HEAd '21
7th International Conference on Higher Education Advances

June 22-23, 2021
Valencia, Spain
Preface

Josep Domenech¹, Paloma Merello², Elena de la Poza¹
¹Universitat Politècnica de València, Spain, ²Universitat de València, Spain.

Abstract
The series of HEAd conferences have become a leading forum for researchers and practitioners to exchange ideas, experiences and research results relating to the preparation of students and the organization of higher educational systems. The seventh edition (HEAd’21) was celebrated during 22 and 23 June 2021. It was organized from Valencia, Spain; although held virtually because of the traveling restrictions after the COVID-19 outbreak. This preface gives an overview of the aims, objectives and scope of HEAd’21, as well as the main contents of the scientific program and the process followed to select them.

Keywords: Higher education; innovative materials; educational technology; evaluation and assessment; globalization in education.
1. Preface to HEAd’21

This volume contains the selected papers of the Seventh International Conference on Higher Education Advances (HEAd’21), which was virtually organized from Valencia, Spain on 22 and 23 June 2021. Despite the traveling restrictions due to the COVID-19 outbreak, this seventh edition was a great success of participation and consolidates the series of HEAd conferences as a leading forum for researchers and practitioners to exchange ideas, experiences and research results relating to the preparation of students and the organization of higher educational systems.

The selection of the scientific program was directed by Paloma Merello, who led a team of 217 program committee members representing 53 countries in all five continents. Following the call for papers, the conference received 351 full paper submissions with authors from 63 different countries. All the submitted papers were reviewed by at least two program committee members under a double blind review process. Finally, 78 papers were accepted as full papers for oral presentation during regular sessions. This represents an overall full paper acceptance rate of 22.2%, the most selective acceptance rate across all the editions. This selection ensures a high-quality program which is greatly valued by the research communities. Additionally, 83 submissions were accepted for short paper presentations, all of them receiving high review scores and published by UPV Press in this volume. The program committee chair congratulates all the authors for having their papers accepted in the proceedings of such a competitive conference.

HEAd’21 also featured two keynote speakers that overviewed important and actual topics: Harry Lappalainen (Turku University of Applied Sciences, Finland) talked about competition without losers, and how to implement this idea in a higher education context. The second keynote speech was delivered by Dr. Ana Zorio-Grima (Universitat de València, Spain) and dealt with the trends, challenges and opportunities of teaching innovation.

The main conference was followed by the third edition of the Symposium on Pedagogy for Higher Education Large Classes (PHELC). This virtual meeting, led by Ann Marie Farrell and Anna Logan, was a great platform for sharing practice, experience and expertise in large classes context.

Although virtually held, the conference was supported and hosted by the Faculty of Business Administration and Management of the Universitat Politècnica de València, which has been recently ranked as the best technical university in Spain by the Academic Ranking of World Universities (ARWU) 2020.

The organizing committee would like to thank all of those who made this year’s HEAd a great success. Specifically, thanks are indebted to the invited speakers, authors, program committee members, reviewers, session chairs, presenters, sponsors, supporters and all the
attendees. Our final words of gratitude must go to the Faculty of Business Administration and Management of the Universitat Politècnica de València for supporting, once again, the HEAd conference, making it possible to become a great event.

2. Organizing Committee

General chair
Josep Domènech, Universitat Politècnica de València

Vice-chair
Elena de la Poza, Universitat Politècnica de València

Program committee chair
Paloma Merello, Universitat de València

Publicity chairs
Gareth Bramley, University of Sheffield
Daniela Zehetmeier, Munich University of Applied Sciences

PHELC Workshop chairs
Anna Logan, Dublin City University
Ann Marie Farrell, Dublin City University

Local organization
Eduardo Cebrián
Mónica Costa Alcaina
Guillem Dasí
Pablo Genovés
Daniele Tavella
Eduardo Torán
José María Tuesta

3. Sponsors and Supporters

Universitat Politècnica de València
European Social Fund
Facultad de Administración y Dirección de Empresas
Departamento de Economía y Ciencias Sociales
Preface

