

Sean P. Goggins • Isa Jahnke • Volker Wulf
Editors

Computer-Supported Collaborative Learning at the Workplace

CSCL@Work

 Springer

Editors

Sean P. Goggins
College of Information Science and
Technology
Drexel University
Philadelphia, PA, USA

Isa Jahnke
Department of Applied Educational Science
Interactive Media and Learning
Umeå University
Umeå, Sweden

Volker Wulf
University of Siegen and Fraunhofer FIT
Siegen (BeFIT)
Siegen, Germany

ISBN 978-1-4614-1739-2 ISBN 978-1-4614-1740-8 (eBook)
DOI 10.1007/978-1-4614-1740-8
Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2013933864

© Springer Science+Business Media New York 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Foreword

It is hard to imagine a topic more perfectly timed than the central issue this book explores. In a world of constant change where many of our skills now have a half-life measured in a few years and many of our institutions are experiencing creative destruction at a daunting pace, we need to find ways to merge the best insights from formal education, where the goal is to learn what is already known, with those of organizational and workplace learning, where at least one of the main goals is to create new knowledge (Chap. 1 by Goggins & Jahnke). Indeed, building a bridge between learning what is known and learning that creates new knowledge is of crucial importance for both the computer-supported collaborative learning community and the computer-supported collaborative work community (Chap. 2 by Fischer). Collaborative learning in small groups (and not only community learning or organizational learning) is “the” important unit of analysis and design in CSCL and CSCW (Chap. 3 by Stahl).

Schooling can no longer survive on a one-way knowledge transfer model and learning in the workplace cannot rest solely on its incessant pursuit of the new (Chap. 5 by Mumford). In both cases we find that a purely cognitive model of knowledge acquisition must be augmented by the social dimension of learning environments. This social dimension extends to workplace learning and regional economic development; benefiting individuals, organizations, and society (Chap. 4 by Rohde & Wulf).

I have spent much of my career exploring both individual learning and organizational/workplace learning, and exploring how technology and the design of learning spaces could accelerate capability building and productive inquiry.

As soon as I saw this manuscript I couldn’t wait to read it since one of my current undertakings is a project in which we are exploring ways of cultivating a questing disposition around sustainability that scales. The project involves approximately a million or more employees spread out in 40,000 factories that make up a loosely coupled worldwide process network. Not surprisingly, I expect that the social aspect of learning, which leverages distributed peer-based mentoring and collaborative storytelling, will be a crucial part of this learning platform. The book includes four empirical cases (Part II in this volume) from CSCL at Work practices especially

focused on reflection processes. For instance, there are two cases within the health care sector. The cases show how collaborative learning practices extend the evaluation skills and deepen the knowledge of doctors and nurses (Chap. 6 by Hartswood, Procter, Taylor, Blot, & Anderson) through collaborative reflections (Chap. 7 by Prilla, Herrmann, & Degeling).

Another major goal of this book is to lay out the foundations for bridging between formal classroom learning and informal learning in schools or the workplace; for instance, reflective community building at the workplace (Chap. 8 by Hokstad, Prasolova-Førland, & Fominykh) and the role of communication and facilitation in work-based learning (Chap. 9 by Kienle). We tend to forget just how natural this bridge can be. For example, the best indicator of success at college is one's ability to join (or form) a study group where class material is discussed within a small group of peers or problem sets are jointly worked on (Richard Light). These study groups rely on peer-to-peer mentoring. No one individual is the expert. Instead, each student contributes some knowledge and experience that, when woven together, create a coherent and complete model. Note that this process also helps to make the information being discussed personal, a major facilitator in helping each participant absorb new material.

A similar and equally effective method applies in the workplace where both peer-based and master-based mentoring, situated in real work and socially embedded, springs into action whenever a new problem arises. In both study groups and in workplace learning, provisional attempts to make sense of something unknown or unforeseen lead to significant ah-ha experiences while they also cultivate a willingness to improvise and reflect rather than to panic. As Part III (in this volume) illustrates such a learning experience occurs in unexpected places triggered through role-playing games (Chap. 10 by King) and social media and social networking sites (Chap. 11 by Gurzick & White), which offers new ways to think about how learning as a social activity may be influenced by new technologies for enabling social interaction.

The need to improvise workarounds to problems that emerge in situ is, of course, not new. What is new is just how often the need to improvise and to construct new knowledge now arises. While the pace of change, which is driven by our digital infrastructures is partly responsible, it is also these increasingly powerful, networked infrastructures that provide the tools to help us meet these challenges. For example, as Gerhard Fischer noted many years ago, one way to amplify the power of situated learning is through a form of learning-on-demand. When the learner/worker is stuck, he/she can pull insight from a vast network of information, and then use social networks to discuss with others their opinions on what to believe. This process is made more effective through the wide use of collectives (Thomas & Brown) and communities of interest that form on the net, and through the emergence of Open Education Resources (OER), scaffolded by discussion groups which come together through social media.

