

## Founding Editors

Gerhard Goos

*Karlsruhe Institute of Technology, Karlsruhe, Germany*

Juris Hartmanis

*Cornell University, Ithaca, NY, USA*

## Editorial Board Members

Elisa Bertino

*Purdue University, West Lafayette, IN, USA*

Wen Gao

*Peking University, Beijing, China*

Bernhard Steffen 

*TU Dortmund University, Dortmund, Germany*

Gerhard Woeginger 

*RWTH Aachen, Aachen, Germany*

Moti Yung

*Columbia University, New York, NY, USA*

More information about this subseries at <http://www.springer.com/series/7407>

Richard Li · Simon K. S. Cheung ·  
Chiaki Iwasaki · Lam-For Kwok ·  
Makoto Kageyama (Eds.)

# Blended Learning

Re-thinking and Re-defining  
the Learning Process

14th International Conference, ICBL 2021  
Nagoya, Japan, August 10–13, 2021  
Proceedings

*Editors*

Richard Li   
Hong Kong Polytechnic University  
Hong Kong, China

Chiaki Iwasaki  
Kansai University  
Osaka, Japan

Makoto Kageto  
Nihon Fukushi University  
Nagoya, Japan

Simon K. S. Cheung  
Open University of Hong Kong  
Hong Kong, China

Lam-For Kwok   
City University of Hong Kong  
Hong Kong, China

ISSN 0302-9743                      ISSN 1611-3349 (electronic)  
Lecture Notes in Computer Science  
ISBN 978-3-030-80503-6              ISBN 978-3-030-80504-3 (eBook)  
<https://doi.org/10.1007/978-3-030-80504-3>

LNCS Sublibrary: SL1 – Theoretical Computer Science and General Issues

© Springer Nature Switzerland AG 2021

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

Welcome to the proceedings of the 14th International Conference on Blended Learning (ICBL 2021). This year, ICBL 2021 was hosted at the Nihon Fukushi University, Nagoya, Japan, during August 10–13 2021.

Blended learning is one of the promising approaches to teaching and learning. It integrates traditional learning with innovative means to create a new learning environment conducive to effective learning. Like the previous conferences in the series, ICBL 2021 provided a platform for knowledge exchange and experience sharing among researchers and practitioners in this field.

The theme of ICBL 2021 was *Re-thinking and Re-defining the Learning Process*. Over the past decade, enabled by educational and technological innovations, the teaching and learning process has been undergoing a lot of changes, not only on instructional design and delivery but also on student advising and assessment. Our focus was on the innovative educational and technological practices of blended learning, and how these practices change the teaching and learning process.

ICBL 2021 attracted a total of 79 paper submissions. After a rigorous review process, 30 papers were selected for inclusion in this volume. The selected papers cover various areas in blended learning, including content and instructional design, enriched and smart learning experience, experience in blended learning, institutional policies and strategies, and online and collaborative learning.

We would like to take this opportunity to thank the following parties who made the conference a success: the Organizing Committee; the International Program Committee; the conference organizers and co-organizer; the conference sponsors, and all of the conference participants.

We trust that you will enjoy reading the papers.

August 2021

Richard Li  
Simon K. S. Cheung  
Chiaki Iwasaki  
Lam-For Kwok  
Makoto Kageto

# Conference Organization

## Organizing Committee

### Honorary Chairs

Horace Ip	City University of Hong Kong, Hong Kong, China
Wakio Oyanagi	Kansai University and Japan Association for Educational Media Study, Japan

### Conference Chairs

Lam-For Kwok	City University of Hong Kong, Hong Kong, China
Shinichi Sato	Nihon Fukushi University, Japan

### Organizing Chairs

John Hui	Education University of Hong Kong, Hong Kong, China
Makoto Kageto	Nihon Fukushi University, Japan

### Programme Chairs

Richard Li	The Hong Kong Polytechnic University, Hong Kong, China
Simon K. S. Cheung	The Open University of Hong Kong, Hong Kong, China
Chiaki Iwasaki	Kansai University, Japan

### Finance Chairs

Kwan Keung Steven Ng	Hong Kong Society for Multimedia and Image Computing, Hong Kong, China
Mihoko Chiba	Konan University, Japan

### Local Arrangement Chairs

Oliver Au	The Open University of Hong Kong, Hong Kong, China
Hiroki Murakawa	Nihon Fukushi University, Japan
Tomomi Sato	Aichi Shukutoku University, Japan