Instituto de Ciencias de la Educación
Centro de Ingeniería Económica

4. Program committee

Shirley Agostinho, University of Wollongong, Australia
Mifrah Ahmad, Deakin University, Australia
Norasmuatul Akma Ahmad, University of Malaysia, Malaysia
Salim Ahmed, Memorial University of Newfoundland, Canada
Gokce Akcayir, University of Alberta, Canada
Mª Ángeles Alcaide, Universitat Politècnica de València, Spain
Gabriella Aleandri, Roma Tre University, Italy
Filomena Almeida, Instituto Universitario de Lisboa, Portugal
Daniel Alonso-Martínez, Universidad de León, Spain
Francisco Álvarez, Universidad Autónoma de Aguascalientes, Mexico
Asier Aranzabal Maiztegi, Universidad del País Vasco, Spain
Azucena Arias Correa, Universidade de Vigo, Spain
Victoria Arija, Rovira i Virgili University, Spain
Jose Luis Arquero, Universidad de Sevilla, Spain
Linda Austin, RMIT University, Vietnam/Australia
Raquel Ayala Carabalo, Escuela Superior Politécnica del Litoral, Ecuador
Marina Milić Babić, University of Zagreb, Croatia
J.P. Bakken, Bradley University, USA
Alice Barana, University of Turin, Italy
Virginia Barba-Sanchez, University of Castilla-La Mancha, Spain
Elena Bárcena, Universidad Nacional Educación a Distancia, Spain
Elvira Barrios Espinosa, University of Málaga, Spain
Mario Barro, Universidad Complutense Madrid, Spain
Paula Bartel, Kempten University, Germany
Inmaculada Bel Oms, Universitat de València, Spain
José V. Benlloch-Dualde, Universitat Politècnica de València, Spain
Naiara Berasategui Sacho, Universidad del País Vasco, Spain
Marnie Binder, California State University, USA
Jhon Urasti Blesia, Universitas Cenderawasih, Indonesia
Luciane Bonaldo, University Anhembi Morumbi, Brasil
Ignacio Bosch Roig, Universitat Politècnica de València, Spain
Domenico Brunetto, Politecnico di Milano, Italy
Sandra Bucarey, Universidad Austral de Chile, Chile
Eliseo Bustamante García, Universitat Politècnica de València, Spain
Laura Cabeza-García, University of León, Spain
Marisol Calabor, Universitat de València, Spain
Sabrina B. Caldwell, The Australian National University, Australia
Javier Calvo Saiz, Universitat de València, Spain
Lourdes Canós-Darós, Universitat Politècnica de València, Spain
Noelia Carmona Vicente, Universitat de València, Spain
Adolfo Carrillo Cabello, University of Minnesota, USA
Javier Casanoves-Boix, Valencian International University, Spain
Roberto Cervelló-Royo, Universitat Politècnica de València, Spain
Dimitris Chassapis, National & Kapodistrian University of Athens, Greece
George Chen, University of New England, Australia
Hui-Chun Chu, Soochow University, China
Alberto Ciolfi, Italian National Agency for the evaluation of Universities, Italy
Roberto Cippitani, Università degli Studi di Perugia, Italy
Elena Comino, Politecnico Torino, Italy
Erika Corradini, University of Southampton, UK
Tània Costa, Universitat Autònoma de Barcelona, Spain
Jami Cotler, Siena College, USA
John Cowan, Edinburgh Napier University, UK
Daniela-Maria Cretu, Lucian Blaga University of Sibiu, Romania
Diego Víctor de Mingo-López, Universitat Jaume I, Spain
Wietse de Vries, Benemérita Universidad Autónoma de Puebla, Mexico
Sofia B. Dias, Faculdade de Motricidade Humana, Portugal
Marilyn Dono-Koulouris, St. John’s University, USA
Pablo Durán Santomil, Universidad de Santiago de Compostela, Spain
Steve Eager, University of the West of Scotland, UK
Ehsan Ekradi, Allameh Tabataba’i University, Iran
Tiberio Feliz Murias, Universidad Nacional Educación a Distancia, Spain
Carolina Fernández-Saliner de Miguel, Universidad Complutense de Madrid, Spain
Joaquim Filipe Ferraz Esteves Araujo, University Of Minho, Portugal
Sandro Nuno Ferreira Serpa, University of the Azores, Portugal
Margarida Figueiredo, University of Évora, Portugal
Sylwia Izabela Filipczuk-Rosińska, Military University of Aviation, Poland
Björn Fisseler, FernUniversität in Hagen, Germany
Nuno Flores, University of Porto, Portugal
Francesco Floris, Università degli Studi di Torino, Italy
Thomas Fuhrmann, OTH Regensburg, Germany
Olga Fullana Samper, Universitat de València, Spain
Josep Gallifa, Ramon Llull University, Spain
Preface

Consuelo Garcia Tamarit, Universidad Internacional de la Rioja, Spain
Suzanne Gatt, University of Malta, Malta
Daniela Gil-Salom, Universitat Politècnica de València, Spain
Belén Gill de Albornoz Noguer, Universitat Jaume I, Spain
Beth L Goldstein, University of Kentucky, USA
Nuria González-Álvarez, Universidad de León, Spain
Mª de Fátima Goulão, Universidade Aberta, Portugal
Samuel Greiff, University of Luxembourg, Luxembourg
Işıl Güney, Hacettepe University, Turkey
Hamin Hamin, Australian National Institute of Management and Commerce, Australia
Vesife Hatisaru, University of tasmania, Australia
Maruša Hauptman Komotar, Alma Mater Europaea – Inst. Studiorum Humanitatis, Slovenia
Katrin Herget, University of Aveiro, Portugal
Garron Hillaire, Massachusetts Institut of Technology, USA
Hugo Horta, The University of Hong Kong, Hong Kong
Sarka Hubackova, University of Hradec Kralove, Czech Republic
Beatriz Jiménez-Parra, Universidad de León, Spain
Srečko Joksimović, University of South Australia, Australia
Jisun Jung, The University of Hong Kong, Hong Kong
Kavi Kumar Khedo, Mauritius, Mauritius
Shakeel Ahmed Khoja, Institute of Business Administration, Karachi, Pakistan
Blanka Klimova, University of Hradec Králové, Czech Republic
Sofya Kopelyan, University of Twente, The Netherlands
Aleksandra Kulpa-Puczyńska, Cardinal Stefan Wyszyński University in Warsaw, Poland
Rangith Baby Kuriakose, Central University of Technology, South Africa
Marc Laperrouza, Escuela Politécnica Federal de Lausana, Switzerland
Idoia Larretxi, University of the Basque Country, Spain
André Leblanc, Dalarna University, Serbia
Clotilde Lechuga, Malaga University, Spain
Ho Keat Leng, Nanyang Technological University, Singapore
Carlos Lerma, Universitat Politècnica de València, Spain
Li Li, University of Exeter, United Kingdom
Guan-Yu Lin, National Changhua University of Education, Taiwan
Rosa Llácer Iglesias, Universitat Politècnica de València, Spain
Elisabet Llauradó, Universitat Rovira i Virgili, Spain
Carmen Llorente Cejudo, Universidad de Sevilla, Spain
Guadalupe López-Íñiguez, Sibelius Academy, University of the Arts Helsinki, Finland
Matthias Ludwig, Goethe-University, Germany
Niu Lung-Guang, Fo-Guang university, Taiwan
Nicolaas Luwes, Central University of Technology, South Africa
Elsa María Macías López, University of Las Palmas de Gran Canaria, Spain
Jill R.D. MacKay, University of Edinburgh, Scotland
Sathiamoorthy Manoharan, University of Auckland, New Zealand
Marina Marchisio, University of Turin, Italy
Célio Gonçalo Marques, Polytechnic Institute of Tomar, Portugal
Mónica Martínez, Universitat Politécnica de València, Spain
Mohammad I. Merhi, Indiana University South Bend, USA
Bärbel Mertsching, University Paderborn, Germany
Orazio Miglino, University of Naples “Federico II”, Italy
María del Mar Miralles Quirós, University of Extremadura, Spain
Ulisses Miranda Azeiteiro, Universidade de Aveiro, Portugal
Sulfeeza Mohd Drus, The Energy University, Malaysia
Matthew Montebello, University of Malta, Malta
Darlinda Moreira, Universidade Aberta, Portugal
Michelle Morgan, United Kingdom
Estefanía Mourelle, Universidade da Coruña, Spain
Ricky Ngandu, Walter Sisulu University, South Africa
Raquel Niclòs Corts, University of Valencia, Spain
Rosella Nicolini, Universitat Autònoma de Barcelona, Spain
Michael Niemetz, OTH Regensburg, Germany
Darren Nixon, University Leeds, UK
Luis Nobre Pereira, University of Algarve, Portugal
Omid Noroozi, Wageningen University and Research, The Netherlands
Maria Isabel Núñez-Peña, University of Barcelona, Spain
Abeer Ali Okaz, Pharos University in Alexandria, Egypt
Cesar Ortega-Sanchez, Curtin University, Australia
Kateryna Osadcha, Bogdan Khmelnitsky Melitopol State Pedagogical University, Ukraine
Viacheslav Osadchyi, Bogdan Khmelnitsky Melitopol State Pedagogical University, Ukraine
Miriam Ossevoort, University of Groningen, The Netherlands
Mustafa Ozmusul, Harran University, Turkey
Orgul Ozturk, University of South Carolina, USA
Cristina Pardo-Ballester, Iowa State University, USA
Cristina Pardo-García, Universitat de València, Spain
Elena Paunova-Hubenova, Bulgarian Academy of Science, Bulgaria
Dieter Pawelczak, UniBw Munich, Germany
Luís Pedro, University of Aveiro, Portugal
Vincenza Pellegrino, University of Parma, Italy
Víctor Hugo Perera, University of Seville, Spain
Preface

