2022

16th International Technology, Education and Development Conference

7-8 March, 2022

CONFERENCE PROCEEDINGS



Sharing the Passion for Learning



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INTED2022 Proceedings

16th International Technology, Education and Development Conference March 7th-8th, 2022 Virtual Conference

Edited by

Luis Gómez Chova, *University of Valencia, Spain* Agustín López Martínez, *University of Barcelona, Spain* Ignacio Candel Torres, *Capgemini, Spain*

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Preface

INTED2022 Conference Proceedings contain selected and revised papers from the 16th International Technology, Education and Development Conference.

INTED2022 was held virtually on March 7th and 8th 2022. After 14 years as an "in-person" conference, the 2021 and 2022 editions were held on-line due to the COVID-19 restrictions.

Every year, INTED brings together lecturers and researchers from universities and educational institutions from all over the world. This edition counted with 1264 participants from more than 75 different countries, ensuring a geographic diversity and a multicultural environment.

The main objective of INTED2022 was to offer a meeting point for educational experts to share and discuss their experiences and projects on education, learning and teaching technologies and educational Innovations. The conference program also provided different networking activities where participants could interact with other delegates and share their perspectives on education. In addition to the Technical Program, different plenary sessions with speeches, workshops and discussion panels were delivered by world-leading keynote speakers (keynote speeches available at IATED Talks, https://iated.org/talks/).

The scope of INTED2022 included the following topics: Digital & Distance Learning, Digital Transformation of Education, Innovative Educational Technologies, Inclusion and Multiculturality, Active and Student-Centered Learning, Assessment, Mentoring & Student Support, Educational Stages and Life-Long Learning, Quality & Impact of Education, Teacher Training and Educational. Management, STEM Education, Discipline-Oriented Sessions, Language Learning and Teaching, Innovative Educational Technologies.

The INTED2022 International Program Committee is composed of lecturers and researchers from all over the world. A meticulous job in selecting papers for publication was conducted. We wish to thank the program committee members who conducted a blind peer review process to guarantee the quality of the contributions and presentations. The following points were evaluated: information content, general structure, clarity, relevance, originality, relation to the conference topics and disciplines. The language of the publication was exclusively English.

Moreover, INTED2022 aims to publish conference proceedings that contain original research articles of high-quality meeting the expected ethical standards. Authors publishing in INTED2022 signed the IATED copyright transfer form. IATED guarantees the high technical and professional quality of the publications, and that good practice and ethical standards are maintained. More information about the publication ethics is available at: https://iated.org/publication_ethics

Finally, we wish to extend our most sincere thanks to all members and delegates who contributed to these INTED2022 Proceedings. We hope that readers will find this volume inspiring and look forward to the continuation of the INTED series in the coming years.

Luis Gómez Chova Agustín López Martínez Ignacio Candel Torres

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Organizing Committee

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INTED2022 Keynote Speakers

Richard Gerver, Education Consultant, United Kingdom
Kristen DiCerbo, Khan Academy, United States
Jordan Shapiro, Joan Ganz Cooney Center, United States
Paul Chapman, The Glasgow School of Art, United Kingdom
Rosan Bosch, Rosan Bosch Studio, Denmark
Julie Smith, Webster University in St Louis, United States
Donnalee Donaldson, EDUCATE!, Rwanda
Tom Sherrington, Education Consultant, United Kingdom

INTED2022 Panel Chairs

Beate Weyland, Free University of Bolzano, Italy
Teun Van Wijk, Education consultant, The Netherlands
Alessandra Galletti, Free University of Bolzano, Italy
Petra Regina Moog, Sophia::Akademy in Düsseldorf, Germany

Richard Gerver (UK)



Keynote speech: COVID and the future of Education

The last two years have been challenging for us all, besides the extreme health issues, we have been dealing with uncertainty, change and demands to redesign our education systems. In his keynote Richard will explore what we have learnt during the pandemic, about ourselves, our futures and what they mean for education moving forward.

