

AN INCLUSIVE APPROACH TO INSPIRE CREATIVITY AND TEAM BUILDING THROUGH MODULAR
ARCHITECTURE DRAWING

Original

AN INCLUSIVE APPROACH TO INSPIRE CREATIVITY AND TEAM BUILDING THROUGH MODULAR
ARCHITECTURE DRAWING / Ugliotti, Francesca Maria; Francesca, Maria; Zucco, Michele; Cassis, Margherita. -
ELETTRONICO. - 1:(2025), pp. 475-479. (International Conference on Education and New Developments
(END Conference) Budapest (Hungary) June 28-30, 2025).

Availability:

This version is available at: 11583/3001335 since: 2025-07-08T08:49:38Z

Publisher:

World Institute for Advanced Research and Science (WIARS), inScience Press

Published

DOI:

Terms of use:

This article is made available under terms and conditions as specified in the corresponding bibliographic description in
the repository

Publisher copyright

(Article begins on next page)

EDUCATION AND NEW DEVELOPMENTS

2025



Volume 1

Edited by
Mafalda Carmo

Designed by Freepik



Education and New Developments
2025

Volume 1

Edited by
Mafalda Carmo

Edited by Mafalda Carmo, World Institute for Advanced Research and Science (WIARS), Portugal

Published by inScience Press, Rua Tomas Ribeiro, 45, 1º D, 1050-225 Lisboa, Portugal

Copyright © 2025 inScience Press

All rights are reserved. Permission is granted for personal and educational use only.

Commercial copying, hiring and lending is prohibited. The whole or part of this publication material cannot be reproduced, reprinted, translated, stored or transmitted, in any form or means, without the written permission of the publisher. The publisher and authors have taken care that the information and recommendations contained herein are accurate and compatible with the generally accepted standards at the time of publication.

The individual essays remain the intellectual properties of the contributors.

ISSN (electronic version): 2184-1489

ISSN (printed version): 2184-044X

ISBN: 978-989-35728-7-0

Legal Deposit: 428062/17

Printed in Lisbon, Portugal by GIMA - Gestão de Imagem Empresarial, Lda.

BRIEF CONTENTS

Foreword	v
Organizing and Scientific Committee	vii
Sponsor	xiii
Keynote Lecture	xv
Index of Contents	xvii

FOREWORD

Dear Colleagues,

This book contains the full text of papers and posters presented at the International Conference on Education and New Developments (END 2025), organized by the World Institute for Advanced Research and Science (WIARS).

Education is a fundamental right that accompanies us from the very beginning of our lives. It encompasses every experience we encounter, influencing and shaping our thoughts, emotions, and actions. Whether we engage in formal education within classrooms or learn from the world around us, the process of acquiring knowledge plays a vital role in our personal growth and development. It equips us with the tools to navigate the complexities of life, broadens our perspectives, and empowers us to make informed decisions. This International Conference seeks to provide some answers and explore the processes, actions, challenges and outcomes of learning, teaching and human development. Our goal is to offer a worldwide connection between teachers, students, researchers and lecturers, from a wide range of academic fields, interested in exploring and giving their contribution in educational issues.

We are delighted to have successfully facilitated connections among academics, scholars, practitioners, and individuals who share a common interest in a field abundant with fresh perspectives, ideas, and knowledge. Our event has attracted a diverse range of contributors and presenters, enriching our understanding of human nature and behavior by showcasing the influence of their unique personal, academic, and cultural backgrounds. This diversity is a testament to the international reach of our conference, fostering multi-disciplinary collaborations and fostering intellectual growth and exchange.

END 2025 received 704 submissions, from more than 45 different countries, reviewed by a double-blind process. Submissions were prepared to take form of Oral Presentations, Posters, Virtual Presentations and Workshops. The conference accepted for oral presentation 264 submissions (38% acceptance rate).

The conference also includes one Keynote presentation by Dr. Diane Boothe, Boise State University, USA. We would like to express our gratitude to our invitee.

This conference addressed different categories inside the Education area and papers are expected to fit broadly into one of the named themes and sub-themes. To develop the conference program, we have chosen four main broad-ranging categories, which also covers different interest areas:

- In **TEACHERS AND STUDENTS**: Teachers and Staff training and education; Educational quality and standards; *Curriculum* and Pedagogy; Vocational education and Counselling; Ubiquitous and lifelong learning; Training programs and professional guidance; Teaching and learning relationship; Student affairs (learning, experiences and diversity; Extra-curricular activities; Assessment and measurements in Education.
- In **PROJECTS AND TRENDS**: Pedagogic innovations; Challenges and transformations in Education; Technology in teaching and learning; Distance Education and eLearning; Global and sustainable developments for Education; New learning and teaching models; Multicultural and (inter)cultural communications; Inclusive and Special Education; Rural and indigenous Education; Educational projects.
- In **TEACHING AND LEARNING**: Critical, Thinking; Educational foundations; Research and development methodologies; Early childhood and Primary Education; Secondary Education; Higher Education; Science and technology Education; Literacy, languages and Linguistics (TESL/TEFL); Health Education; Religious Education; Sports Education.
- In **ORGANIZATIONAL ISSUES**: Educational policy and leadership; Human Resources development; Educational environment; Business, Administration, and Management in Education; Economics in Education; Institutional accreditations and rankings; International Education and Exchange programs; Equity, social justice and social change; Ethics and values; Organizational learning and change, Corporate Education.