## Publicity Chairs

Morris Jong	The Chinese University of Hong Kong, Hong Kong, China
Yinghui Shi	Central China Normal University, China
Hiroyuki Aoki	International Christian University, Japan
Tomomi Takabayashi	Cyber University, Japan

## Web Masters

Richard Li	The Hong Kong Polytechnic University, Hong Kong, China
Ryo Yoshikawa	Nagoya Bunri University, Japan

## International Program Committee

### Chairs

Richard Li	The Hong Kong Polytechnic University, Hong Kong, China
Simon K. S. Cheung	The Open University of Hong Kong, Hong Kong, China
Chiaki Iwasaki	Kansai University, Japan

### Members

Oliver Au	The Open University of Hong Kong, Hong Kong, China
Jinnong Cao	The Hong Kong Polytechnic University, Hong Kong, China
C. S. Chai	The Chinese University of Hong Kong, Hong Kong, China
Kan-Kan Chan	University of Macau, Macau, China
Chih-Tsan Chang	National Chung Cheng University, Taiwan, China
Thomas Chiu	The Chinese University of Hong Kong, Hong Kong, China
Mike Chui	Education University of Hong Kong, Hong Kong, China
Tetsuro Ejima	Aichi University of Education, Japan
Rie Emoto	Iwate University, Japan,
Blanka Frydrychova	University of Hradec Králové, Czech Republic
Klimova	
Gibran Alejandro Garcia	Toyo University, Japan
Mendoza	
Yoshiko Goda	Kumamoto University, Japan
Wolfgang Halang	Fernuniversität in Hagen, Germany
Owen Hall Jr.	Pepperdine University, USA
Tianyong Hao	South China Normal University, China

Nehal Hasnine	Hosei University, Japan
Andreas Henrich	University of Bamberg, Germany
Yuki Hirai	Shinsyu University, Japan
Yoko Hirata	Hokkai-Gakuen University, Japan
Yoshihiro Hirata	Hokkai-Gakuen University, Japan
Norio Hozaki	Waseda University, Japan
Jenq-Muh Hsu	National Chiayi University, Taiwan, China
John Yan Keung Hui	Education University of Hong Kong, Hong Kong, China
Josef Hynek	University of Hradec Králové, Czech Republic
Ryohei Ikejiri	The University of Tokyo, Japan
Masatoshi Ishikawa	Tokyo Seitoku University, Japan
Jane Geng Jie	The Chinese University of Hong Kong, Hong Kong, China
Morris Jong	The Chinese University of Hong Kong, Hong Kong, China
Akinobu Kanda	Tokyo Metropolitan University, Japan
Gary A. Kirkpatrick	Nihon Fukushi University, Japan
Takayuki Konno	Meisei University, Japan
Kenichi Kubota	Kansai University, Japan
Masayuki Kudo	Fuji Women's University, Japan
Haruo Kurokami	Kansai University, Japan
Reggie Kwan	The Open University of Hong Kong, Hong Kong, China
Lam-For Kwok	City University of Hong Kong, Hong Kong, China
Chiu-Lin Lai	National Taiwan University of Science and Technology, Taiwan, China
Ivan Ka Wai Lai	City University of Macau, Macau, China
Jeanne Lam	The University of Hong Kong, Hong Kong, China
Keith Lee	The Open University of Hong Kong, Hong Kong, China
Min-Hsien Lee	National Taiwan Normal University, Taiwan, China
Victor Lee	City University of Hong Kong, Hong Kong, China
Yi Li	Nanjing University, China
Kam Cheong Li	The Open University of Hong Kong, Hong Kong, China
Heng Luo	Central China Normal University, China
Will Ma	Technological and Higher Education Institute of Hong Kong, Hong Kong, China
Takeshi Matsuda	Tokyo Metropolitan University, Japan
Tatsunori Matsui	Waseda University, Japan
Terumi Miyazoe	Tokyo University of Science, Japan
Kousuke Mouri	Tokyo University of Agriculture and Technology, Japan
Masayuki Murakami	Kyoto University of Foreign Studies, Japan
Junko Nemoto	Meijigakuin University, Japan



