

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison

*Lancaster University, Lancaster, UK*

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Friedemann Mattern

*ETH Zurich, Zurich, Switzerland*

John C. Mitchell

*Stanford University, Stanford, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*TU Dortmund University, Dortmund, Germany*

Demetri Terzopoulos

*University of California, Los Angeles, CA, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Gerhard Weikum

*Max Planck Institute for Informatics, Saarbrücken, Germany*

More information about this series at <http://www.springer.com/series/7409>


Carlos Delgado Kloos · Patrick Jermann  
Mar Pérez-Sanagustín · Daniel T. Seaton  
Su White (Eds.)

# Digital Education


## Out to the World and Back to the Campus

5th European MOOCs Stakeholders Summit, EMOOCs 2017  
Madrid, Spain, May 22–26, 2017  
Proceedings

*Editors*

Carlos Delgado Kloos   
Universidad Carlos III de Madrid  
Leganés (Madrid)  
Spain

Patrick Jermann   
École Polytechnique Fédérale de Lausanne  
Lausanne  
Switzerland

Mar Pérez-Sanagustín   
Pontifical Catholic University of Chile  
San Joaquín, Santiago de Chile  
Chile

Daniel T. Seaton  
Harvard University  
Cambridge, MA  
USA

Su White  
University of Southampton  
Southampton  
UK

ISSN 0302-9743                      ISSN 1611-3349 (electronic)  
Lecture Notes in Computer Science  
ISBN 978-3-319-59043-1              ISBN 978-3-319-59044-8 (eBook)  
DOI 10.1007/978-3-319-59044-8

Library of Congress Control Number: 2017941499

LNCS Sublibrary: SL3 – Information Systems and Applications, incl. Internet/Web, and HCI

© Springer International Publishing AG 2017

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, express 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.

Printed on acid-free paper

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

# Preface

Aristophanes once said that “education is kindling of a flame, not the filling of a vessel.” That quote remains true today. The best education is the one that engages the students in emotional ways. When this is achieved, learning becomes a joy for all involved and the educational outcomes are best achieved.

We would like to move that statement one level up, to the meta-level, about learning on how to educate best. There are many questions open about how to teach best. Very little is known about how the brain learns, so it is of no surprise that we are still struggling with the teaching practices. In this context, massive open online courses (MOOCs) appeared just a few years ago, and in relation to the quote of Aristophanes, we can say that MOOCs have ignited the learning conversation about education. Professors started to reflect more on how to teach best, universities have reinforced and reformed their teaching and learning units, and the world is discussing how to best use technology for teaching and learning.

About five years have passed since platforms like edX, Coursera, MiríadaX, and FutureLearn were founded, and after the initial hype, MOOCs have secured a milestone in the history of education. MOOCs are now well established and have evolved into multiple forms. On the one hand, they have found their way back into campus in the form of SPOCs (small private online courses) where they enable the use of various blended pedagogies such as flipped classrooms. Additionally, they are increasingly used in companies for training purposes of employees and partners. Also, professional education is another big area where MOOCs are used. Professionals are using the MOOCs to develop their skills and adapt to the changing needs of the labor market. In these proceedings, you will find a long list of MOOC use cases. These use cases make you reflect on the potential of MOOCs, their impact, and the implications that their use entails in several contexts.

The EMOOCs 2017 conference, the 5th in the series of European MOOCs Stakeholders Symposia, was held in Leganés (Madrid, Spain) on the campus of Universidad Carlos III de Madrid (UC3M) during May 22–26, 2017. It followed on from the initial closed conference at EPFL in Lausanne (Switzerland) in 2013. A second open conference was also held in Lausanne in 2014. In 2015, the Université catholique de Louvain hosted the event in Mons (Belgium) and 2016 it was Universität Graz in Graz (Austria). This year, Open edX con 2017, the conference for developers around the open source Open edX platform, was co-located with EMOOCs 2017 on the UC3M campus, allowing for interesting synergies to occur.

Altogether 137 contributions were submitted after the different calls for paper of the conference. Of these, 53 papers were submitted to the Experience and Research Tracks, from which 23 were accepted for presentation at the conference and publication as full papers, 10 for the Experience Track, and 13 for the Research Track, making an acceptance rate of 43%. Additional papers were accepted at a subsequent deadline that

are included here as short papers (three for the Experience Track and seven for the Research Track).