The contributions were published across two volumes, and this is the Volume 1 of the book titled Education and New Developments 2025, that showcases the outcomes of dedicated research and developments undertaken by authors who are driven by their passion to enhance research methods that directly relate to teaching, learning, and the practical applications of education in the present day. Within its pages, you will find a diverse array of contributors and presenters who expand our understanding of educational matters by sharing their unique personal, academic, and cultural perspectives. Through their valuable insights and experiences, they enrich our exploration and contribute to the growth of educational discourse in our contemporary world.

This first volume only focuses on the main areas of TEACHERS AND STUDENTS and TEACHING AND LEARNING, being the contributions of the other two areas published in Volume 2.

We would like to express thanks to all the authors and participants, the members of the academic scientific committee, and of course, to our organizing and administration team for making and putting this conference together.

Hoping to continue the collaboration in the future.

Respectfully,

Mafalda Carmo
World Institute for Advanced Research and Science (WIARS), Portugal
Conference and Program Chair

ORGANIZING AND SCIENTIFIC COMMITTEE

Organizer

World Institute for Advanced Research and Science (WIARS)
www.wiars.org

Conference and Program Chair

Mafalda Carmo
World Institute for Advanced Research and Science (WIARS), Portugal

International Scientific Committee

Aaron R. Deris, Minnesota State University, USA

Abha Gupta, Old Dominion University, USA

Adanela Musaraj, Indiana Tech, USA

Adel Jebali, Concordia University, Canada

Adrian Ponz Miranda, Zaragoza University, Spain

Ahmet Ok, Middle East Technical University, Turkey

Alan Singer, Hofstra University, USA

Ali Ahmad Al-Barakat, University of Sharjah, United Arab Emirates

Ana Conboy, College of Saint Benedict and Saint John's University, USA

Ana Hernández, Universidad Autónoma de Madrid, Spain

Ana Pongrac Pavlina, University of Zagreb, Croatia

Ana-Maria Bercu, Alexandru Ioan Cuza University of Iasi, Romania

Andis Klegeris, University of British Columbia Okanagan, Canada

Andrea Bencsik, University of Pannonia Veszprem, Hungary

Andrea Fiorucci, University of Salento, Italy

Andreas Zehetner, University of Applied Sciences Upper Austria, Austria

Andrei Nastas, Lower Danube University, Romania

Angela Piu, University of Valle D' Aosta, Italy

Angelica-Lizeth Sanchez-Lopez, Tecnológico De Monterrey, Mexico

Anja María Mackeldey, Colegio Alemán Medellín / Universidad de Antioquia, Colombia

Antoni Kolek, Kozminski University, Poland

Antonija Huljev, University of Osijek, Croatia

Aphrodite Ktena, National and Kapodistrian University of Athens, Greece

Asta Vaitkevičienė, Vilnius University, Lithuania

Aurelija Dauksaite-Kolpakoviene, Vytautas Magnus University, Lithuania

Barba Aldis Patton, University of Houston-Victoria, USA

Beata Maslanka-Wieczorek, Polish-Japanese Academy of Information Technology, Poland

Beatriz Carrasquer Alvarez, Zaragoza University, Spain

Begona Sampedro, University of Cordoba, Spain

Binshan Lin, Louisiana State University Shreveport, USA

Birgit Schmiedl, University College of Teacher Education Lower Austria, Austria

Bojana Culum Ilic, University of Rijeka, Croatia

Borislava Kirilova, Sofia University,
Bulgaria

Borja Manzano Vázquez, University
of Granada, Spain

Burcu Koc, Sakarya University,
Turkey

Carola Hernandez, Universidad de
los Andes, Colombia

Carolina Bodea Hategan,
Babes-Bolyai University, Romania

Celina Da Silva, York University,
Canada

Cezar Scarlat, University
“Politehnica” of Bucharest, Romania

Chantal Ouellet, Université du
Québec à Montréal, Canada

Charalampos Karagiannidis,
University of Thessaly, Greece

Chiara Uliana, University of Granada,
Spain

Chien-Ming Cheng, National
Academy for Educational Research,
Taiwan

Cory A. Bennett, Idaho State
University, USA

Cristiana Pizarro Madureira,
ESECS – Instituto Politécnico de
Leiria, Portugal

Cristiano Luchetti, American
University of Ras Al Khaimah,
United Arab Emirates

Dale Kirby, Memorial University,
Canada

Dalia Hanna, Sheridan College,
Canada

Damijana Kerzic, University of
Ljubljana, Slovenia

David Aparisi, University of Alicante,
Spain

David Cline, Saginaw Valley State
University, USA

David Nocar, Palacky University
Olomouc, Czech Republic

Diana Straksiene, Vilnius University,
Siauliai Academy, Lithuania

Diana Maria Cismaru, National
University of Political Studies and
Public Administration, Romania

