CSCW research, including studies dedicated to topics such as coordination [1, 2], articulation work [3, 4], knowledge management [5, 6] and awareness [7], as well as opportunities to design tools and technologies supporting such practices [8]. Today, it is actually the norm that software development is organized as collaboration between geographically dispersed participants, who come from different cultural and social backgrounds, collaborating across diverse time zones. We define global software development (GSD) as practices where geographically distributed collaborators are mutually engaged and thus interdependent in software development activities with the aim of designing, programming, and implementing an IT-system. GSD collaborative practices might be organized as outsourcing (inter-organizational collaboration), as offshoring (intra-organizational collaboration), or a mixed of both. The organizational structures of GSD highly impact what kind of collaborative practices can emerge. GSD is an established, emergent, and growing enterprise. While GSD produces new additional challenges for software development due to the dispersed nature of the work, still many of the core challenges remain the same [9]. Therefore, we can state that research on GSD involves a mix of interests in the core practices of software development [10] and in distributed collaboration [11]. Thus, some of the challeng-

es are related to software development, while other challenges are of more general concern for distributed collaboration. GSD research in a CSCW perspective is not only published within CSCW venues, but also at other venues such as Software Engineering/ICSE and ICGSE. However to be interesting for this workshop, the GSD research have to be relevant for either understanding the collaborative practices within GSD or for designing collaborative tools for GSD – and as such link to the core CSCW agenda. In this workshop we want to focus in on the intersections between software development practices and global distributed collaboration, and investigate three key questions: 1) What are the invisible, taken-for-granted aspects of work, which make GSD practices work? 2) What are the challenges in GSD we should be designing CSCW tools to support? 3) How can we bring together multi-method interdisciplinary approaches to study *and* design for GSD?

What do we already know?

The workshop will cover three main areas of interest: The invisible work; Design; Interdisciplinary methods.

The invisible work in GSD

This sub-area originates in the CSCW interest in studying collaboration and articulation work [12]. The methods typically applied in such studies are workplace studies based upon ethnography [13], and the general interest is guided by the research question *what is the invisible taken-for-granted work, which makes GSD practices work?* Examples of research within this area are in-depth qualitative studies of work practices involved in GSD (e.g. studies focusing on knowledge management, coordination, and articulation work). When we refer to special interest in the invisible work practices within GSD, it does not mean that we have do

not have an interest in GSD work practices in general. But that our main interest in the workshop is to unpack the practices, which makes the GSD work: Practices, which might be in plain sight, but often neglected or overlooked by management. To succeed in GSD, it is critical that we understand the invisible work practices, which make global work function. Often there is a tendency to focus on the pre-scripted processes (e.g. SCRUM), which can indeed help in supporting GSD practices; however, we know little about other forms of 'extra work', which are critical to make practices of collaboration work across geography, culture, and time. Extensive research has been done in the area of global work and virtual teams e.g. in terms of trust [14], common ground [15], and social context [16]. Many within the GSD research community are aware of this work. However, we still need to identify and summarize the relevant links across different fields to ensure how best they benefit from each other.

Designing for GSD

This sub-area zooms in on the design of collaborative tools and technologies for distributed and global software development. From existing research, we know that general-purpose communication technologies like video; instant messaging; social media; email; and document repositories are used heavily in GSD. These technologies are core to everyday coordination in GSD, but at the same time they carry with them significant challenges [17]. Sources from both industry and the research literature have proposed more specific tools and technologies for GSD. Examples include integrated source code and documentation repositories, integrated task tracking, source control, and planning tools, as well as tools for task and 'team health' visualizations to support coordination in GSD [17]. At the same time,

many concepts from CSCW can be helpful for designing support tools for GSD, such as Coordination Mechanisms, Common Information Spaces, or approaches for supporting local and distributed forms of awareness. While several of these approaches have been already discussed in GSD, there is a need for a more coherent and systematic understanding of CSCW-related design approaches for supporting distributed software development work.