Biography: Richard, author of the number one bestsellers, Change: Learn to Love It, Learn to Lead It, and Simple Thinking: How to Remove the Complexity from Work & Life, offers a groundbreaking

look into how the world is dealing with the challenge of unleashing human potential and embracing and leading change in the most uncertain of times. A former globally renowned and life changing school principal, has taken innovation by storm. Over the last two decades he has transitioned his global reputation for leadership in education and is now regarded as one of the most original and authentic thinkers around human leadership and organisational transformation in the world. He has been named UK Business Speaker of the Year three times. His time now sees him work with organisations at the forefront of global innovation and excellence including Microsoft, Deloitte, Google, TUI and Morgan Stanley, Visa, Puig, Telefonica and Technicolor. He has also worked with some of the world's most iconic retail organisations including Harrods in London. His unique experience and insight into realising human potential also finds him working in elite sport; with Olympic and Paralympic coaches, EPL Soccer coaches, England Golf and professional cricket teams. He has served as a Board member on everything from billion-dollar businesses to start ups, not for profits and Universities. He has worked with an extraordinary range of people including former US President Barack Obama, The Dalai Lama, Prince Charles and Apple co-founder Steve Wozniak. He has two of the most popular LinkedIn Learning courses in the world, covering overcoming complexity and mental toughness. Gerver's unique insight into our development from infants to adults helps us to understand the nature of our personal and professional responses to risk, change, creativity and development. His ability to connect experiences across many often, seemingly different environments, helps people to expand their thinking and their own perception of their potential. With his trademark humour and insight, Gerver shares his experience on cultural and organisational transformation, human development, and management with groups around the world.

Kristen DiCerbo. Khan Academy (USA)

Keynote speech: Navigating Digital Learning

With the increase in learning with technology, both in the classroom and at home, students are learning in new ways, and may need new strategies to be successful. Dr. Kristen DiCerbo, the Chief Learning Officer of Khan Academy, will discuss research-based tips for navigating online learning. She'll talk about staying motivated, how to develop learners' sense of ownership over their learning, and how to know if learners are gaining the knowledge and skills they need when working remotely.

Biography: Dr. Kristen DiCerbo is the Chief Learning Officer at Khan Academy, a nonprofit dedicated to providing a free world class education to anyone, anywhere. In this role, she is responsible for driving and communicating the teaching and learning strategy for Khan Academy's programs, content, and product in order to improve student and teacher engagement and outcomes. She ensures pedagogical coherence and a research-informed design across Khan Academy's offerings. Dr. DiCerbo's work has consistently been focused on embedding what we know from education research about how people learn into digital learning experiences. Prior to her role at Khan Academy, she was Vice-President of Learning Research and Design at Pearson, where she led a team of researchers and learning designers conducting new research in learning and assessment and translating research insights into the design of learning tools. She also previously served as a research scientist supporting teaching and learning in the Cisco Networking Academies and as a school psychologist in an Arizona school district. Dr. DiCerbo's personal research program centers on the use of games and simulations to understand what learners know and can do and she has published extensively in academic journals and books in this area. She speaks to audiences of parents, teachers, school leaders, research scientists, and the educational technology community about learning and learning science. Kristen received her Bachelor's Degree from Hamilton College and Master's Degree and Ph.D. in Educational Psychology at Arizona State University. Marc Brackett Ph.D. Founder and Director of the Yale Center for Emotional Intelligence and a Professor in the Child Study Center of Yale University (USA).

Jordan Shapiro. Joan Ganz Cooney Center (USA)

Keynote speech: Rise Up: Forward-Thinking Strategies for the Future of Teaching and Learning

Jordan Shapiro, PhD. has spent more than a decade working with educators, business leaders, and governments to help prepare the next generation of global citizens for a rapidly changing world. His work has transformed the way we approach the relationship between technology and child development. He has introduced groundbreaking new frameworks for thinking about pedagogy and learning. In this keynote presentation, he will ask unexpected questions about what it takes to prepare our children and students to think critically, advocate for social justice, thrive emotionally, and

feel fulfilled in economic, political, and technological contexts that seem to be chaotic.