Kwan Keung Steven Ng	Hong Kong Society for Multimedia and Image Computing, Hong Kong, China
Hiroaki Ogata	Kyoto University, Japan
Wakio Oyanagi	Nara University of Education, Japan
Naraphorn Paoprasert	Kasetsart University, Thailand
Diana Perez-Marin	Rey Juan Carlos University, Spain
Kongkiti Phusavat	Kasetsart University, Thailand
C. K. Poon	Hang Seng University of Hong Kong, Hong Kong, China
Petra Poulouva	University of Hradec Králové, Czech Republic
Jacky Pow	Hong Kong Baptist University, Hong Kong, China
Kanduboda B. Prabath	Ritsumeikan University, Japan
Yanghai Rao	Sun Yat-sen University, China
Junjie Shang	Peking University, China
Yinghui Shi	Central China Normal University, China
Ivana Simonova	University of Ostrava, Czech Republic
Niwat Srisawasdi	Khon Kaen University, Thailand
Liana Stanescu	University of Craiova, Romania
Cai Su	Beijing Normal University, China
Libuse Svobodova	University of Hradec Králové, Czech Republic
Akiko Takahashi	Tokushima University, Japan
Jayshiro Tashiro	University of Ontario Institute of Technology, Canada
Kosuke Terashima	Osaka Kyoiku University, Japan
Jumpei Tokito	Kwansei Gakuin University, Japan
Fu Lee Wang	The Open University of Hong Kong, Hong Kong, China
Shu-Ming Wang	Chinese Culture University, Taiwan, China
Billy Tak-Ming Wong	The Open University of Hong Kong, Hong Kong, China
Crusher Wong	City University of Hong Kong, Hong Kong, China
Raymond Wong	City University of Hong Kong, Hong Kong, China
Tak-Lam Wong	Douglas College, Canada
Di Wu	Central China Normal University, China
Haoran Xie	Education University of Hong Kong, Hong Kong, China
Youru Xie	South China Normal University, China
Toshiyuki Yamamoto	Kansai University, Japan
Ryota Yamamoto	University of Tokyo, Japan
Satoshi Yamashita	Kisarazu College, Japan
Harrison Yang	State University of New York at Oswego, USA
W. L. Yeung	Lingnan University, Hong Kong, China
Y. T. Yu	City University of Hong Kong, Hong Kong, China
Tomas Zeman	Czech Technical University in Prague, Czech Republic
Zehui Zhan	South China Normal University, China
Liming Zhang	University of Macau, Macau, China
Jianhua Zhao	South China Normal University, China

Xiaohong Zhang  
Yunxiang Zheng  
Sha Zhu

Kumamoto University, Japan  
South China Normal University, China  
Central China Normal University, China

## Organizers



Nihon Fukushi University



City University of Hong Kong

## Co-organizer



香港多媒體及影像計算學會  
Hong Kong Society for Multimedia and Image Computing

Hong Kong Society for Multimedia and Image Computing

## Sponsors



香港培華教育基金會  
Hong Kong Pei Hua Education Foundation

Hong Kong Pei Hua Education Foundation



Springer

Springer Science+Business Media

**Keynote Speakers and Panel Chairs**

**Keynote Speakers**

Katsuaki Suzuki	Kumamoto University, Japan
Jimmy H. M. Lee	The Chinese University of Hong Kong, Hong Kong, China
Yekyung Lisa Lee	Sogang University, South Korea
Wenge Guo	Peking University, China

**Panel Chairs**

Horace H. S. Ip	City University of Hong Kong, Hong Kong, China
Kenichi Kubota	Kansai University, Japan
Youru Xie	South China Normal University, China

# Contents

## Keynotes

From Nine Events of Instruction to the First Principles of Instruction: Transformation of Learning Architecture for Society 5.0 . . . . .	3
<i>Katsuaki Suzuki</i>	
From MOOC to SPOC: Fable-Based Learning . . . . .	16
<i>Jimmy H. M. Lee</i>	
The Meaning of Learner Centeredness in College Online Environments Revisited . . . . .	26
<i>Yekyung Lisa Lee</i>	
Seeing the Future of Education: Three-Year Experiment of Digital Reading Online Course . . . . .	36
<i>Wenge Guo</i>	

## Content and Instructional Design

Construction of the Teacher-Student Interaction Model in Online Learning Spaces . . . . .	53
<i>Youru Xie, Yuling Huang, Yucheng Bai, Wenjing Luo, and Yi Qiu</i>	
The Influence of Different Partnerships on Learning Motivation and Social Network in Peer Assessment. . . . .	66
<i>Yuru Lin, Yi Zhang, and Yichi Wang</i>	
Re-thinking and Re-defining the Learning Process? Students' Feedback on Online Distance Instruction . . . . .	78
<i>Ludmila Faltynkova, Ivana Simonova, Katerina Kostolanyova, and Slavomira Klimszova</i>	
Technological Barriers and Learning Outcomes in Online Courses During the Covid-19 Pandemic . . . . .	92
<i>Xiangyang He and Harrison Hao Yang</i>	
A Study on the Application of AI Experiential Learning in the Architecture and Design Courses of a Taiwan University . . . . .	103
<i>Shao-Fu Li, Kwan-Keung Ng, and Lap-Kei Lee</i>	