Diane Boothe, Boise State University,
USA

Dijana Drandic, Juraj Dobrila
University of Pula, Croatia

Dijana Oreški, University of Zagreb,
Croatia

Dimitris Kilakos, National
& Kapodistrian University of Athens,
Greece

Dorina Anca Talas, Babes-Bolyai
University, Romania

Dorota Gawryluk, Bialystok
University of Technology, Poland

Elena Baguzina, Moscow State
Institute of International Relations,
Russian Federation

Elena Garcia Guerrero, University of
Granada, Spain

Elena Seghedin, Alexandru Ioan Cuza
University from Iasi, Romania

Emmanouil Choustoulakis,
University of Peloponnese, Greece

Eva Patrikakou, Depaul University,
USA

Eva Trnová, Masaryk University,
Czech Republic

Evangelina Bonifácio, Polytechnic
Institute of Bragança, Portugal

Fabiana Leta, Universidade Federal
Fluminense, Brazil

Fernando Martin Villena, Universitat
Pompeu Fabra, Spain

Gabriella Velics, Eotvos Lorand
University, Hungary

Georgiana Ciobotaru, Dunarea de Jos
University of Galati, Romania

Gianluca Carella, Politecnico di
Milano, Italy

Gibrán Aguilar Rangel, Autonomous
University of Queretaro, Mexico

Gina Aurora Necula, Dunarea de Jos
University of Galati, Romania

Grainne Ni Dhomhnaill, University
College Dublin, Ireland

Gyongyi Bujdosó, University of
Debrecen, Hungary

Hana Vancova, Trnava University,
Slovakia

Hashini Mohottala, University of
Hartford, USA

Héctor Tronchoni, Florida
Universitaria in Catarroja, Spain

Helin Puksand, Tallinn Univesity,
Estonia

Henri Jacobs, Central University of
Technology, Free State (CUT), South
Africa

Igor Miladinovic, University of
Applied Sciences Campus Vienna,
Austria

Ilijana Cutura, University of
Kragujevac, Serbia

Ina Blau, The Open University of
Israel, Israel

Ioana Letitia Serban, Babes-Bolyai
University, Romania

Ioannis Makris, State Special School /
Directorate of Secondary Education
West Athens, Greece

Irena Petrusic, University Adriatic,
Montenegro

Janaina Cardoso, Rio de Janeiro State
University, Brazil

Javier Casanoves-Boix, University of
Valencia, Spain

Jeannette Jones, Texas Lutheran
University, USA

Jenni Sanguiliano Lonski, Rollins
College, USA

Jitka Hlouskova, Independent
Education Professional, Czech
Republic

Joanna Paliszkiewicz, Warsaw
University of Life Sciences, Poland

John Blake, University of Aizu, Japan

John Smallwood, Nelson Mandela
University, South Africa

Jorge Viguri Cordero, Universitat
Jaume I, Spain

Jose Augusto Oliveira Huguenin,
Universidade Federal Fluminense,
Brazil

Juana M. Ortega Tudela, University
of Jaén, Spain

Juana Maria Sancho Gil, University
of Barcelona, Spain

Jurgita Lenkauskaite, Siauliai
University, Lithuania

Kadi Lukanenok, Tallinn University,
Estonia

Kalliopi Trouli, University of Crete,
Greece

Karel Němejc, Czech University of
Life Sciences Prague, Czech Republic

Katerina Vitásková, Palacky
University in Olomouc, Czech
Republic

Kavita Karan, Southern Illinois
University Carbondale, USA

Krešimir Pavlina, University of
Zagreb, Croatia

Kyparisia Papanikolaou, School of
Pedagogical and Technological
Education, Greece

Ladario da Silva, Universidade
Federal Fluminense (UFF), Brazil

Laura Rio, University of Bologna,
Italy

Lee Ann Rawlins Williams,
University of North Dakota, USA

Leela Ramsook, University of
Trinidad and Tobago, Trinidad and
Tobago

Lefkothea Kartasidou, University of
Macedonia, Greece

Lefkothea-Vasiliki Andreou,
University of Ioannina, Greece

Leila Kajee, University of
Johannesburg, South Africa

Lela Abdushelishvili, International
Black Sea University, Georgia

Les Sztandera, Thomas Jefferson
University, USA

Liga Paula, Latvia University of Life
Sciences and Technologies, Latvia

Lisa Winstead, California State
University, USA

Loredana Terec-Vlad, Stefan Cel
Mare University from Suceava and
Lumen, Romania

Loreta Chodzkiene, Vilnius
University, Lithuania

Lucia Dancisinova, University of
Presov, Slovakia

Luis Gonzaga Roger Castillo,
Universidad de Granada (UGR) /
Centro de Estudios, Spain

