



**14TH INTERNATIONAL CONFERENCE OF
EDUCATION,
RESEARCH AND
INNOVATION**

A photograph of a modern building's interior, showing a complex, white, geometric ceiling structure with a grid of beams and lights. The text 'CONFERENCE PROCEEDINGS' is overlaid in large, bold, white, sans-serif font with a black outline.

**CONFERENCE
PROCEEDINGS**

8-9 NOVEMBER 2021
iated.org/iceri



**14TH INTERNATIONAL CONFERENCE OF
EDUCATION,
RESEARCH AND
INNOVATION**

**CONFERENCE
PROCEEDINGS**

8-9 NOVEMBER 2021
iated.org/iceri

Published by
IATED Academy
iated.org

ICERI2021 Proceedings
14th International Conference of Education, Research and Innovation
November 8th-9th, 2021

Edited by
L. Gómez Chova, A. López Martínez, I. Candel Torres
IATED Academy

ISBN: 978-84-09-34549-6
ISSN: 2340-1095
DL: V-3123-2021

Book cover designed by
J.L. Bernat

All rights reserved. Copyright © 2021, IATED Academy

The papers published in these proceedings reflect the views only of the authors. The publisher cannot be held responsible for the validity or use of the information therein contained.

ICERI2021 COMMITTEE AND ADVISORY BOARD

<i>Agustín López</i>	SPAIN	<i>João Monteiro</i>	PORTUGAL
<i>Aileen Cotter</i>	IRELAND	<i>John Craft</i>	UNITED STATES
<i>Akihiro Maeda</i>	JAPAN	<i>Jose F. Cabeza</i>	SPAIN
<i>Alia Ammar</i>	UNITED STATES	<i>Jose Luis Bernat</i>	SPAIN
<i>Amparo Girós</i>	SPAIN	<i>Joseph Agbenyega</i>	UNITED ARAB EMIRATES
<i>Ana Paula Lopes</i>	PORTUGAL	<i>Kari Krell</i>	CANADA
<i>Ana Tomás</i>	SPAIN	<i>Kay Gallagher</i>	UNITED ARAB EMIRATES
<i>Anna Romagnuolo</i>	ITALY	<i>Laila Nordstrand Berg</i>	NORWAY
<i>Antonio García</i>	SPAIN	<i>Lorena López</i>	SPAIN
<i>Breno Deffanti</i>	BRAZIL	<i>Luis Gómez Chova</i>	SPAIN
<i>Catherine O'Donnell</i>	UNITED KINGDOM	<i>Luis Roseiro</i>	PORTUGAL
<i>Chelo González</i>	SPAIN	<i>Luke Raeside</i>	IRELAND
<i>Christopher Evans</i>	UNITED KINGDOM	<i>M^a Jesús Suesta</i>	SPAIN
<i>Craig Loewen</i>	CANADA	<i>Maria Porcel</i>	SPAIN
<i>Craig Walker</i>	UNITED STATES	<i>Maria Rudneva</i>	RUSSIAN FEDERATION
<i>Cynthia Rosas Magallanes</i>	MEXICO	<i>Martha Leal-Gonzalez</i>	MEXICO
<i>Daniel Abrahams</i>	UNITED STATES	<i>Matome Mashiapata</i>	SOUTH AFRICA
<i>Darren Falconer</i>	AUSTRALIA	<i>Mayaugust Finkenberg</i>	UNITED STATES
<i>David Jennings</i>	IRELAND	<i>Miguel Peiró</i>	SPAIN
<i>David Martí</i>	SPAIN	<i>Mike Hillis</i>	UNITED STATES
<i>Eladio Duque</i>	SPAIN	<i>Norma Barrachina</i>	SPAIN
<i>Elmaziye Özgür</i>	CYPRUS	<i>Orlando Belo</i>	PORTUGAL
<i>Ewa Bogacz-Wojtanowska</i>	POLAND	<i>Paul Hunter</i>	SWITZERLAND
<i>Fedor Duzhin</i>	SINGAPORE	<i>Peter Gabor</i>	CANADA
<i>Fernando Enrique Ortiz Rodriguez</i>	MEXICO	<i>Peter Haber</i>	AUSTRIA
<i>Filomena Soares</i>	PORTUGAL	<i>Pia Palotie</i>	FINLAND
<i>Frank Brosow</i>	GERMANY	<i>Remigijus Bubnys</i>	LITHUANIA
<i>Helmut Wöllik</i>	AUSTRIA	<i>Rosa Cendros Araujo</i>	CANADA
<i>Hiroyuki Obari</i>	JAPAN	<i>Salman Azhar</i>	UNITED STATES
<i>Ignacio Ballester</i>	SPAIN	<i>Sergio Pérez</i>	SPAIN
<i>Ignacio Candel</i>	SPAIN	<i>Sinéad McCotter</i>	UNITED KINGDOM
<i>Ineta Helmane</i>	LATVIA	<i>Sylvia Dempsey</i>	IRELAND
<i>Iván Martínez</i>	SPAIN	<i>Taija Votkin</i>	FINLAND
<i>James Mackay</i>	NEW ZEALAND	<i>Taketoshi Yokemura</i>	JAPAN
<i>Jaroslaw Kujawski</i>	POLAND	<i>Tammy Ladwig</i>	UNITED STATES
<i>Javier Domenech</i>	SPAIN	<i>Thomas Lavery</i>	UNITED KINGDOM
<i>Javier Martí</i>	SPAIN	<i>Victoria Kompanets</i>	FINLAND
<i>Joanna Lees</i>	FRANCE	<i>Wendy Gorton</i>	UNITED STATES
<i>Joanna Richardson</i>	UNITED KINGDOM	<i>Xavier Lefranc</i>	FRANCE