Biography: Jordan Shapiro, PhD is a globally celebrated American thought leader. He's senior fellow for the Joan Ganz Cooney Center at Sesame Workshop, and Nonresident Fellow in the Center for Universal Education at the Brookings Institution. His Forbes' column (2012-17) on global education, learning through digital play, kids and culture was read by over 5 million people around the world. He is an international speaker and consultant whose fresh perspective combines psychology, philosophy, and economics in unexpected ways. His book, The New Childhood: Raising Kids to Thrive in a Connected World (Little, Brown Spark 2018) changed the cultural conversation about parenting and screen time. Shapiro has worked an adviser and strategist to the United States Air Force, helping Air University's eSchool develop pedagogical practices that promote sophisticated 21st century "habits of mind." He created Thomas Edison State University's flagship online course, "Critical Thinking with Video Games," an

interdisciplinary learning experience designed for adult learners, that draws connections between the classic texts of the Western academic tradition and the narrative and mechanic components of today's most popular video games. During the week, you can find him in the classroom at Temple University, where he teaches in the Intellectual Heritage Program and developed the online version of the university's core curriculum. Asked to list his favorite texts to teach, he doesn't hesitate, "Plato's Republic and Freud's Civilization and its Discontents. It's amazing to see young adults discover how old ideas can remain so relevant even in such a new world." Shapiro is an expert adviser to the World Economic Forum, and a participant in China's Taihe Civilization Forum. He's also a member of the academy that judges the Varkey Foundation's Global Teacher Prize. And he serves on the advisory board of the exclusive global think tank, Symi Symposium, led by former Greek prime minister George Papandreou. He regularly travels around the world, delivering keynote addresses at international conferences hosted by organizations like UNESCO's Mahatma Gandhi Institute of Education for Peace and Sustainable Development (MGIEP)

Paul Chapman. The Glasgow School of Art (UK)



Keynote speech: Mixed Realities: Real Problems, Virtual Solutions In this presentation I will review the evolution of computer graphics and the long anticipated 'coming of age' of immersive technologies. I will give some real-world examples of how SimVis are using these technologies to facilitate our understanding of complex real-world environments ranging from pharmaceutical engineering, heritage visualisation, medical training and dangerous sports. The talk concludes with an assessment of the future.

Biography: Professor Paul Chapman is Head of the School of Simulation and Visualisation (SimVis) at GSA where he has worked

since 2009. SimVis is a postgraduate research and commercial centre based in the Digital Media Quarter in Glasgow housing state of the art virtual reality, graphics and sound laboratories. Previously Paul was Director of the Hull Immersive Visualisation Centre and spent several years working as an offshore engineer in the oil, gas and diamond mining industries. Paul holds BSc, MSc and PhD degrees in Computer Science, he is a Chartered Engineer, Chartered IT Professional, Fellow of the British Computer Society and was an inaugural member of the Royal Society of Edinburgh's Young Academy. Paul is also a Director and Trustee of It's Good 2 Give providing practical support to young cancer patients and their families across Scotland.

Rosan Bosch. Rosan Bosch Studio (Denmark)



Keynote speech: Designing for an uncertain future

The world is in rapid change and the pandemic has taught us that learning can happen everywhere. But the most important question is: how do we motivate children to become agile, curious and self-directed learners that solve the unknown challenges of the future.

Biography: Rosan is founder and creative director of Rosan Bosch Studio. She is internationally renowned for her designs and inspiring perspectives on stimulating learning spaces. With design as a tool for innovation and change, Rosan challenges established cultures and norms. In close dialogue with the users, she transforms physical

spaces into meaningful and significant experiences – from stimulating workspaces to libraries and schools for all ages. Rosan is the creative force of the studio. She sets the course for our visions, concept development, user involvement and strategic decisions that provide holistic design solutions. Her new book 'Play to Learn - Designing for Uncertainty' is a hands-on inspirational guide to designing playful learning landscapes that place the learner at the center of the design and education. In Designing for a Better World Starts at School, she presents a new paradigm for future school designs that support human development and creativity. Using six principles for learning situations, she creates differentiated, imaginative and dynamic environments that meet the needs for diversity and flexibility in learning experiences. She has worked with local and national authorities to transform education, from the Vittra schools in

Sweden and the award-winning Sheikh Zayed Private Academy in Abu Dhabi to the Ministry of Education in Argentina. She has developed innovative public libraries like the Children's Library in Billund as well as development workspaces for Lego PMD and exhibitions for international companies like VELUX and Mærsk. Rosan is educated at the Hogeschool voor de Kunsten in the Netherlands and the Faculty of Fine Arts at the University of Barcelona in Spain, and has worked professionally with art, architecture and design for more than 25 years. She is a popular public speaker and has been the keynote at conferences around the world: this includes EMINENT Conference at The European Schoolnet, TEDxZaragoza, TEDxIndianapolis, Harvard Graduate School of Education and School Architecture Conference by Argentina's Ministry of Education.