Apart from this, the program featured many other interesting events:

- Eight panel sessions from the Business Track and the Policy Track
- Work-in-progress contributions presented as posters
- Nine workshops
- A Spanish Track with contributions from Ibero-America

Brilliant keynote speakers rounded up the program:

- Anant Agarwal, CEO, edX
- Armando Fox, Professor and Advisor to MOOClab, UC Berkeley
- Javier Hernández-Ros, Director, Data, DG CONNECT, European Commission
- Carolina Jeux, CEO, Telefónica Educación Digital
- Rick Levin, CEO, Coursera
- Simon Nelson, CEO, FutureLearn
- Sir Timothy O’Shea, Principal and Vice-Chancellor, University of Edinburgh

Many people participated in making this event a success. We would like to thank the authors for their contributions, the Program Committee members for their reviewing activity, the chairs of the different tracks, the Organizing Committee with members from the UTEID (Unidad de Tecnología Educativa e Innovación Docente) and the Department of Telematics Engineering, both of UC3M. Furthermore, UC3M supported the event through many of its services. Additional collaborators include PAU Education, the eMadrid network, the UNESCO Chair for “Scalable Digital Education for All” at UC3M, the European University Association, Springer, and EasyChair. We are grateful to the generous sponsors who supported EMOOCs 2017: McGraw-Hill Education, edX, Coursera, and FutureLearn as gold sponsors; Telefónica Educación Digital and SnowlTech as silver sponsors.

March 2017

Carlos Delgado Kloos  
Patrick Jermann  
Mar Pérez-Sanagustín  
Daniel Seaton  
Su White

# Organization

## Program Committee

|                        |   |
|------------------------|---|
| John Aiken             | Michigan State University Physics Education Research Lab, USA |
| Gudrun Bachmann        | University of Basel, Educational Technologies, Switzerland    |
| Aneesha Bakharia       | University of Queensland, Australia                           |
| Chris Brooks           | University of Michigan, USA                                   |
| Gavin Clinch           | Connatch-Ulster Alliance, Ireland                             |
| Ruth Cobos             | Universidad Autónoma de Madrid, Spain                         |
| Dan Davis              | TU Delft, The Netherlands                                     |
| Max De Mendizábal      | Universidad Nacional Autónoma de México, Mexico               |
| Inge de Waard          | The Open University, UK                                       |
| Carlos Delgado Kloos   | Universidad Carlos III de Madrid, Spain                       |
| Pierre Dillenbourg     | EPFL, Switzerland   |
| Gulustan Dogan         | City University of New York, USA                              |
| E.A. Draffan           | University of Southampton, UK                                 |
| Martin Ebner           | Graz University of Technology, Austria                        |
| Rebecca Ferguson       | The Open University, UK                                       |
| Silvia Elena Gallagher | Trinity College Dublin, The University of Dublin, Ireland     |
| Davinia Hernández-Leo  | Universitat Pompeu Fabra, Barcelona, Spain                    |
| Tanja Jadin            | University of Applied Sciences Upper Austria, Austria         |
| Patrick Jermann        | Ecole Polytechnique Fédérale de Lausanne, Switzerland         |
| Lukasz Kidzinski       | Stanford University, USA                                      |
| Irwin King             | CUHK, Hong Kong   |
| Rene Kizilcec          | Stanford University, USA                                      |
| Michael Kopp           | University of Graz, Austria                                   |
| Anja Lorenz            | Lübeck University of Applied Sciences, Germany                |
| Guy Lories             | Université catholique de Louvain, Belgium                     |
| Katherine Maillat      | Institut Mines-Télécom, Télécom Ecole de Management, France   |
| Jorge Maldonado        | Pontificia Universidad Católica de Chile, Chile               |
| Kim Manturuk           | Duke University, USA  |
| Colin Milligan         | Glasgow Caledonian University, UK                             |
| Andreina Parisi-Amon   | Coursera, USA   |
| Mar Pérez-Sanagustín   | Pontificia Universidad Católica de Chile, Chile               |
| Juliana Raffaghelli    | University of Florence, Italy                                 |