Uxio Pérez-Rodríguez, Universidade de Vigo, Spain
Anja Pfennig, HTW Berlin, Germany
Jennifer Phillips, University of Manchester, UK
Pablo Pinazo-Dallenberg, Universidad Internacional de Valencia, Spain
Antonella Poce, Università di Modena e Reggio Emilia, Italy
Soner Polat, Kocaeli University, Turkey
Yurgos Politis, Technological University Dublin, Ireland
Jenny Pomino, Carl Duisberg Center Cologne, Germany
Luis Porcuna, Universitat Politècnica de València, Spain
Ruben Porcuna, Universitat de València, Spain
Dimitri Prandner, Johannes Kepler University, Austria
Natalija Prokofjeva, Riga Technical University, Latvia
Sergio Rabellino, University of Torino, Italy
Martin Ramirez-Urquidy, Universidad Autónoma de Baja California, Mexico
Timothy Read, Universidad Nacional a Distancia, Spain
José Rafael Rojano-Cáceres, Universidad Veracruzana, Mexico
Carlos Romá-Mateo, University of Valencia, Spain
Peter Ruijten-Dodoiu, Eindhoven University of Technology, The Netherlands
Mercedes Ruiz Lozano, Universidad Loyola Andauca, Spain
Charly Ryan, formerly university of winchester, UK
Martin Salzmann-Erikson, University of Gävle, Sweden
Demetrios G. Sampson, University of Piraeus, Greece
Prathyusha Sanagavarapu, Western Sydney University, Australia
Susanna Sancassani, Politecnico di Milano, Italy
João M. Santos, Instituto Universitário de Lisboa, Portugal
Brenda Saris, WelTec and Whitireia, New Zealand
Hans Schuessler, Texas A&M University, USA
Yvonne Sedelmaier, Coburg University of Applied Sciences, Germany
Elies Seguí-Mas, Universitat Politècnica de València, Spain
Anna M. Señe-Mir, Universitat de Vic – Universitat Central de Catalunya, Spain
Henrik Køhler Simonsen, Copenhagen Business School, Denmark
Álvaro Suárez Sarmiento, Universidad de Las Palmas de Gran Canaria, Spain
Fátima Suleman, Iscte – Instituto Universitário de Lisboa, Portugal
Odette Swart, Unisa, South Africa
Ying Tang, Indiana University, USA
Jesús Tejada, Universidad de Valencia, Spain
Andreia Teles Vieira, NOVA University Lisbon, Portugal
Dirk Tempelaar, Maastricht University, The Netherlands
Sabu M. Thampi, Indian Institute of Information Tech. and Management – Kerala, India
Iman Tohidian, Allameh Tabataba’i University, Iran
Łukasz Tomczyk, Pedagogical University of Cracow, Poland
Guillermina Torno-Carbó, Universidad Politècnica de València, Spain
José Torrecilla, Complutense University of Madrid, Spain
Frederik Truyen, KU Leuven, Belgium
Itziar Txurruka, University of the Basque Country, Spain
Jani Ursin, University of Jyväskylä, Finland
Enric Valor, Universitat de València, Spain
Mercedes Varela-Losada, University of Vigo, Spain
Marta Varo-Martínez, University of Cordoba, Spain
Rosa M. Vasconcelos, Minho University, Portugal
Jesus Vazquez Abad, Université de Montréal, Canada
Ilaria Venturini, Sapienza Università di Roma, Italy
Henrique Vicente, University of Évora, Portugal
Cristina Vilaplana Prieto, University of Murcia, Spain
María Cinta Vincent Vela, Universitat Politècnica de València, Spain
Maarit Virolainen, University of Jyväskylä, Finnish Inst. for Educational Research, Finland
Karen L. Webber, University of Georgia, USA
Martin Wolf, University of Applied Sciences Aachen, Germany
Jiun-Yu Wu, National Yang Ming Chiao Tung University, Taiwan
Ibrahim Yildirim, Gaziantep University, Turkey
Jorge Agustín Zapatero Ayuso, Universidad Complutense de Madrid, Spain
Katerina Zdravkova, University Ss. Cyril and Methodius University, N. Macedonia
Gaoxia Zhu, Cornell University, USA
Roza Zhussupova, L.N.Gumilyov Eurasian National University, Russia
Ivan Zilic, The Institute of Economics, Croatia
Ana Zorio-Grima, Universitat de València, Spain