Interdisciplinary multi-method approach for GSD

The final sub-area interest concerns the methods we apply and the practices we involve when engaging with research in GSD from a CSCW perspective. This includes discussions of how to capture coordination practices we cannot directly observe, bringing ethnographic findings to inform design, working with industrial partners, designing for action, etc. Linking ethnographic studies with design research has been the core of CSCW interest from the very beginning [18], and is an ongoing discussion topic [13]. As in other types of CSCW research, this tension between how we move from user studies to design. GSD is clearly a multidisciplinary research field, and as such we need to embrace different types of research and make sure that we include important findings from other relevant areas.

Expected Outcome

The workshop will conclude with a final interactive session on consolidating the ideas presented in the workshop and brainstorming potential future lines of work.

References

[1] Avram, G., Bannon, L., Bowers, J. and Sheehan, A. Bridging, patching and keeping the work flowing: Defect

resolution in distributed software development. *Comput Support Coop Work*, 18, 2009, 477-507.

[2] Boden, A., Nett, B. and Wulf, V. Coordination practices in distributed software development of small enterprises. In *Proceedings of the International Conference on Global Software Engineering (ICGSE)* (Munich, Germany, August 27-30, 2007). IEEE Press, 2007

[3] Grinter, R. Supporting articulation work using software configuration management systems. *Comput Support Coop Work*, 5, 1996, 447-465.

[4] Matthiesen, S., Bjørn, P. and Petersen, L. M. "Figure Out How to Code with the Hands of Others": Recognizing Cultural Blind Spots in Global Software Development. In *Proceedings of the Computer Supported Cooperative Work (CSCW)* (Baltimore, USA, 2014). ACM.

[5] Jensen, R. E. and Bjørn, P. Divergence and convergence in global software development: Cultural complexities as societal structures. In *Proceedings of the COOP: Design of cooperative systems* (France, 2012). Springer.

[6] Boden, A., Avram, G., Bannon, L. and Wulf, V. Knowledge management in distributed software development teams: Does culture matter? In *Proceedings of the International conference on Global Software Engineering (ICGSE)* (Limerick, Ireland, 13-16 July, 2009). IEEE Press.

[7] Souza, C. d. and Redmiles, D. The awareness network: To whom should I display my action? And, whose actions should I monitor. In *Proceedings of the European Conference on Computer Supported Cooperative Work (ECSCW)* (Limerick, Ireland, 2007). Kluwer Academic.

[8] Gutwin, C., Penner, R. and Schneider, K. *Group awareness in distributed software development*. ACM, 2004.

[9] Herbsleb, J. Global software engineering: The future of socio-technical coordination. In *Proceedings of the Future*

of Software Engineering (FOSE) (Washington, DC, USA, 2007). IEEE Computer Society, 2007.

[10] Herbsleb, J., Mockus, A., Finholt, T. and Grinter, R. *An Empirical study of global software development: Distance and speed*. IEEE, 2001.

[11] Söderberg, A.-M., Krishna, S. and Bjørn, P. Global Software Development: Commitment, Trust and Cultural Sensitivity in Strategic Partnerships. *International journal of Management*, 2013

[12] Schmidt, K. and Bannon, L. Taking CSCW Seriously: Supporting Articulation Work. *Comput Support Coop Work*, 1, 1-2 1992), 7-40.

[13] Blomberg, J. and Karasti, H. Reflections on 25 years or ethnography in CSCW. *Comput Support Coop Work*, 222013), 373-423.

[14] Jarvenpaa, S. L. and Leidner, D. E. Communication and Trust in Global Virtual Teams. *Organ Scien*, 10, 6 (Nov.-Dec. 1999), 791-815.

[15] Olson, G. M. and Olson, J. S. Distance Matters. *Human-Computer Interaction*, 15,2000), 139-178.

[16] Bjørn, P. and Ngwenyama, O. Virtual Team Collaboration: Building Shared Meaning, Resolving Breakdowns and Creating Translucence. *Information Systems Journal*, 19, 3, 2009, 227-253.

[17] Halverson, C., Ellis, J., Danis, C. and Kellogg, W. Designing task visualizations to support the coordination of work in software development. In *Proceedings of the Computer supported Cooperative work (CSCW)* (New York, USA, 2006). ACM.

[18] Blomberg, J., Giacomi, J., Mosher, A. and Swenton-Hall, P. *Ethnographic Field Methods and their Relation to Design*. Lawrence Erlbaum Associates Publisher, City, 1993.