Lecture Notes in Business Information Processing

Series Editors

Wil van der Aalst *RWTH Aachen University, Aachen, Germany*John Mylopoulos *University of Trento, Trento, Italy*Michael Rosemann *Queensland University of Technology, Brisbane, QLD, Australia*Michael J. Shaw *University of Illinois, Urbana-Champaign, IL, USA*Clemens Szyperski *Microsoft Research, Redmond, WA, USA*

More information about this series at http://www.springer.com/series/7911

Adam Przybyłek · Miguel Ehécatl Morales-Trujillo (Eds.)

Advances in Agile and User-Centred Software Engineering

Third International Conference on Lean and Agile Software Development, LASD 2019 and 7th Conference on Multimedia, Interaction, Design and Innovation, MIDI 2019 Leipzig, Germany, September 1–4, 2019 Revised Selected Papers



Editors Adam Przybyłek **D** Gdańsk University of Technology Gdansk, Poland

Miguel Ehécatl Morales-Trujillo University of Canterbury Christchurch, New Zealand

ISSN 1865-1348 ISSN 1865-1356 (electronic) Lecture Notes in Business Information Processing ISBN 978-3-030-37533-1 ISBN 978-3-030-37534-8 (eBook) https://doi.org/10.1007/978-3-030-37534-8

© Springer Nature Switzerland AG 2020

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.

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.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

While agile as well as user-centred software development has already become mainstream in industry and a strong community has crystallized around the new way of thinking, making the transition to the new mindset is still challenging for many companies. Hence, there is a need for providing a platform for spreading best practices and stories of successful transitions. The LASD (Lean and Agile Software Development) and MIDI (Multimedia, Interaction, Design and Innovation) conference series have become prominent forums where practitioners, researchers, and academics meet to share and discuss their concerns, experiences, research findings, and trends.

This year, both LASD and MIDI took place under the umbrella of the 14th Federated Conference on Computer Science and Information Systems (FedCSIS 2019) in Leipzig, Germany, during September 1–4, 2019. In total, we received 36 submissions, out of which 9 were accepted as full papers and 3 as short papers. The accepted papers were presented to a well-focused audience, thus the discussion provided the authors with new ideas and directions for further research.

After the events, authors of 8 selected papers were invited to submit revised and extended versions of their work to this post-conference monograph. Topics discussed in this volume range from recent evolutions in the field (such as scaling agile, balancing agile and plan-driven methods, agile methods for safety-critical systems), through agile adoption and trends, to human issues (such as elements of the agile mindset, empowering agile teams with collaborative games, and gamification).

We would like to express our gratitude to everyone who made LASD 2019 and MIDI 2019 successful. First of all, we thank all the authors for their contributions, the many attendees for creating fruitful discussion, as well as the members of the Program Committees for taking the time and effort to provide insightful remarks. We acknowledge the chairs of MIDI 2019, i.e. Krzysztof Marasek, Andrzej Romanowski, and Marcin Sikorski, for their collaboration. We are also deeply grateful to the chairs of the FedCSIS conference series, namely Maria Ganzha, Leszek Maciaszek, and Marcin Paprzycki, for their help with the organization of our events. Moreover, we are indebted to Karolina Walaszek for IATEX typesetting assistance. Finally, we would like to thank the team at Springer (especially Alfred Hofmann, Ralf Gerstner, and Christine Reiss) for making this volume possible.

We hope that you find this monograph useful for your professional and academic activities, and we wish you a stimulating read. We also cordially invite you to visit our conference websites at https://www.fedcsis.org/2020/lasd and https://midi.pja.edu.pl, and to join us for the upcoming editions.

November 2019

Adam Przybyłek Miguel Ehécatl Morales-Trujillo

Organization

LASD 2019

Event Chair

Adam Przybyłek

Gdańsk University of Technology, Poland

Program Committee

Muhammad Ovais Ahmad Ibrahim Akman Sikandar Ali Fernando Almeida Mohammad Alshayeb Samuil Angelov Irena Bach-Dąbrowska Alessandra Bagnato Alvine Boaye Belle Nourchene Benaved Mario Bernhart Vikram Bhadauria Nik Nailah Binti Abdullah Miklós Biró Jan Olaf Blech Markus Borg Adam Brzeski Alena Buchalcevova Jim Buchan Luigi Buglione Alexandros Chatzigeorgiou Daniela Cruzes Wiktor Bohdan Daszczuk Igor Dejanović

Arpita Dutta

Anna Derezinska Philipp Diebold NIT Rourkela. India Maria Jose Escalona Imane Essebaa Fabian Fagerholm