Julie Smith. Webster University in St Louis, Missouri (USA)



Webinar: Media Literacies: The 21st Century Survival Skills that can Change the World

People around the world are spending – on average – eight hours a day with electronic mass media. Yet even in 2022, we are still not talking enough about how this affects people personally, politically, physically, emotionally and educationally. Using theoretical frameworks to provide context as well as classroom experiences to provide relevance, Smith will explain the importance of media literacy skills, how to teach them and the difference they can make in the lives of citizens and students.

Biography: Julie Smith is on the faculty of the School of Communications at Webster University in St Louis, Missouri USA. She is the author of "Master the Media: How Teaching Media Literacy Can Save our Plugged-In World" and "Wake Them Up! Supercharge Engagement in your College Classroom". Smith travels nationally and internationally providing workshops on media literacy, social media and digital forensics and is the co-host of the "What the Media?!" podcast with KMOX radio in St Louis.

Donnalee Donaldson. EDUCATE! (Rwanda)



Keynote speech: Unlocking Youth Potential at Scale

Educate! will present its approach to improving the quality of education youth receive through the education system. The organization will share its strategy for improving life outcomes for graduates by reforming a single secondary subject, as well as the evidence it now has of this impact. Educate! believes this quick and cost-effective path to bettering the experience and outcomes of secondary school for youth has the potential to unlock young people's potential at scale throughout East Africa, and beyond.

Biography: Donnalee Donaldson is Educate!'s Policy and Partnerships Strategist. Donnalee is an educator and lawyer from Montego Bay, Jamaica. Since 2007, she has been involved in creating educational ventures in the USA, Ghana, Tanzania, and Rwanda. She is passionate about expanding access to quality education, particularly because academic scholarships enabled her to have access to an education that would otherwise have been unattainable. She joined Educate! in order to pursue her interest in working on systemic change in the education sector, and is thrilled that Educate! has partnered with the Rwanda Education Board to support the country's secondary school curriculum reform. Before joining Educate! she worked for Kepler where she helped launch two university campuses in three years, including Rwanda's first in a refugee camp. Teaching at the university level allowed her to have insight on some of the improvements that need to be made at the secondary level to better prepare students to enter the workforce or become entrepreneurs. Donnalee was previously a litigation attorney for the City of New York's Law Department and remains a member of the New York State Bar. She holds a B.A. from Seton Hall University and a J.D. from the Emory University School of Law. Additionally, she was one of Ashoka's inaugural Changemaker Scholars in 2016.

Tom Sherrington. Education consultant (UK)



Webinar: Rosenshine's Principles in Action

The session will explore the popular set of teaching principles summarised by Barak Rosenshine, suggesting how they apply in various contexts. We will also look at the Walkthrus materials and website walkthrus.co.uk to showcase how this toolkit can be used to support teachers implementing Rosenshine's principles through coaching systems and professional development programmes.

Biography: Tom Sherrington is an education consultant and author. He writes the popular blog teacherhead.com and his books include The Learning Rainforest and best-seller Rosenshine's Principles in

Action. Most recently he co-authored the Teaching WalkThrus series with Oliver Caviglioli. With 30 years' experience as a physics and maths teacher and school leader, Tom is in demand from schools around the world to deliver CPD for teachers and leadership teams. He works with hundreds of schools and colleges providing training and consultancy support on improving the quality of teaching through the Walkthrus materials. He is a regular keynote speaker and contributor to conferences and education festivals.

Workshop: Learning Environment Applications: Co-creation and participation in pedagogical architecture focused on school spaces



Beate Weyland. Free University of Bolzano (Italy)

Prof. Dr. Beate Weyland is a professor of didactics at the Free University of Bolzano. She leads teachers in rethinking spaces and forms of teaching and learning in schools, including for children and young people. She conducts research on the relationship between pedagogy and architecture and design, as well as on issues of didactic innovation in schools. She has explored different ways of collaborative design in new construction or renovation processes, as well as in the simple appropriation and revision of school buildings, traveling between conferences and meetings on the quality of educational spaces in Italian and German-speaking countries. Main

research interests: Collaborative planning, open and sensory didactics, the relationship between didactics, architecture, and design, the relationship between school and nature.