## Enriched and Smart Learning Experience

Supporting Students' Reflection in Game-Based Science Learning: A Literature Review . . . . .	119
<i>Xiaotong Yang and Yang Liu</i>	
Peer-Assessment Enhanced Collaborative Learning in a Virtual Learning Environment . . . . .	132
<i>Di Zou, Haoran Xie, and Fu Lee Wang</i>	
Personalised Learning in STE(A)M Education: A Literature Review . . . . .	142
<i>Kam Cheong Li and Billy Tak-Ming Wong</i>	
Applying an Intelligent Learning Partner in Teacher Education for Improving CT-Related TPACK . . . . .	152
<i>Zhenzhen He, Changqin Huang, Tao He, and Kai Bo</i>	
Using Chatbots in Flipped Learning Online Sessions: Perceived Usefulness and Ease of Use . . . . .	164
<i>Khe Foon Hew, Weijiao Huang, Jiahui Du, and Chengyuan Jia</i>	
The Customized Mathematic Instruction Supported by an Intelligent Tutoring System and Its Effect During the COVID-19 Epidemic. . . . .	176
<i>Jiyoun Jia and Yanying Miao</i>	

## Experience in Blended Learning

Roles Interaction During Mobile-Blended Collaborative Learning: The Impact of External Scripts . . . . .	191
<i>Cixiao Wang</i>	
Students' Evaluation of Performance-Centred Blended Learning Assessment in Japan: Can-Do and Cannot-Do Notions. . . . .	203
<i>Terumi Miyazoe</i>	
Examining Beginners' Continuance Intention in Blended Learning in Higher Education . . . . .	214
<i>He Yang, Jin Cai, Harrison Hao Yang, and Xiaochen Wang</i>	
Content Development for Blended Learning in Pharmaceutical Preparations . . . . .	226
<i>Narinee Phosri and Verayuth Lertmattee</i>	
Activity Design for Cultivating Students' Journalistic Skills and Inquiry-Mind in a Blended Learning Environment. . . . .	237
<i>Xiaohong Zhang, Kaoru Matsubayashi, and Kenichi Kubota</i>	

## **Institutional Policies and Strategies**

Using Design Thinking in Educational Game Design: A Case Study of Pre-service Teacher Experience . . . . .	253
<i>Yuling Zhang and Juanjuan Chen</i>	
The Effects of Using Tablet PCs on Student Self-regulated Learning and Learning Achievement. . . . .	264
<i>Yinghui Shi, Qiuyu Pu, Ling Chen, Kexin Jia, and Harrison Hao Yang</i>	
Students' Reflection on Online Distance Learning: Advantages, Disadvantages, Recommendations . . . . .	275
<i>Ivana Simonova, Ludmila Faltynkova, and Katerina Kostolanyova</i>	
Cultural Factors in Urgent Transition to Online Learning During the COVID-19 Pandemic – Case Studies from Japan and China. . . . .	287
<i>Shudong Wang and Aipeng Chen</i>	
Implication on Perceived Usefulness of Open Educational Resources After a Rapid Switch to Online Learning Mode . . . . .	298
<i>Simon K. S. Cheung</i>	

## **Online and Collaborative Learning**

COVID-19's Effects on the Scope, Effectiveness, and Roles of Teachers in Online Learning Based on Social Network Analysis: A Case Study. . . . .	311
<i>Yigang Ding, Xinru Yang, and Yunxiang Zheng</i>	
Fading Scaffolds for Better Online Learning? A Comparative Analysis of Three Scaffolding Practices . . . . .	326
<i>Xu Han, Heng Luo, Jiaxin Yang, and Siyi Jiang</i>	
An Assessment Framework for Online Active Learning Performance. . . . .	338
<i>Caixia Liu, Di Zou, Wai Hong Chan, Haoran Xie, and Fu Lee Wang</i>	
Relationships Among Online Teaching Design, Experience, and Perception of College Teachers During the Pandemic . . . . .	351
<i>Shiqian Gu, Xiaotong Yang, and Wei Li</i>	
Implementation of an Online International Exchange Project for an Official University Lecture. . . . .	367
<i>Shinichi Sato and Makoto Kageto</i>	
<b>Author Index . . . . .</b>	<b>379</b>