Indeed, our own work at PARC, deeply informed by anthropologists Julian Orr, Lucy Suchman, Brigitte Jordan, and Jack Wayland along with numerous computer scientists, pioneered the use of social media to create a new kind of distributed

knowledge creation space among Xerox tech reps spread around the world. This system, appropriately named Eureka (Bobrow & Whalen), enabled Xerox tech reps to capture insights and experiences that emerged from handling troubleshooting problems that were either not satisfactorily covered in their troubleshooting manuals or had never been seen or envisioned before. These stories were then peer-vetted and passed around the world on Xerox's internal networks. But the role of computer support systems is just one part of what makes systems like Xerox Eureka so powerful. The real power comes from the social and reputational capital that was created by its participants and from the identities being constructed through becoming active members of this network of practice. This is also illustrated by three empirical cases in Part IV (in this volume) with a strong emphasis of creative work including product design and mechanical engineering. One case shows that to "make the process of decision making visible" affects the quality of solving problems when the answer is not known, but also helps to develop these capacities in new people and facilitate expert communication about their expertise (Chap. 12 by Lund, Prudhomme, & Cassier). The CSCL system called PeTEX addresses how tele-operated laboratories can bridge learning to the workplace and shows the critical dimension of distributed creative work (Chap. 13 by Terkowsky et al.).

Learning at the workplace often focuses on learning such as the primary activity. But CSCL at Work also considers the fact that learning means to provide employees with timely access to information for conducting everyday work while respecting business goals; learning in these cases is a secondary activity (work is the primary activity). An empirical case of customer service work and software product development describes this in detail (Chap. 14 by Mørch).

The above social life of learning is, today, further amplified with the use of video, such as YouTube, that is uniquely suited to capture and render more of the tacit dimension of knowledge. Inexpensive and easy to use digital cameras along with powerful but easy to use video editing now make it simple to capture, edit, and show what you have discovered.

What is needed now, more than ever, are theories and practices that bridge between formal and informal learning, didactic and experiential learning, peer-based and master-based mentoring, local and distributed learning, and the cognitive and the social dimensions of learning. We also need to explore new kinds of computational platforms that can enhance the potential synergy between these contrasting pairs. This is where the research efforts of CSCL at Work lie. They will help us craft learning contexts that lead to a new kind of learningscape, one that creatively exploits the inherent tension between process and practice. Yes, each of these pairs calls for a socio-technological lens, but what is also needed is a design sensibility that can help all the parties involved cocreate learning spaces that enhance both institutional and personal capabilities for thriving in a knowledge economy in constant change.

References

- Bobrow, D. G., Whalen, J. (2002). *Community knowledge sharing in practice: The Eureka story*. Reflections, journal of the Society for Organizational Learning and MIT Press, 4(2), 47–59.
- Thomas, D., Brown, J. S. (2011). *A new culture of learning. Cultivating the Imagination for a World of Constant Change*.
- Light, R. J. (2001). *Making the most of college: Students speak their minds*. Cambridge: Harvard University Press.
- Light, R. J. (no year). “The college experience: A blueprint for success.” Harvard web video program. Retrieved from 9 March 2013 <http://athome.harvard.edu/programs/light/>

Contents

1 CSCL@Work: Computer-Supported Collaborative Learning at the Workplace—Making Learning Visible in Unexpected Online Places Across Established Boundaries	1
Sean P. Goggins and Isa Jahnke	
Part I Challenges for CSCL@Work from Different Perspectives	
2 A Conceptual Framework for Computer-Supported Collaborative Learning at Work.....	23
Gerhard Fischer	
3 Theories of Collaborative Cognition: Foundations for CSCL and CSCW Together	43
Gerry Stahl	
4 CSCL@Networking: Regional Learning in Software Industries.....	65
Markus Rohde and Volker Wulf	
5 Work Based Learning: A Structure for Learning Through Work.....	89
John Mumford	
Part II CSCL@Work in Practice: Facilitation and Reflection	
6 Technologies of Participation: A Case Study of CSCL@Work in Mammography	113
Mark Hartswood, Rob Procter, Paul Taylor, Lilian Blot, and Stuart Anderson	

7 Collaborative Reflection for Learning at the Healthcare Workplace	139
Michael Prilla, Thomas Herrmann, and Martin Degeling	
8 Collaborative Virtual Environments for Reflective Community Building at Work: The Case of TARGET	167
Leif M. Hokstad, Ekaterina Prasolova-Førland, and Mikhail Fominykh	
9 The Role of Communication and Facilitation for CSCL@Work	185
Andrea Kienle	
Part III Unexpected Learning Places	
10 Massively Multiplayer Online Role-Playing Games: A Potential Model of CSCL@Work	205
Elizabeth M. King	
11 Online Personal Networks of Knowledge Workers in Computer-Supported Collaborative Learning	225
David Gurzick and Kevin F. White	
Part IV CSCL@Work in Product Design and Mechanical Engineering	
12 Pivotal Moments for Decision Making in Collaborative Design: Are They Teachable?	243
Kristine Lund, Guy Prudhomme, and Jean-Laurent Cassier	
13 PeTEX@Work: Designing CSCL@Work for Online Engineering Education	269
Claudius Terkowsky, Isa Jahnke, Christian Pleul, Dominik May, Thorsten Jungmann, and A. Erman Tekkaya	
14 Information Seeking and Collaborative Knowledge Creation: Exploring Collaborative Learning in Customer Service Work and Software Product Development	293
Anders I. Mørch	
Part V Sum Up (Also for Practitioners)	
15 CSCL@Work for Practitioners	317
Sean P. Goggins, Isa Jahnke, and Volker Wulf	
Index	325