|                    |   |
|--------------------|---|
| Jeanine Reutemann  | University of Applied Sciences Basel FHNW,<br>Switzerland |
| Ulla Ringtved      | eLearningLab, University of Aalborg, Denmark              |
| Martín Rodríguez   | IE Business School, Spain                                 |
| Ido Roll           | University of British Columbia, Canada                    |
| Yigal Rosen        | Harvard University, USA                                   |
| Ilia Rushkin       | Harvard University, USA                                   |
| Andy Saltarelli    | Stanford University, USA                                  |
| Daniel Seaton      | Harvard University, USA                                   |
| Nicolas Sennequier | IMT, France   |
| Kshitij Sharma     | CRAFT-EPFL, Switzerland                                   |
| Gideon Shimshon    | Leiden University, The Netherlands                        |
| Marinke Sussenbach | TU Delft, The Netherlands                                 |
| Selen Turkey       | Harvard Initiative for Learning and Teaching, USA         |
| Guadalupe Vadillo  | UNAM, Mexico  |
| Su White           | University of Southampton, UK                             |
| Ahmed Yousef       | Fayoum University, Al Fayyūm, Egypt                       |
| John Zornig        | The University of Queensland, Australia                   |
| Judith Zubieta     | IIS, UNAM, Mexico   |

### **Additional Reviewers**

Chan, Hou Pong  
Dopper, Sofia  
Estévez-Ayres, Iria  
Marquis, Danika  
Zhang, Jiani



# Contents

## Experience Track

|  |    |
|--|----|
| From a Small Liberal Arts College to the World: Our Blended Courses, SPOC, and MOOCs in Italian Studies . . . . .  | 3  |
| <i>Daniela Bartalesi-Graf</i>  |    |
| Giving Flexible Learners a Head Start on Higher Education: Designing and Implementing a Pre-induction Socialisation MOOC . . . . .   | 10 |
| <i>James Brunton, Mark Brown, Eamon Costello, Orna Farrell, and Conor Mahon</i>  |    |
| The EMMA Experience. Emerging Patterns and Factors for Success . . . . .   | 20 |
| <i>Rosanna De Rosa, Chiara Ferrari, and Ruth Kerr</i>  |    |
| Mentoring Learners in MOOCs: A New Way to Improve Completion Rates? . . . . .  | 29 |
| <i>Lucie Dhome, Jean-Pierre Deflandre, Olivier Bernaert, Sébastien Bianchi, and Maria Thirouard</i>  |    |
| Towards E-presence at Distance as a Way to Reach and Share E-quality: The Case of the ECO sMOOCs . . . . .   | 38 |
| <i>Divina Frau-Meigs and Adeline Bossu</i>   |    |
| Additional Functionalities to Convert an xMOOC into an xLMOOC . . . . .  | 48 |
| <i>Ana Gimeno-Sanz, Cristina Navarro-Laboulais, and Ignacio Despujol-Zabala</i>  |    |
| A Principled Approach to the Design of Collaborative MOOC Curricula . . . . .  | 58 |
| <i>Stian Håklev and James D. Slotta</i>  |    |
| Towards Full Engagement for Open Online Education. A Practical Experience for a MicroMaster. . . . .   | 68 |
| <i>Rocael Hernández and Hector R. Amado-Salvatierra</i>  |    |
| From Low-Scale to Collaborative, Gamified and Massive-Scale Courses: Redesigning a MOOC . . . . .  | 77 |
| <i>Alejandro Ortega-Arranz, Luisa Sanz-Martínez, Susana Álvarez-Álvarez, Juan A. Muñoz-Cristóbal, Miguel L. Bote-Lorenzo, Alejandra Martínez-Monés, and Yannis Dimitriadis</i> |    |
| Innovation in EU Communication: MOOCs from the European Committee of the Regions . . . . .   | 88 |
| <i>Martin Gosset and Wolfgang Petzold</i>  |    |