**External reviewers**

David Comiskey
Ayanda Pamella Deliwe
Guillem Escorihuela
Ana Estima
Abderrahman Hassi
Ameeta Jaiswal-Dale

Clare Lloyd
Gareth Morris
Alba Lucy Ortega
Alina Romanovska
Annmarie Ryan
Clara Bento Vaz
Index

Effectiveness of Automatic Formative Assessment for learning Mathematics in Higher Education ................................................................. 1
Engaging Physics Tutoring: A didactical toolbox for teaching assistants (TAs) .......... 9
Verification of the measuring properties and content validity of a computer based MST test for the estimation of mathematics skills in Grade 10 ........................................... 17
A virtual co-creation collaboration between a university physics research group and school students ..................................................................................................................... 27
Exploring Formative Assessment Possibilities: Building a 'Teamwork Discourse' with First-Year Engineering Students Online ................................................................. 37
Students’ Behaviours in using Learning Resources in Higher Education: How do behaviours reflect success in Programming Education? ...................................................... 47
Exposing undergraduate students to research: A Condensed Matter Physics case study ................................................................................................................................. 57
The relationship between self-efficacy and accounting students' academic performance at a South African university ................................................................. 67
Reverse Metadesign: Pedagogy And Learning Tools For Teaching The Fashion Collection Design Process Online ................................................................. 75
The HTR Model for Well-Being in Educating Community ........................................ 85
Analyzing the use of linking words in concept maps designed for pathophysiology learning in medicine ........................................................................................................ 95
From Business Agile to Agile Education: A Response to Change in Times of Pandemic

Autonomy in language learning: a case study with Italian as a second language

Curriculum transformation to address the Sustainable Development Goals: A holistic approach for embedding gender in higher education

The tools related to mathematics teachers’ pedagogical reasoning: critical review

Evaluation Systems in Online Environments

Using Online Forums to Promote Collaborative Learning in Introductory Programming Courses

Development and Evaluation of Online Approaches for Improved Kinaesthetic Learning in Science

New tools for online teaching and their impact on student learning

Suddenly moving large classes online: Illuminating the experience of the teaching staff in one university

Emotional training of online journalists via multimedia communicative projects linked to sustainable development

Teaching in higher education during COVID-19 pandemic: Empirical findings and assumptions based on results of an online-survey in a European context

HR scenario game: Learning human resource management in a virtual environment

The Virtual Shoe Salon: A creative and active approach for teaching research and data analysis to fashion students

Light Bulb Moments in the Classroom: Probing Design Opportunities for Ambient LA Displays in Higher Education

Arts-therapy as innovative educational strategy for embodied narrative, lifelong learning and inclusion

Wikipedia at the University: engaging students and teachers in open knowledge and collaborative work

Teaching Communication with Disabled Patients Using Case-Based Learning Experience from practice

Training in higher education in the Covid-19 context: A case study of operation management training in a Business Innovation and Project Management Master
Teaching Design Thinking in times of COVID-19: an online learning experience ..........263
Forced distance learning in Covid-19: peculiarities of the position of lecturers, students of IT and humanitarian specialties .................................................................271
Adapting your teaching during the pandemic? How social science research education adapted to the COVID-19 pandemic..........................................................281
Online teaching in COVID-19 times. Student satisfaction and analysis of their academic performance........................................................................................................289
Experiences from Transforming a Lecture “Communication Systems” from Presence to Virtual Format during the COVID-19 Pandemic ..............................................297
Feeling in Covid time..................................................................................................307
¿Y si usamos los dos? Attitudes towards Translanguaging in an L2 Spanish Writing Course ............................................................................................................................325
Socioeconomic status and university students’ perceptions of English as a professional language...........................................................................................................335
When learning Italian as a Second Language, tourism and technology go hand in hand.........................................................................................................................341
Teaching English Pronunciation Online during the COVID-19 Crisis Outbreak ..............351
From saying it right to doing it right: a model of pragmatic competence development......359
Social Systems in Higher Education: Collectivities and Technology ..............................367
Analogy-based Instruction for Effective Teaching of Abstract Concepts in Computer Science .......................................................................................................................377
Promoting Intergenerational Engagement Within the College Classroom: Faculty Training Needs ...........................................................................................................387
Stakeholders in curriculum development case of Supply Chain and Logistics programme ..................................................................................................................397
A learner-centered approach to design a Computational Finance module in higher education.................................................................................................................405
Embracing the digitalization of research education? How social science research education was influenced by the COVID-19 pandemic .................................................413
Use of Movies in an accounting class as a teaching technique to promote learning about financial reporting and ethical issues.................................................................421
Online teaching and learning: a year later what has changed?........................................429
Assessing Database Development Skills using an On-line MCQ: Reflections on Test Design and Academic Integrity.................................................................439
Active learning in digital communications with low-cost software defined radio ..........447
Transition to virtual education at University of San Carlos of Guatemala 2020...........457
Reducing the Individual, Institutional and Societal Harms from Student Drug Use........465
Cross-border Previous Learning Recognition: Enhancing Lifelong Learning and Social Inclusion ........................................................................................................473
Developing a shared syllabus template as a living document of inclusive practices in a teaching and learning community.................................................................481
Students from Portuguese Speaking African Countries in Portuguese Higher Education ..................................................................................................................491
DIADEMMA: A tool to promote peer-mentoring in Colombian higher education .........499
Short Videos to Communicate Effectively to Engineering Students..............................509
Insights into academic feasibility at the KIT: a mixed-methods exploration of the department of mechanical engineering ...............................................................519
Making the Abstract Straightforward: A Pilot of Immersive VR in an Allied Health Program of Study ........................................................................................................527
Students' self-perceptions of mindfulness after learning mindfulness techniques in a professional skills course .................................................................................535
Group Formation-Finding-Your-Matching-Card in a Collaborative Learning Classroom .................................................................................................................545
Linking teachers’ facial microexpressions with student-based evaluation of teaching effectiveness: A pilot study using FaceReader™ .............................................555
graphed: A Web-Based Concept Mapping Application for Instruction and Research ......563
Developing a technology enabled workflow to aid space layout communication for students with Autism Spectrum Disorder - A project case study ..........................571
Technology as gamification means in mathematics learning ...........................................581
Considerations when using an Automatic Grading System within Computer Science Modules