Magdolna Chrappán, University of
Debrecen, Hungary

Magne V. Aarset, NLA University College, Norway

Maia Chkotua, International Black Sea University, Georgia

Maira Lescevic, Vidzeme University of Applied Sciences, Latvia

Maja Kerneza, University of Maribor, Slovenia

Malgorzata Cieciora, Polish-Japanese Academy of Information Technology, Poland

Manfred Meyer, Westfälische Hochschule, Germany

Manuel Fernández-Alcántara, University of Alicante, Spain

Marcin Fojcik, Western Norway University of Applied Sciences, Norway

Maria Gonzalez Alriols, University of the Basque Country, Spain

Maria Lopes de Azevedo, Polytechnic Institute of Portalegre, Portugal

Maria Orfila, Rey Juan Carlos University, Spain

Maria Carme Boqué Torremorell, Ramon Llull University, Spain

María José Latorre, University of Granada, Spain

Marko Slavkovic, University of Kragujevac, Serbia

Marta Talavera, University of Valencia, Spain

Marzena Wojcik-Augustyniak, University of Siedlce, Poland

Matthias Baume, Technical University of Munich, Germany

Mayara de Carvalho Santos, State University of Campinas, Brazil

Melissa Caspary, Georgia Gwinnett College, USA

Michael Reiner, IMC University of Applied Sciences Krems, Austria

Michael Wagner, Drexel University, USA

Michail Kalogiannakis, University of Thessaly, Greece

Mike Green, University of Kent, UK

Milan Kubiato, J. E. Purkyne University, Czech Republic

Mohammad Ahmad Abdeldayem, Zagazig University, Egypt

Monica Maier, Technical University of Cluj-Napoca, Romania

Monika Mladenovic, University of Split, Croatia

Nadja Cekolj, University of Rijeka, Croatia

Napak-On Srirakarn, Acknowledge Education, Australia

Natalia Casado, University King Juan Carlos, Spain

Natalie Lavoie, University of Quebec in Rimousk, Canada

Natasa Vlah, University of Rijeka, Croatia

Nazario Zambaldi, Free University of Bolzano, Italia

Ned Ladd, Bucknell University, USA

Nicolás Ruiz-Robledillo, University of Alicante, Spain

Noam Topelberg, Bar Ilan University, Israel

Nora Gavira-Durón, Universidad de las Americas Puebla, Mexico

Olga Dorul, Dunarea De Jos University of Galati, Romania

Omid Noroozi, Wageningen University & Research, The Netherlands

Onur Ergünay, Izmir Democracy University, Turkey

Patrik Schulcz, Esade Business School (Ramon Llull University), Spain

Pavel Brebera, University of Pardubice, Czech Republic

Pavlina Rackova, University of Defence, Czech Republic

Pawel Pokutycki, Royal Academy of Art (KABK), The Hague, The Netherlands

Petros Kefalas, University of York Europe Campus, Greece

Pule Phindane, Central University of Technology, South Africa

Raluca Trifu, UMF Iuli Hatieganu from Cluj Napoca, Romania

Rasa Nedzinskaite-Maciuniene, Vytautas Magnus University, Lithuania

Remigijus Bubnys, Kaunas University of Technology, Lithuania

Richard C. Kalunga, University of the District of Columbia, USA

Ronghuai Huang, Institute of Beijing Normal University, China

Rosanna Tammaro, University of Salerno, Italy

Rusul Alabada, Al-Muthanna University, Iraq

Rút Lenková, University of Presov, Slovakia

Ryuichi Matsuba, Kumamoto University, Japan

Sam Ramaila, University of Johannesburg, South Africa

Seppo Sirkemaa, University of Turku, Finland

Sercan Saglam, American University of the Middle East, Kuwait

Shin Lan, School of Education, Shanghai Normal University, China

Si Xiao, Columbia University, USA

Sigrid Schefer-Wenzl, University of Applied Sciences Campus Vienna, Austria

Silvania Alves de Carvalho, Universidade Federal Fluminense, Brazil

Silvia Doncevova, Comenius University in Bratislava, Slovakia

Silvia Pokrivcakova, Trnava University, Slovakia

Simon Richir, Arts et Metiers (ENSAM), France

Simone Brasili, University of Camerino, Italy

Sinan Olkun, Ankara University, Turkey

Sonia Morante-Zarcero, Rey Juan Carlos University, Spain

Stamatis Papadakis, University of Crete, Greece

Stathis Konstantinidis, University of Nottingham, UK

Stefan Kubica, Technical University of Applied Sciences Wildau, Germany

Stefania Pinnelli, University of Salento, Italy

Stephanie Linek, ZBW – Leibniz Information Centre for Economics, Germany

Susan Scott, Lakehead University, Canada

Susanne Schumacher, Free University of Bozen, Italy

Suzie Savvidou, The University of Sheffield International Faculty, Greece

Syed Ziaur Rahman, University of Kalba, United Arab Emirates

Taina Lintilä, Haaga-Helia University of Applied Sciences, Finland

Tatjana Portnova, Russian Center of the University of Granada, Spain

Temenujka Zafirova Malcheva, Sofia University, Bulgaria