|   |     |
|---|-----|
| Does Gamification in MOOC Discussion Forums Work? . . . . .   | 95  |
| <i>Matthias Reischer, Mohammad Khalil, and Martin Ebner</i>   |     |
| A MOOC-Based Flipped Class: Lessons Learned from the Orchestration<br>Perspective. . . . .  | 102 |
| <i>María Fernanda Rodríguez, Josefina Hernández Correa,<br/>Mar Pérez-Sanagustín, Julio A. Pertuze, and Carlos Alario-Hoyos</i>                       |     |
| An International Collaboration in the Design Experience<br>of a MOOC Series . . . . .   | 113 |
| <i>Susanna Sancassani, Paola Corti, and Valeria Baudo</i>   |     |
| <b>Research Track</b>   |     |
| Measuring the Degree of Innovation in Education Through<br>the Implementation of an Indicator Based on Analyzing<br>MOOC-Related Activities . . . . . | 123 |
| <i>Jose María Álvarez-Rodríguez, Antonio de Amescua,<br/>Javier García-Guzman, and Maribel Sánchez-Segura</i>   |     |
| Toward a Typology of MOOC Activity Patterns: Learners<br>Who Never Rest? . . . . .  | 134 |
| <i>Rémi Bachelet and Rawad Chaker</i>   |     |
| Improving MOOC Student Learning Through Enhanced Peer-to-Peer Tasks . . .   | 140 |
| <i>Borja Bordel, Ramón Alcarria, Diego Martín,<br/>and Diego Sánchez-de-Rivera</i>  |     |
| Who Wants to Chat on a MOOC? Lessons from a Peer<br>Recommender System . . . . .  | 150 |
| <i>François Bouchet, Hugues Labarthe, Rémi Bachelet, and Kalina Yacef</i>   |     |
| Weekly Predicting the At-Risk MOOC Learners Using Dominance-Based<br>Rough Set Approach . . . . .   | 160 |
| <i>Sarra Bouzayane and Inès Saad</i>  |     |
| #MOOC Friends and Followers: An Analysis of Twitter Hashtag Networks . . .  | 170 |
| <i>Eamon Costello, Mark Brown, Binesh Nair, Mairéad Nic Giolla Mhichíl,<br/>Jingjing Zhang, and Theo Lynn</i>   |     |
| Understanding Learning and Teaching in MOOCs from the Perspectives<br>of Students and Instructors: A Review of Literature from 2014 to 2016 . . . . . | 176 |
| <i>Ruiqi Deng, Pierre Benckendorff, and Deanne Gannaway</i>   |     |
| Effect of Free Certificate Discontinuation in Completion Rates of MOOC . . .  | 182 |
| <i>Ignacio M. Despujol, Carlos Turró, Linda Castañeda,<br/>and Jaime Busquets</i>   |     |

Challenges of Identifying Second Language English Speakers in MOOCs . . . 188  
*Ismail Duru, Ayse Saliha Sunar, Gulustan Dogan, and Su White*

MOOC Quality Evaluation System: Tomsk State University Experience. . . . 197  
*Victor Dyomin, Galina Mozhaeva, Olesya Babanskaya,  
and Ulyana Zakharova*

The Drivers of Employer Support for Professional Skill Development  
in MOOCs . . . . . 203  
*Monika Hamori*

To Change or Not to Change? That’s the Question... On MOOC-Success,  
Barriers and Their Implications. . . . . 210  
*Maartje Henderikx, Karel Kreijns, and Marco Kalz*

Follow-Up of Learning Activities in Open edX: A Case Study  
at the University of Cauca . . . . . 217  
*Daniel Jaramillo-Morillo, Mario Solarte Sarasty,  
Gustavo Ramírez González, and Mar Pérez-Sanagustín*

Increasing Educational Value: The Transformation of MOOCs  
into Open Educational Resources . . . . . 223  
*Michael Kopp, Ortrun Gröblinger, and Claudia Zimmermann*

Implementation Intentions and How They Influence Goal Achievement  
in MOOCs . . . . . 233  
*Karel Kreijns, Marco Kalz, Jonatan Castaño-Muñoz, and Yves Punie*

A Social Learning Space Grid for MOOCs: Exploring a FutureLearn Case. . . 243  
*Kalpani Manathunga, Davinia Hernández-Leo, and Mike Sharples*

The Double Classroom: Design Patterns Using MOOCs  
in Teacher Education. . . . . 254  
*Anne-Mette Nortvig and Karsten Gyntner*

Early Prediction and Variable Importance of Certificate Accomplishment  
in a MOOC . . . . . 263  
*José A. Ruipérez-Valiente, Ruth Cobos, Pedro J. Muñoz-Merino,  
Álvaro Andujar, and Carlos Delgado Kloos*

Types of Dropout in Adaptive Open Online Courses . . . . . 273  
*Maxim Skryabin*

Exploring the Role of Assessment in Developing Learners' Critical Thinking in Massive Open Online Courses. . . . . 280  
*Catherine Zhao, Sonal Bhalla, Lesley Halliday, Joanne Travaglia, and Julia Kennedy*

**Author Index** . . . . . 291