Teun Van Wijk. Education consultant (Netherland)

Teun Van Wijk from Den Haag (NL) has more than 35 years of experience as a school construction and education consultant in combining learning with the learning environment, often with surprising and innovative results. He always does this together with the future users, encouraging them to break out of the usual thinking structures and to go new ways. To do this, he has developed various effective methods that stimulate creativity, future-oriented thinking and collaboration. In many cases, he supervises the design phase (PHASE ZERO) himself with the aim of maintaining the focus on education. His projects range from primary schools, secondary

schools and universities to research centers in the Netherlands, Belgium, Germany and Oman. As an expert in the interconnection of education and architecture his engagement aims in healthy, sustainable, flexible, efficient and inspiring learning environments. Teun van Wijk is also a key player of "Project Learning Space", a unique German-Dutch cooperation located at the Teacher Training Center of Düsseldorf with teachers and learners, scientific companions, school building consultants and product experts. The project is an invitation to teachers to experiment, to gain experience, to try out new things, to redesign familiar learning spaces and fill them with new meaning.



Alessandra Galletti. Free University of Bolzano (Italy)

Dr. Alessandra Galletti is a research fellow at the Free University of Bolzano. She is an architect, and she is part of the Italian working group of the European research project Learning Environment Application (LEA) with Prof. Beate Weyland of Unibz. She is involved in inclusive design with particular attention to learning spaces. She graduated in Architecture in 2011 and obtained her Ph.D. at the University of Ferrara in 2016. She carries out educational activities, consulting, and mediation of participatory design processes with schools. She is part of the multidisciplinary collective for innovative school design PADlab www.padlab.org. She is a

partner of the European Centre for Research and Promotion of Accessibility CERPA Italia Onlus.search interests: Collaborative planning, open and sensory didactics, the relationship between didactics, architecture, and design, the relationship between school and nature.



Petra Regina Moog. Sophia::Akademy in Düsseldorf (Germany)

Dr. Petra Regina Moog is a founding partner and managing director of the non-profit Sophia::Akademy in Düsseldorf and heads the area of Participatory Process Support and Pedagogical Architecture. She has worked in a variety of contexts: as a researcher, university and school teacher, author, coach, process facilitator and is a certified mediator. She is particularly interested in the development of potential and participation in education, as well as the connection between art, culture and science, especially STEAM education At present she is coordinating of two different EU funded ERASMUS+ innovation projects aiming to support the European educational

landscape not only in developing participative future orientated school buildings [LEA project] but also fostering teacher trainer education professional using innovative learning environments [MOBILE project].

Conference Tracks & Sessions

The INTED2022 conference program is available online at https://iated.org/inted2022

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 Students & Teachers Wellbeing in COVID-19 Times

DIGITAL TRANSFORMATION OF EDUCATION

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

INNOVATIVE EDUCATIONAL TECHNOLOGIES

Virtual & Augmented Reality Videos and Social Media in Education Technology Enhanced Learning Chatbots & Robots Digitalization and Challenges of Libraries

INCLUSION & MULTICULTURALITY

Special Educational Needs Inclusive Education Multicultural Education Diversity Issues

ACTIVE & STUDENT-CENTERED LEARNING

Gamification & Game-based 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 Support & Motivation

EDUCATIONAL STAGES & LIFE-LONG LEARNING

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

QUALITY & IMPACT OF EDUCATION

Quality in Education CV Design and Post-pandemic Scenarios Sustainability & Environmental Awareness Social Impact of Education University-Industry Collaboration Globalisation & Internationalization

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

DISCIPLINE-ORIENTED SESSIONS

Architecture & Civil Engineering Health Sciences Education Business & Tourism Education Music Education Military Education and Training Documentary & Archival Research

LANGUAGE LEARNING AND TEACHING

Foreign Languages New Technologies in Language Learning Language Learning & Translation Studies Intercultural & Sociocultural Competences