Causal Attribution Habits and Cultural Orientation as Contributing Factors to Students’ Self-Efficacy: A Comparison Between Female Students in the United States and Saudi Arabia

Recent Advances in Academic Performance Analysis

Evaluating Learning for the Multiple Constituencies of Higher Education: A Call for Action, A Call for Research

Style features in the programming process which can help indicate plagiarism

Expectations and outcomes: How technologies drive virtual teaching

Sustainability and Communication in Higher Education

Learning sustainability by making games. The experience of a challenge as a novel approach for Education for Sustainable Development

Teaching sustainability: How to visualize and change CO2 emissions and corresponding habits?

A self-evaluation tool of sustainability concepts in higher education institutions courses

Fashion Design for Sustainability. A transformative challenge across the European fashion education system

Implementation of the BIM Methodology in the Architecture Degree: Experience of the Architecture School of San Sebastian

The impact of the Covid-19 disruption on distance learning higher education students and activities

Exploring an Unfamiliar Space Reflections on the Socio-Psychological Aspects of Synchronous Online Teaching

Students’ learning can be enhanced via Centres of Teaching and Learning in Higher Education: A quick view all over the world

Comparing Pre- and Intra-Covid-19 students’ perception of the digitalization of higher education institutions

Do proctored online University exams in Covid-19 era affect final grades respect face-to-face exams?
Meeting diversity during the covid-19 pandemic in a fully online learning environment ................................................................. 735
Advancing higher-education practice by analyzing and training students' vocal charisma: Evidence from a Danish field study ........................................ 743
Promoting Inclusive Practice: Video CVs as a Teaching & Learning Tool in the Language Classroom ........................................... 753
Assuring the Quality of the Course Learning Outcomes Assessment Process .................................................. 763
Towards a transdisciplinary approach in the training of teachers: Creating procedures in learning and teaching in higher education .......................... 773
Building an interactive platform for practical design projects between students and industries .............................................................. 783
Born or made - Can interdisciplinary and intersectoral doctorate education create institutional entrepreneurs? A systematic review ...................................... 791
Assessment of Environmental Literacy .................................................................................... 799
Impact of Text Discussions on the Professional Identity of Higher Education Students .............................................................. 809
An Example of Innovative University Teaching and Learning: the Fashion-Tech Model of Integration ......................................................... 817
A case study on student perception of online lecturing ........................................................................ 827
Digitising a Learning Activity: Challenges and Opportunities ........................................................................ 837
Design principles for interdisciplinary collaborative learning through social, digital innovation ........................................................................ 847
Zoom data analysis in an introductory course in mechanical engineering ..................................................... 855
Impacts of the socio-political instability in Hong Kong on university students’ learning experience .......................................................................................... 863
Demola Co-creation Approach: The Students’ Perspective ........................................................................ 873
Educational quality and dropout risk: a causal analysis of the university dropout phenomenon .............................................................. 881
Fostering the resilience of graduate students ........................................................................ 889
Tell me what you study and where you live! Exploring the role that these aspects play when choosing a university .................................................................................. 899
Index

The effect of an online active learning-based course on approaches to teaching .......... 907
Fostering Research and e-Learning-Communities’ Integration: a MOOC on the project DETECt ................................................................. 917
Partnerships and Pedagogy: Transforming the BA Online ........................................ 925
Designing Interactive Narratives for the Fashion System. MOOC and blended learning in a transdisciplinary design module ................................................ 933
Factors essential for successful and sustainable e-learning ...................................... 941
On an Architectural Concept for Didactics in the Context of Constructive Alignment .... 949
Architecture and digital drawing tablets, bringing back human control over HAL .......... 957
The effects of collaboration scripts on the number and quality of student interactions in a social annotation tool ............................................................... 967
Model for Profiler Agent during unexpected educational circumstances .................. 975
Suitability of Blackboard as Learning Management System to assess oral competence: Students’ perceptions and results ................................................. 983
An Overview of a Blockchain Application in Education Using Hyperledger Project ....... 993
Post-editing Machine Translation in MateCat: a classroom experiment ..................... 1003
Emerging technologies for learning in occupational safety and health: the experience of the videogame “Becoming safe” ......................................................... 1011
Male infertility diagnostic laboratories during COVID-19 pandemic: development of a novel teaching/learning strategy ....................................................... 1019
Therapeutic communication skills in palliative care nursing education: an exploratory study using a role-playing tool ....................................................... 1027
Novel implementation of experiential learning in health and wellbeing in a university setting ............................................................................................. 1035
‘Face-to Face vs. Flipped’: A Comparative Study on Academic Outcomes and Learning Preferences in First Year Allied Health Students Undertaking Anatomy and Physiology ............................................................ 1043
Clinical Simulation in pediatrics and neonatology using EDISON: an educational innovation project ................................................................. 1053
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it more than employability? Revisiting employers’ perception of graduates’ attributes</td>
<td>1063</td>
</tr>
<tr>
<td>The practicality of curricula towards improved employability</td>
<td>1071</td>
</tr>
<tr>
<td>Support from Teaching Staff and Self-efficacy as Determinants of Students’ Perceived Employability: a Longitudinal study</td>
<td>1079</td>
</tr>
<tr>
<td>Human capital depreciation and job tasks</td>
<td>1087</td>
</tr>
<tr>
<td>A Qualitative Study of the Inclusion of Social Enterprise in the Entrepreneurial Education Curriculum</td>
<td>1097</td>
</tr>
<tr>
<td>Required skills for employability in Portugal from graduates and students of the Polytechnic Institute of Bragança (IPB)</td>
<td>1105</td>
</tr>
<tr>
<td>Pandemic Pedagogy: Assessing the Online Implementation of a Decolonial Curriculum</td>
<td>1113</td>
</tr>
<tr>
<td>Organizing Events as a Tool to Develop Marketing Skills the atUALiza.te Event Case Study</td>
<td>1121</td>
</tr>
<tr>
<td>PhD courses and the intersectoral experience: a comprehensive survey</td>
<td>1131</td>
</tr>
<tr>
<td>Service-learning - Diagnostic technologies presented by Ph.D. students to help socially neglected people during the SARS-CoV-2 pandemic</td>
<td>1141</td>
</tr>
<tr>
<td>Board game for the engineering students to promote interest in city infrastructure courses</td>
<td>1149</td>
</tr>
<tr>
<td>The impact of study abroad experiences on international students’ employability: a preliminary study on Chinese engineering students in US</td>
<td>1157</td>
</tr>
<tr>
<td>Research development in doctoral education: role of languages and cultures</td>
<td>1167</td>
</tr>
<tr>
<td>Designing active Maths for undergraduate STEAM students</td>
<td>1177</td>
</tr>
<tr>
<td>Monsters, fear and fun. Bringing creative methodologies into the higher education classroom to study children and childhood</td>
<td>1187</td>
</tr>
<tr>
<td>A Problem-Based Learning Implementation to a Psychology Course in Higher Education</td>
<td>1195</td>
</tr>
<tr>
<td>Evaluation and improvements regarding the implementation of Project-Based Learning within the Innovative Development program</td>
<td>1203</td>
</tr>
<tr>
<td>How flipped classroom teaching methods in first year studying succeed</td>
<td>1211</td>
</tr>
</tbody>
</table>
Index