University of Oulu, Finland Atilim University, Turkey China University of Petroleum, China University of Porto and INESC TEC, Portugal King Fahd University of Petroleum and Minerals, Saudi Arabia Fontys University of Applied Sciences, The Netherlands WSB Gdańsk, Poland SOFTEAM R&D Department, France École de Technologie Supérieure, Canada Higher Colleges of Technology, UAE Vienna University of Technology, Austria Texas A&M International University, USA Monash University Malaysia, Malaysia Software Competence Center Hagenberg and Johannes Kepler University Linz, Austria RMIT University, Australia SICS Swedish ICT AB, Sweden Gdańsk University of Technology, Poland University of Economics, Czech Republic Auckland University of Technology, New Zealand Engineering Ingegneria Informatica SpA, Italy University of Macedonia, Greece SINTEF ICT, Norway Warsaw University of Technology, Poland University of Novi Sad, Serbia Warsaw University of Technology, Poland Fraunhofer IESE, Germany Universidad de Sevilla, Spain Hassan II University of Casablanca, Morocco University of Helsinki, Finland

Fernando Marques Figueira Filho	Universidade Federal do Rio Grande do Norte, Brazil
Gabriel Alberto García-Mireles	Universidad de Sonora, Mexico
Javad Ghofrani	HTW Dresden University of Applied Sciences, Germany
Krzysztof Goczyła	Gdańsk University of Technology, Poland
Sangharatna Godboley	NIT Rourkela, India
Javier Gonzalez Huerta	Blekinge Institute of Technology, Sweden
Janusz Górski	Gdańsk University of Technology, Poland
Peggy Gregory	University of Central Lancashire, UK
Ridewaan Hanslo	Council for Scientific and Industrial Research, South Africa
Sebastian Heil	Chemnitz University of Technology, Germany
Uwe Hohenstein	Siemens AG, Germany
Philipp Hohl	ZF Friedrichshafen AG, Germany
Marko Ikonen	Projektivarikko Oy, Finland
Andrea Janes	Free University of Bolzano, Italy
Janne Järvinen	F-Secure Corporation, Finland
Aleksander Jarzębowicz	Gdańsk University of Technology, Poland
Miloš Jovanović	University of Novi Sad, Serbia
George Kakarontzas	Aristotle University of Thessaloniki, Greece
Kalinka Kaloyanova	Sofia University, Bulgaria
Benjamin Kanagwa	Makerere University, Uganda
Georgia Kapitsaki	University of Cyprus, Cyprus
Matěj Karolyi	Masaryk University, Czech Republic
Aleksandra Karpus	Gdańsk University of Technology, Poland
Mohamad Kassab	Innopolis University, Russia
Marija Katić	School of Computing, UK
Wiem Khlif	University of Sfax, Tunisia
Jens Knodel	Fraunhofer IESE, Germany
Martin Kropp	University of Applied Sciences and Arts Northwestern
	Switzerland, Switzerland
Pasi Kuvaja	University of Oulu, Finland
Maarit Laanti	Nitor, Finland
Timo O. A. Lehtinen	Aalto University, Finland
Valentina Lenarduzzi	Tampere University, Finland
Grischa Liebel	University of Gothenburg, Sweden
Ivan Luković	University of Novi Sad, Serbia
Ilaria Lunesu	Università degli Studi di Cagliari, Italy
Viljan Mahnič	University of Ljubljana, Slovenia
George Mangalaraj	Western Illinois University, USA
Bartosz Marcinkowski	University of Gdańsk, Poland
Manuel Mazzara	Innopolis University, Russia

ix

Antoni-Lluís Mesquida Calafat Jakub Miler Gloria Miller Sanjay Misra Durga Prasad Mohapatra Miguel Ehécatl Morales-Trujillo Richard Mordinyi Jürgen Münch Mirna Muñoz Karolina Muszyńska Anh Nguyen-Duc Arne Nover Hanna Oktaba Marco Ortu Tosin Daniel Oyetoyan Necmettin Özkan Subhrakanta Panda Rui Humberto R. Pereira Aneta Poniszewska-Maranda Alexander Poth Michał Przybyłek Raman Ramsin Sonja Ristić Bruno Rossi Zdenek Rybola Dina Salah Mattia Salnitri Eva-Maria Schön Jorge Sedeno Mali Senapathi Marcin Sikorski Michał Śmiałek Michel Soares Alvaro Soria Maria Spichkova **Olga Springer** Tor Stålhane Christoph Johann Stettina