CONFERENCE TRACKS & SESSIONS

DIGITAL TRANSFORMATION OF EDUCATION

Data Science & AI in Education
Learning Analytics
Digital Technologies and Resources for Learning under Lockdown
Digital Transformation
21st Century Skills
Educational Programming & Robotics

DIGITAL & DISTANCE LEARNING

Distance Education in COVID-19 Times
MOOCs & Open Educational Resources
Blended & Mobile Learning
e-Learning Experiences
Learning Management Systems & Virtual Learning Environments
Post-Pandemic Scenarios in Education

INNOVATIVE EDUCATIONAL TECHNOLOGIES

AI, Chatbots & Robots
Virtual & Augmented Reality
Technology Enhanced Learning

MULTICULTURALITY & INCLUSION

Inclusive Education
Special Educational Needs
Multicultural Education
Diversity Issues

ACTIVE & STUDENT-CENTERED LEARNING

Gamification & Game-based Learning
Active & Experiential Learning
Problem & Project-Based Learning
Pedagogical Innovations
Soft Skills Development

ASSESSMENT, MENTORING & STUDENT SUPPORT

Assessment & Evaluation
Rethinking Assessment in COVID-19 Times
Mentoring & Tutoring
Student Engagement & Wellbeing in COVID-19 Times
Student Support & Motivation

EDUCATIONAL STAGES & LIFE-LONG LEARNING

From Pre-school to Secondary Education
Higher Education & Labour Market Transition
Vocational Training
Non-formal Learning
Developing Entrepreneurship in Education
Life-long & Workplace Learning

QUALITY & IMPACT OF EDUCATION

Quality in Education
Curriculum Design Experiences
Sustainability & Environmental Awareness
Social Impact of Education
University-Industry Collaboration
Educational Trends & Globalisation

TEACHER TRAINING & ED. MANAGEMENT

ICT & Digital Skills
Teacher Training and Support
Professional Development of Teachers
Educational Management

STEM EDUCATION

Mathematics & Statistics
Engineering Education
STEM Experiences
Computer Science

LANGUAGE LEARNING AND TEACHING

Foreign Languages
Language Learning & Translation Studies
New Technologies in Language Learning

DISCIPLINE-ORIENTED SESSIONS

Architecture & Interior Design
Health Sciences Education
Business and Marketing Education
Legal Education