Teaching experience: Inequalities in prices of drugs to fight against COVID-19 ............ 1219
Teach Multivariable Functions Through Applications and GeoGebra............................. 1229
A Proposed Framework for the Growth of Online Learning Communities ..................... 1239
Exploring The Influence of COVID-19 on Initial Teacher Education in Malta: Student Participation in Higher Education................................................................. 1249
How it started/ how it’s going’: Aligning Teacher Educators’ designs, approaches and identities in our new online reality ................................................................. 1259
Getting to know you: Student-faculty interaction and student engagement in online courses .................................................................................................................. 1267
Hiding in Plain Sight: Literacy Development Possibilities in Initial Teacher Education ................................................................................................................. 1277
Contributions of the SocialNEET project to the development of skills for active life .... 1285
First-year university students entrepreneurial competence: Exploring the relationship between grit, creative self-efficacy and entrepreneurial self-efficacy ......................... 1295
Personal Employability and employment outcomes in a university sample: a study before and after COVID-19 .................................................................................. 1303
Entrepreneurship, Higher Education and R+D in Mexico ............................................. 1313
Creating a Virtual Leader Development Course Using the Design Thinking Process for Innovation ........................................................................................................... 1323
Collaborative mentoring to prepare doctoral students for college teaching ................. 1333
Case Study in Project Management: A Vehicle for Business Curriculum Integration..... 1341
Global Competency Through Collaborative Online International Learning (COIL) ...... 1351
Measuring the Internet Skills of Gen Z Students in Higher Education: Validation of the Internet Skills Scale in University Settings ......................................................... 1359
Applying Physical Education Methods to Skills Teaching of Law Students ............... 1369
Professional development of in-training museum educators: an experience of curriculum improvement in time of a pandemic .............................................................. 1377
Combining experimentation and reflection techniques in behavioral competency development programs: A learning approach based on journaling and peer coaching .... 1385
My course is a series, and what is yours? ..................................................................... 1393
Proposal for an intelligent digital teacher’s textbook solution adapted to the Bachelor-Master-Doctorate system ................................................................. 1401
Charting the competency-based eportfolio implementation journey ...................... 1409
Development of a learning pilot for the remote teaching of Smart Maintenance using open source tools ................................................................. 1419

Daria Casciani, Chiara Colombi, Federica Vacca
Design Department, Politecnico di Milano, Italy.

Abstract
The present article discusses the experience of redesigning the pedagogy and learning tools of a pillar course at the School of Design of Politecnico di Milano, the Metadesign studio course. Metadesign is a design methodology that leads to the concept definition of a new product or service through a research process that synthesizes design goals, technological and productive constraints, market context, and consumption trends for a consumers’ group of reference. It represents a unique methodological approach characterizing a design education as it provides a consolidated research practice able to support the design process. The course structure foresees the reconstruction in phases and the development of all the contextual elements—product, space, service, communication artifact, etc.—that come into relation with the to-be-designed object and influence its characteristics. This process enables creating the "abacus" of components to use in a design activity. Considering the ever-increasing need to reshape the whole education system because of the paradigmatic change pushed by digital transformation and the urgency for on-distance courses posed by the COVID-19 emergency, the article presents a renewed "reversed" course structure. It highlights strengths and opportunities for further improvements representing a solid base for innovating a fashion design education.

Keywords: Metadesign; fashion design; learning-by-doing; reflection-in-action; deductive reflection; virtual learning environments.
1. Introduction to Metadesign for Fashion: Pedagogical Principles and Approaches

Metadesign (Van Onck, 1964) is a methodological approach that aims to provide students with preliminary design skills to lead the concept definition of a new product or service considering a system of socio-cultural, production and market opportunities, and constraints. This methodology represents the core of design education at Politecnico di Milano. In the 2nd year of all the bachelor's degree programs at the Design School of Politecnico di Milano, a design studio focuses on it.

The Metadesign studio encompasses the entire design process, from research methods and tools for understanding the product system to the interpretative reading of the design context, up to the envision of a use scenario. Specifically, in the Fashion Design Program, Metadesign Studio aims to trace the entire design process that leads to the conceptualization of an apparel collection, covering the different phases, from research and analysis to concept generation, design, and presentation, towards methods and tools representative of the discipline.

The faculty team composition is interdisciplinary in terms of competencies, roles, and responsibilities. It includes both scholars, experts in managing the Metadesign process applied to the fashion design domain, and professionals skilled in all the phases concerning the development of an apparel collection, from research to design and production. This interdisciplinary composition guarantees the integration of an Academy-Industry perspective (Colombi & Vacca, 2016) by offering students, grouped in working teams, the opportunity to develop their own design skills through the experimentation of a real case study (Bertola et al., 2017).