Davide Taibi

Gdańsk University of Technology, Poland Skema Business School, Germany Covenant University, Nigeria NIT Rourkela, India University of Canterbury, New Zealand Vienna University of Technology, Austria Reutlingen University, Germany Centro de Investigación en Matemáticas, Mexico University of Szczecin, Poland University College of Southeast Norway, Norway University of Osnabrueck and Willert Software Tools GmbH, Germany National Autonomous University of Mexico, Mexico University of Cagliari, Italy SINTEF Digital, Norway Kuveyt Turk Participation Bank, Turkey Birla Institute of Technology and Science, India Instituto Politecnico do Porto - ISCAP, Portugal Łódź University of Technology, Poland

University of the Balearic Islands, Spain

Volkswagen AG, Germany University of Warsaw, Poland Sharif University of Technology, Iran University of Novi Sad, Serbia Masaryk University, Czech Republic FIT CTU in Prague, Czech Republic Sadat Academy, Egypt University of Trento, Italy University of Seville, Spain University of Seville, Spain Auckland University of Technology, New Zealand Polish-Japanese Academy of Information Technology, Poland Politechnika Warszawska, Poland Federal University of Sergipe, Brazil ISISTAN Research Institute, Argentina RMIT University, Australia Gdańsk University of Technology, Poland Norwegian University of Science and Technology, Norway Leiden University, The Netherlands Free University of Bolzano, Italy

Ayca Tarhan	Hacettepe University Computer Engineering
	Department, Turkey
Jörg Thomaschewski	University of Applied Sciences Emden/Leer, Germany
Carlos Torrecilla Salinas	University of Seville, Spain
Michael Unterkalmsteiner	Blekinge Institute of Technology, Sweden
Andrzej Wardziński	Gdańsk University of Technology, Poland
Jan Werewka	AGH University of Science and Technology, Poland
Dominique Winter	University of Applied Sciences Emden/Leer, Germany
Michał Wróbel	Gdańsk University of Technology, Poland
Murat Yilmaz	Çankaya University, Turkey
Nacer Eddine Zarour	University Constantine 2, Algeria
Katarzyna Łukasiewicz	Gdańsk University of Technology, Poland

Additional Reviewers

Paweł Markowski

Polish-Japanese Academy of Information Technology, Poland

MIDI 2019

Event Chairs

Krzysztof Marasek

Andrzej Romanowski Marcin Sikorski

Program Committee

Cezary Biele Peter Forbrig Sissel Guttormsen Danijel Koržinek

Agata Kołakowska Agnieszka Landowska Masood Masoodian Jakub Miler Mohammad Obaid Ewa Satalecka

Pavel Slavik Krzysztof Szklanny

Marcin Wichrowski

Ро	lish-Japanese Academy of Information Technology,
	Poland
Łó	dź University of Technology, Poland
Go	lańsk University of Technology, Poland

Information Processing Institute, Poland
University of Rostock, Germany
University of Bern, Switzerland
Polish-Japanese Academy of Information Technology,
Poland
Gdańsk University of Technology, Poland
Gdańsk University of Technology, Poland
Aalto University, Finland
Gdańsk University of Technology, Poland
Uppsala University, Sweden
Polish-Japanese Academy of Information Technology,
Poland
Czech Technical University, Czech Republic
Polish-Japanese Academy of Information Technology,
Poland
Polish-Japanese Academy of Information Technology,
Poland

Alicja Wieczorkowska	Polish-Japanese Academy of Information Technology,
	Poland
Marco Winkler	Université Nice Sophia Antipolis, France
Adam Wojciechowski	Łódź University of Technology, Poland
Krzysztof Wołk	Polish-Japanese Academy of Information Technology, Poland
Juergen Ziegler	University of Duisburg-Essen, Germany

Contents

Scaling Agile – A Large Enterprise View on Delivering and Ensuring Sustainable Transitions	1
Release Planning in a Hybrid Project Environment Kristina Marner, Sven Theobald, and Stefan Wagner	19
Identification of the Agile Mindset and Its Comparison to the Competencies of Selected Agile Roles	41
Adapting Agile Practices to Security Context – Practitioners' Perspective Katarzyna Łukasiewicz and Sara Cygańska	63
Quantitative Analysis of the Scrum Framework	82
Scientific Collaboration, Citation and Topic Analysis of International Conference on Agile Software Development Papers	108
Playing the Sprint Retrospective: A Replication Study Yen Ying Ng, Jędrzej Skrodzki, and Maciej Wawryk	133
Comparison User Engagement of Gamified and Non-gamified Augmented Reality Assembly Training Diep Nguyen and Gerrit Meixner	142
Author Index	153