Tena Velki, Josip Juraj Strossmayer University of Osijek, Croatia

Tricia Hudson Matthew, Metropolitan State University of Denver, USA

Turan Paker, Pamukkale University, Turkey

Valeria Di Martino, University of Palermo, Italy

Vashti Singh, University of Guyana, Guyana

Veronica Marin Diaz, University of Cordoba, Spain

Veronica Violant Holz, University of Barcelona, Spain

Verónica Yanez-Monje, Universidad of Concepcion, Chile

Victor Fester, University of Waikato, New Zealand

Wendy Setlalentoa, Central University of Technology, South Africa

Wiktór Bolkunow, Warsaw School of Economics, Poland

Wilton José Diolindo Nascimento Júnior, University of Campinas, Brazil

Xénia Liashuk, Trnava University,
Slovakia

Xiaoyuan Suo, Webster University,
USA

Xiaozhu Lin, Politecnico di Milano,
Italy

Yevgeniya Daineko, International IT
University, Kazakhstan

Youngsoon Kim, Inha University,
South Korea

Zoltán Rónay, Eotvos Loránd
University, Hungary

SPONSOR



<http://www.wiars.org>

KEYNOTE LECTURE

“REIMAGINING CROSS-DISCIPLINARY ACTIVE LEARNING METHODOLOGIES TO ENGAGE EFL STUDENTS”

Dr. Diane Boothe

*Director of P-20 Outreach and Professor, Department of Literacy, Language and Culture,
College of Education, Boise State University, USA*

Abstract

The continued demand and unique learning environment for English as a Foreign Language (EFL) learners is ever changing as educators focus on best practices to promote optimal learning for 21st century students and meet the needs of our complex interdisciplinary globalized world. Central to the demand for revitalizing the classroom experience is to prepare students to enter the evolving workforce. Cutting-edge EFL skills are often tantamount to achieving success in this endeavor and keeping up with the rapid pace of learning. Not only are EFL students expected to demonstrate observable and measurable English skills, but there is a growing interest and stipulation to demonstrate strengths critical to cross-disciplinary fields as well as collaborative active learning methods. This address investigates student-centered instructional methods that focus on the multidimensional perspectives of active learning environments. Experiences from a variety of disciplines will be highlighted including Science, Technology, Engineering and Mathematics (STEM), emphasizing direct EFL preparation to ensure success and promote purposeful collaboration and engaged English learning. Dynamic teaching strategies and methodologies focusing on active, hands-on learning will be discussed. Challenging student-centered activities will be suggested that can be adjusted for a variety of abilities across age groups featuring key transferable English language competencies. Exploration of best practices that build a culture of innovation and prepare students for EFL content areas will be addressed.

***Keywords:** Cross-disciplinary, student-centered, interdisciplinary, multidimensional, competencies.*

Biography

Diane Boothe is Professor of Literacy, Language and Culture at Boise State University, and served as Dean of the College of Education from 2005-2014. Prior to coming to Boise State University, she was the Department Chair of Curriculum and Instruction and Professor at the University of West Georgia. She served as a bilingual teacher, and elementary and middle school principal. Diane has worked consistently with multilingual populations to bring about change and support the development of innovative educational programs and policies. She creates collaborative partnerships and fosters positive relationships with the community, schools, and agencies that she serves. She received her Doctor of Public Administration degree from the University of Southern California. Her primary research efforts have been in the areas of English Language Learning, Multilingual Education, Diversity and Comparative Education Systems. She coauthored a book titled *In the Eyes of the Beholder: Critical Issues for Diversity in Gifted Education*, focusing a chapter on gender and gifted females when identifying the multidimensional perspectives of giftedness. Diane has served in leadership positions as the President of Georgia Teachers of English to Speakers of Other Languages (TESOL), the TESOL International Higher Education Chair, the TESOL International Nominating Committee, and, for ten years, as the editor of the *TESOL in Action Journal*. She has been selected as the keynote or featured speaker and delivered the plenary session for international and national conferences.