The studio-based didactic experience is structured in two subsequent levels. The first one has a theoretical-analytical focus, and it is organized in theoretical lectures, instrumental lectures, and seminars with guest speakers. It mainly involves a creative and critical thinking approach (Crane, 1983; Anderson, 1990), encouraging learners to develop systemic and logical reasoning, frame market context, examine technological and productive constraints, and understand consumption trends linked to the very fashion product. The second one presents a conceptual focus on a reflection-in-action approach (Stewart & Colombi, 2015) characterized by two crucial pedagogical methods.

On the one hand, the learning-by-doing approach, where students' participation in practical activities, complemented by a critical and strategic thinking method, is preferred (Shön, 1983). On the other hand, the participatory learning approach, where learners are encouraged to actively participate within the working team and in constant dialogue and reflection with faculty, favoring a learning process based on sharing knowledge in the process and practice (Orr & Shreve, 2017). This second level provides for a team assignment throughout the semester. The assignment is divided into intermediate working phases and is partially
developed by students during the working hours in class and partially during at-home working hours. Therefore, the objective of this approach is to constantly monitor and train the different teams in the simulation of the professional activity of an actual design department.

2. Reverse Metadesign: Redesigning the Fashion Design Process

Until the 2019-2020 academic year, the Metadesign studio was almost entirely held in person. The in-person format included instrumental lectures taught by the faculty and seminars with guest experts in the field to offer detailed and timely contents for specific phases of the team assignment.

In line with the ever-increasing need to reshape the whole fashion education system through the paradigms of digital transformation and, more in general, to innovate the design education acquiring new pedagogical tools, already for the 2018-2019 academic year, the theoretical lectures related to the Metadesign theory were transferred into an ad-hoc designed Massive Online Open Course (MOOC), entitled “Introducing Metadesign.” The MOOC provides fundamental definitions and references for the topic. It presents all the design phases/processes and activities, teaching students to shift from a basic problem solving to a problem setting and problem finding attitude to structure the pre-project research.

The proposed blended methodology introduced innovative teaching and learning approaches that were expanded on the following course components. According to a reflection-in-action path (Stewart & Colombi, 2015), a consistent number of hours of the in-person format were allocated to in-class activities to favor learners' understanding towards a participative approach and inductive exploration. In-class activities were meant to support teams in the concept development of a Spring-Summer womenswear collection for a Ready-to-Wear brand selected and assigned to each team by the faculty. For this purpose, the six months long assignment was divided into three different phases (Bertola et al., 2017).

The first one, Scenario Design, was grounded in between observation and reflection on the actual context. It dealt with a preliminary analysis of the assigned brand's values and stylistic identity to abstract in-depth iconographic research into three different perceptual scenarios (moodboards)—which define colors, shades, touches, and atmospheres—, and outlining the ideal consumer and her lifestyle.

The second one, Product and Concept Design, concerned the synthesis of the brand's distinctive stylistic into new and original design solutions thanks to the definition of the main features of the collection, such as cuts, constructions, volumes, lengths, fittings, details, etc.

In this phase, key-outfits designs, fabric customizations, graphic motifs development, embellishments experimentations were the core activities of the Metadesign studio required.
and developed by students. The third and last phase, Merchandise Planning, covered the process of systematization, reflection, and abstraction on the outcomes of the previous steps, activating the second loop of a deeper understanding of the experienced process.

This phase materialized the ideal structure of a collection organized into three main occasions of use (work, leisure, special occasion) to complete an ideal wardrobe. The merchandising plan was then achieved, starting from developing key ideas and key items representing the three scenarios/lines defined in the first two phases. Students designed alternative or complementary typologies of items, complemented by color-fabric options, to offer a balanced mix of essential, fashionable, and carry-over items.

The learning process, structured as described above, adopted a methodological approach based on inductive practices, which, starting from a direct experience of the design practice, allow the student to reflect on the performed and then observed activities. This approach aims to abstract practices, and therefore to codify methodologies, leading to the acquisition of new knowledge. Due to the COVID-19 pandemic, the structure of the Metadesign studio needed a significant redesign by moving from in-person to on-distance learning.

The previous efforts of transferring theoretical contents into a MOOC format were not sufficient to guarantee a sustainable learning model for a design studio. The learning-by-doing approach needs to be experienced to learn a design methodology.

Therefore, it was necessary to reverse the methodological process of the team assignment, rethinking not only the structure and phases of the studio but completely redesigning the contents learning path. The “Reverse Metadesign” format proposed for the 2020-2021 academic year is based on a deductive process based on the assumption that the analysis and subsequent breakdown of a virtuous process already carried out would allow the students to understand and codify the design processes and then to replicate them.

The initial project phase, Introducing the Brand, focused both on analyzing an assigned RTW brand—aimed at investigating brand strategy, market position, and permanent stylistic codes—and on the reading and decoding of a specific apparel collection.

Through a process of deductive reflection of the actual product, this phase had the main objective of (i) recognizing the stories/lines of inspiration developed by the design team of the brand, recognizing the main visual elements, and translating them into moodboards; (ii) pinpointing the seasonal stylistic codes, such as colors, textures, shapes, finishes; and (iii) finally identifying the Stock Keeping Units (SKUs) of collection, organizing them by typologies.

The subsequent two phases of the project concerned the decoding of the brand identity and the design strategies activated by the very brand. Firstly, students, also in this case organized in teams, were asked to develop a critical analysis of the plan of the collection architecture
(Reverse Merchandising phase) based on the brand identity, values, positioning, ideal customer, etc. Secondly, they were asked to propose a product development strategy (Product Design phase) to complement the collection coherently with the brand’s one. Students had to use and redesign colors, fabrics, and embellishments consistently with the brand identity, the product mix of the analyzed collection, and the lifestyles of the ideal consumer.