INDEX OF CONTENTS

ORAL PRESENTATIONS

Teachers and Students

Students' systematic repetition as a framework for learning algebra: A case study from teachers' professional development <i>Natalia Karlsson, & Wiggo Kilborn</i>	3
The extracurricular professional internship in the teacher training program in the vocational field of healthcare <i>Martin Karstädt</i>	8
Utilizing knowledge and AI cooperation approaches in professional music training — the TUT experience <i>Hua Hui Tseng</i>	13
Students' mathematics self-efficacy and mathematical literacy abilities <i>Eleni Nolka</i>	17
Me&MyCity project and entrepreneurship education <i>Auli Ojala</i>	22
Video and active learning: Exploring the role of films in training future dance teachers <i>Tatiana Sanches</i>	27
Defining and measuring student learning <i>Clay M. Starlin, & Sue Fan Foo</i>	32
Strengthening traditional family values through educational tourism: The example of “Karina Home” guesthouse <i>Karina Stivriņa, & Velta Ļubkina</i>	37
Exploring sexuality in educational and teaching degree programs <i>Valeria Bruno, & Emiliane Rubat Du Mérac</i>	42
Conceptualization of a diagnostic teaching discourse: A case study <i>Natalia Karlsson, & Wiggo Kilborn</i>	47
The association rules for high school teachers in Taiwan participating in in-service continuing education courses <i>Lung-Hsing Kuo, & Pei-Hua Tsai</i>	51
Exploring Ubuntu: Teaching characters in selected drama text as a means of “sharing” and community building <i>Bridget Mangwegape</i>	56
Artificial Intelligence tools in specialized MBA coursework for medical professionals <i>Les M. Sztandera, & Adam Dicker</i>	61
Addressing the need for comprehensive sexuality education in Italy <i>Valeria Bruno, & Emiliane Rubat Du Mérac</i>	65

Exploring teachers' perceptions of self-regulated learning in primary schools: Insights from intermediate-phase teachers in South Africa <i>Keneilwe Agbenyegah, & Bernadette Geduld</i>	69
“Flying school of teaching internships” – in search of an alternative model for implementation of teacher internship <i>Agnieszka Koterwas, Edyta Nowosielska, & Małgorzata Zambrowska</i>	74
An exploration on the association rules of secondary education teacher qualification examination in Taiwan <i>Lung-Hsing Kuo, & Pei-Hua Tsai</i>	79
Development of a driving style feedback method aimed at adaptive learning in safe driving education <i>Maki Arame, Yoshiko Goda, Masashi Toda, & Junko Handa</i>	84
Student teachers' beliefs about self-assessment <i>Ida Szucs Zagyvane</i>	89
Teaching Romani literatures in a global classroom <i>Anita Tarnai</i>	94
Ubiquitous and lifelong learning: A Latin American experience <i>Claudia Cintya Peña Estrada, Gibrán Aguilar Rangel, Omar Bautista Hernández, & Luis Ambrosio Velázquez García</i>	98
Modelling and reflection on instructional activities (MaRIA) framework: The voice of participants in the TAP-TS project <i>Bento Cavadas, Neusa Branco, Elisabete Linhares, Susana Colaço, Conor Galvin, & Elena Revyakina</i>	103
Review of the literature in learning support in STEM education at the higher education level <i>Janak Adhikari, Neil Anderson, & Aidan McGowan</i>	108
Concept definition and concept image of basic spatial geometry concepts among junior high-school pupil <i>Shaker Rasslan, & Samaher Zoabe</i>	113
Exploring mentorship experiences of bachelor of education student teachers during teaching practice: Perspectives on conflict of mentor and mentee roles <i>Ratokelo Willie Thabane</i>	118
Examining the effect of learning management systems (LMSS) on part-time lecturers' teaching practices at a South African university of technology <i>Walter Matete, Paseka Patric Mollo, & Bridget Mangwegape</i>	123
Theoretical lesson framework or design organizational chart <i>Claudia Veronica Ciobanu</i>	128
 <u>Teaching and Learning</u>	
Strategies to improve student engagement: Comparison of assessment results and student feedback <i>Ana Paula Nolasco, Maria Paula Oliveira, & Paolo Vettori</i>	133

Inclusion of learners with barriers to learning in mainstream schools: A psycho-social support intervention	138
<i>Appolonia Masunungure, Thabo Makhalemele, Matabe Rosa Modiba, & Omphile Madiba</i>	
Using concept maps to enhance students' comprehension of telecommunications	143
<i>Gerasimos Pagiatakis, Nikolaos Voudoukis, Dimitrios Uzunidis, & Dimitrios Karaoulanis</i>	
Redefining STEM education: Initiating and developing a pre-college aerospace team	148
<i>Evan L. Barron, Elizabeth H. Kniskern, Kevin L. Simmons, & Shawna L. Christenson</i>	
The emergence of STEAM and its pedagogical implications: A re-evaluation of the psychomotor domain	151
<i>Uchenna Kingsley Okeke, & Sam Ramaila</i>	
Rethinking technology-driven simulation in health education: A qualitative evaluation of low-fidelity approaches	156
<i>Susan Canning</i>	
Teaching law in the age of AI: Time for curriculum reform?	161
<i>Allison Geduld</i>	
STEM and space: Advancing real world aerospace to pre-college students	166
<i>Shawna L. Christenson, John D. Moore, & Kevin L. Simmons</i>	
Teachers' TPACK: Evaluating the strengths and weaknesses of online assessment in K-12 science instruction	171
<i>Uchenna Kingsley Okeke, & Sam Ramaila</i>	
Digital learning communities: A streamlined approach to learning support in technology education	175
<i>Janak Adhikari, Neil Anderson, & Aidan McGowan</i>	
A constructivist pathway to refreshing mathematical understanding	180
<i>Andras Margitay-Becht</i>	
Mystical poetry and sport: An experience of didactic transposition based on the students' interest	185
<i>Yailin Martinez-Hierrezuelo, & Betsaida Sedano Munoz</i>	
What helps you to learn? Insights from university students and feedback from neuroscience	189
<i>Maria ngeles Vicente-Torres</i>	
Employing Kahoot gaming tool to teach electromagnetic propagation and signal transmission through optical fibers	194
<i>Nikolaos Voudoukis, Gerasimos Pagiatakis, Dimitrios Uzunidis, & Dimitrios Karaoulanis</i>	
"How will I manage?" Students' perceptions and expectations before an exam	199
<i>Giulia Maria Cavaletto, & Federica Cornali</i>	
Student competitions: Opportunities to practice interdisciplinary knowledge in practical problem solving	203
<i>Jaana Taar, Kristi Paas, & Tiina Vant</i>	

POSTERS

Teachers and Students

- Transitioning professional curricula to workforce development training: Bridging education and employment** 211
Nancy Nisbett, & Brandon Taylor
- Higher education for social educators in Italy: The impact of the initial training experience on competencies development** 214
Maria Grazia Rionero
- Communication and self-care training for non-teaching university employees** 217
Lenka Hudáková, Viktória Hičárová, & Marta Dobrowolska Kulanová
- Integration in workforce of Québec adults living with Autism Spectrum Disorder or Asperger syndrome** 220
Carole Sénéchal, & Serge Larivée
- Assessing student performance and development for sustainable higher education** 223
Anca Simion, & Otilia Bersan
- Application of project-based learning didactics for a first-year course of electronic engineering** 226
Ta-Chi Jeang, Hung-Cuong Thai, Jun-Ping Shiau, Chia-Jui Yueh, & Hung-Yu Wang
- CP and teacher education: The case of a postgraduate program (P.S.P.) at the University of Crete, Greece** 229
Pelagia Kalogiannaki

Teaching and Learning

- The 2024 total solar eclipse as a driver for engagement and research collaboration between high school and college students** 232
Ned Ladd, Treavor Kendall, & Brian Garthwaite
- Bridging the gap: Teachers' perspectives on the transition from preschool to primary school** 235
Carlotta Degli Esposti, & Ada Cigala
- PharmPath: Virtual immersive simulations and in-person experiential opportunity in pharmacy education for secondary and post-secondary students from underrepresented communities** 238
Aleksandra Bjelajac Mejia, Lachmi Singh, Leanne M. Perry, Jada D'Sa, Mia Maljevic, & Ryan Keay
- Optimizing competency-based learning in engineering: A study on the best-fit methodologies for transversal skills** 241
Fernando Martínez-Gil, Consolación Gil, Jorge Ventura, & Julio Molleda
- The connection between gut-brain axis, anxiety and learning: A micro-scenario for high school students** 244
Maria Anastasiou, Maria-Panagiota Sarafi, Alexandra Miari, & Lefkothea-Vasiliki Andreou

Analysis for characteristics of low-achievers and construction of a classification model using programming data	247
<i>Takuya Hasegawa, & Yosuke Ito</i>	
Unpacking the needs and challenges of embedding soft skills in STEM curricula in EU HEIs	250
<i>Christina Galani, Tomasz Noszczyk, Arkadiusz Dyjakon, Paulina Budryte, Tautvydas Bokmota, Alessandra Tomasini, Francesca Concia, Schleutker Kai, & Cátia Barbosa</i>	
Socio-pedagogical educators and teachers in ECEC services: What is the initial and in service training for professional competencies	253
<i>Maria Grazia Rionero, Patrizia Sposetti, & Giordana Szpunar</i>	
The nutrition nexus: Educating on the science, ethics and health impact of food choices	256
<i>Argyro Kyparissi, & Lefkothea-Vasiliki Andreou</i>	
Spiritual deficiency within health care education	259
<i>Nancy-Angel Doetzel</i>	
Using monthly workshops to drive engagement and repeat visits at the McAuliffe-Shepard Discovery Center	262
<i>Ned Ladd, & Amanda Leith</i>	
Cognitive and linguistic factors predicting different reading comprehension skills in third and fourth Grade students	265
<i>Ioannis Grigorakis</i>	
Sustainability in STEM: Teaching energy awareness in ICT through interdisciplinary approaches	268
<i>Fernando Martínez-Gil, Consolación Gil, Jorge Ventura, Viktor Isanbaev, Raúl Baños, & Alfredo Alcayde</i>	
The violence condition: An active learning STREAM lesson plan for high school students and undergraduates	271
<i>Nikolaos Katsanos, Alexandra Miari, Argyro Kyparissi, & Lefkothea-Vasiliki Andreou</i>	