3. Interaction and Engagement in Distance Learning

An essential part of the learning happens in allowing interaction and engagement intended as “the amount of physical and psychological energy that the student devotes to the academic experience” (Astin, 1984) among student-teacher, student-student, and student-content to ensure a connected student experience (Moore 1989). While some studies have not found a clear relationship between engagement and learning outcomes (Axelson & Flick, 2010: 42), many researchers have argued that there are unequivocal links between engagement and students’ learning and achievements (Kahn, 2014; Sinatra, Heddy, & Lombardi, 2015).

Engagement is much more important in on-distance, and online learning, where high students drop out, could be critical. The intellectual interaction with contents should be enhanced by student-teacher (e.g., stimulating, counseling, encouraging, coaching students) and student-student engagement (e.g., allowing interaction between peers, in pair or group, with or without the presence of the instructor).

Focusing on the iterative reciprocal interaction between cognitive, behavioral, and environmental aspects, the social learning pedagogical model by Albert Bandura (1997) emphasizes the importance of exploiting peer-to-peer learning to reach educational goals and to grow independence and higher personalized learning experiences (Bowen et al., 2014).

4. Creativity Management in Distance Learning

As part of the innovation processes and activities, creativity derives both from intra-individual components (e.g. task motivation, domain-relevant skills, and creative strategies) and also from the social environment components (e.g., collaboration activities and the communication pattern characteristics) (Amabile, 1996). With online education, digital environments should support students’ creative design processes, particularly in the conceptual phase of design, to boost knowledge gathering, sharing, and integration toward the generation of creative ideas (Greene, 2002).

In this paper, we focus on digital environments enhancing social creativity related to social interaction allowed by collaborative digital tools that support brainstorming processes (e.g., accessing information and pieces of knowledge and sharing experiences, ideas, resources, or
responsibilities). In this regard, research states (Hulsheger et al., 2009) that creativity increases when there is a higher level of communication among the team members to support fruitful collaborative synchronous and asynchronous sessions for idea generation. Furthermore, these digital spaces allow users/groups to exchange contents and share materials via visual supports communication (e.g., mapping, images, diagrams) (Wang et al. 2010).

5. Virtual Learning Environments (VLEs) and Digital Tools

A combination of VLEs and digital tools supported the three levels of interaction and engagement toward creativity in the course. Digital tools were organized to handle a subset of learning management goals such as students’ participation, interaction, and creative brainstorming to design digital fashion moodboards. For the sake of simplicity, we divided the tools (e.g., course space repository, digital e-classrooms, and group e-rooms and collaboration tools for student teamwork.) into distinct ones by presenting their affordances and limitations as separated. However, we acknowledge that their use will be not linear but mixed to help the digital learning experience positively.

5.1. Course space repository

Several VLEs allow lectures repository, archival, and fruition from students in remote digital modality. They also enable course management and are helpful to handle the logistical aspects of planning, scheduling, calendaring, and delivering content in a password-protected web environment. Besides, they support the traditional and prescriptive unidirectional communication between teacher and student through direct advisement, lecture, assignment sharing, and evaluation feedback communication.

5.2. Digital E-classrooms and groups e-rooms

These digital learning environments allow remote connection and synchronous interaction where both teaching and coaching can occur (teacher-student interaction) but student-centered interactive discussions (e.g., Microsoft Teams, Zoom, Cisco Webex). In addition to the plenary e-classroom, digital free spaces allow students to meet and work in groups autonomously and collaboratively. In these two virtual environments, the facilitation and management of effective communication among team members and faculty are ensured through virtual meetings, instant messaging, screen sharing, and voice/video conferencing.

A speed dating exercise was organized to allow the students to present their ID charts sharing personality traits (e.g., strengths and weaknesses), study and cultural interests, working habits, and teamwork preferences. Students introduced themselves in a one-minute pitch in front of their peers to show their expertise and build their team autonomously through those virtual platforms.
5.3. **Collaboration tools for student teamwork**

Collaboration tools aim to allow a collective space for students to co-create a shared and meaningful body of knowledge, to interact for brainstorming, and to creatively co-design a product/service/system (e.g., Miro, Mural, Conceptboard, Ziteboard, Stormboard). Visual digital whiteboards are successfully used as project management tools to control the workflow of activities, as ideation tools to map and visualize ideas in early creative stages, and as co-design tools to allow groups to modify output and edit in real-time or asynchronously and to facilitate consensus building.

They are also management tools for resources, allowing archive project files that all group members can access. In place of online software for moodboards design (e.g., Pinterest, Moodzeer, Adobe Spark, Canva, GoMoodboard, Niice), groups of students used Miro as a white canvas to collaborate for brainstorming and visual storming toward the creation of the moodboards for each thematic line of the fashion brand they were assigned.

This co-generative process of moodboard making allows students to reflect on fashion-related thematic lines through the cultural, material, and chromatic aspects. They first reflect on abstract values, adjectives, themes, cultural references, and symbols to build a shared visual mental map of keywords. Later they choose iconographic materials (e.g., photographs, patterns, materials, objects, colors, textures) to be preparatory for designing digital fashion moodboards.

6. **Conclusions**

Although the Reverse Metadesign process succeeded from a formal point of view in transferring the students the methodological processes behind the development of a clothing collection, the on-distance learning certainly limited some aspects of knowledge better explored in the traditional pedagogical model. First and foremost, the process of fabric and its embellishment knowledge.

Despite the increasing application of digital technology in the haptic perception of fabrics, the visual and tactile perception was completely missing. At the same time, it remains fundamental to learning the matter potentiality in terms of comfort, functionality, and expressive content. Secondly, on-distance learning has restricted the design participation of students in the whole Metadesign studio activities, limiting the exchange between different teams and inevitably reducing the interaction with the faculty in favor of virtual participation that is not always fully integrated and stimulated.

However, as the comprehension of pre-project activities was successful, the new pedagogical structure tested and here discussed represents a good starting point to build other didactic experiences with three objectives: i) developing solutions to introduce a more direct
experience of fabrics, not only through haptic technological solutions but also with basic design exercises that stimulate perceptual understanding; ii) improving the structure of the product Development Phase to accompany the students’ design activity better; iii) expanding further interactive and flipped activities for a more dynamic learning environment.

References