VIRTUAL PRESENTATIONS

Teachers and Students

Possibilities of using Aharon Appelfeld’s publication Adam and Thomas in teaching literary education <i>Milan Mašát</i>	277
Natural talent: Creating opportunities for aspiring actors in dramatic arts <i>Limkani Sincuba</i>	282
Predicting success in engineering studies: Challenges of early detection of weak signals of STEM-related aptitudes <i>Florentina Alina Grigorescu (Pîrvu), & Cezar Scarlat</i>	287
Experiencing university life away from home: An exploratory study on homesickness in off-site students <i>Paola Corsano, Rosa Triunfo, Cristiana Punzi, & Laura Guidotti</i>	292
I could not have said it better myself – student insights into oral examinations in higher education <i>Pasi Hellsten</i>	297
New approach to mathematics teaching based on the cultural ontology <i>Lina Vinitsky-Pinsky, Maayan Zhitomirsky-Geffet, Artour Mouftakhov, & Leonid Kugel</i>	301
Exploring pre-service economics teachers’ perceptions of micro-teaching: Insights and challenges in teacher preparation <i>Vangile Candice Khumalo, Abelwe Maluleka, & Rhulani Maluleka</i>	306
Action research as a driver of pedagogical innovation: A comparative study of Italian and Spanish teacher education models <i>Alessandro Barca, Donatella Donato, & Maria Concetta Carruba</i>	311
Quantitative analysis of the impact of higher professional technical courses on NEET youth from vocational education pathways <i>Rúben Carvalho, Liliana Pereira, Cláudia Rodrigues, Cristina Pereira, José Barradas, & João Borges</i>	316
Scaffolding in-service science teachers for developing epistemic empathy <i>Valentina Bologna, & Caterina Bembich</i>	321
Student-centered approaches in preservice teacher assessment: voices and experiences from Zimbabwean teacher-training colleges <i>Alice Dhliwayo, & Thuthukile Jita</i>	326
Artificial Intelligence in teacher training: Benefits, challenges and tools <i>Bruno F. Gonçalves</i>	331
Emotional education as part of the curriculum: A model based on the Sedona Method of Emotional Release <i>Iulian Zonenstain</i>	336
Is education a human right? <i>Neno Dimov</i>	341
Exploring the essentials of high-quality student recruitment in universities: A multivariate analysis of geographical and institutional dynamics <i>Bo Peng, Yan Xu, Xinzhu Wu, & Lifang Wang</i>	346

Contemporary vocational education: The key to equal access and a sustainable future <i>Denitsa Dimitrova, & Ivanka Yankova</i>	351
The new teaching profile in basic education: Challenges of sustainable development of the 21st century <i>Cecilia Charles, Esthela Gutiérrez, Elizabeth Gálvez, & José Juan Cervantes</i>	356
Designing entrepreneurs: Structuring an educational framework for design-driven entrepreneurship <i>Gianluca Carella, Marta Conte, & Cabirio Cautela</i>	361
The contribution of STEM education in creating authentic learning and assessment environments in K-12 education <i>Aikaterini Kasimati, Maria Sklaveniti, & Theodora Papageorgiou</i>	366
Development of a second-tier Response to Intervention (RTI) program for fine motor function <i>Carolina Suemy Costa Ariga, & Giseli Donadon Germano</i>	371
Between a rock and a hard place – insights from teaching assistants in higher education <i>Pasi Hellsten</i>	375
Limitations of the use of ChatGPT technology for learning technical subjects in architecture <i>María Jesús Morales-Conde, Paola Villoria-Sáez, Manuel Alejandro Pedreño-Rojas, & César Porras-Amores</i>	380
Bridging the gap between industry and education: Designing courses for economic impact <i>Rúben Carvalho, Liliana Pereira, Cláudia Rodrigues, Cristina Pereira, José Barradas, & João Borges</i>	385
The application of mixed reality in autistic students for educational settings through bibliometric indicators <i>Andrea Cerdán Chacón, Gonzalo Lorenzo Lledó, Santiago Meliá Beigbeder, Diana Gadzhimusieva, & Eliseo Andreu Cabrera</i>	390
Examining teacher perspectives on inclusive education: Insights from South African educators <i>Mziwonke Luningo, Christabel Dudu Mantlana, & Limkani Sincuba</i>	395
Development of intervention case cards to help PBL instructors in reframing their role perceptions <i>Yuriko Ishida, Akiko Kai, Yusei Suzuki, & Ryuichi Matsuba</i>	400
The origin and acquisition of PCK for teaching science: A case of pre-service teachers' planning to teach unforeseen topics in life and natural sciences <i>Tholani Tshuma</i>	405
Art education in the construction of a hopeful future as experienced by art education and teacher students <i>Katri-Helena Rautiainen, & Merja Kauppinen</i>	410
Problems and solutions in adult education in Latvia: Case study of the Zemgale planning region <i>Ginta Kronberga, & Monta Mantrova</i>	415
Musical ability as an ally in reducing psychological distress in school-age students <i>Irene Aliagas, Luis Ponce-de-León, Jesús Privado, Miren Pérez-Eizaguirre, Marta Martínez-Rodríguez, & M^a Dolores Merino</i>	420

Tear-free math assessment for informal learning research	425
<i>Teresa Lara-Meloy, Ken Rafanan, & Elise Levin-Güracar</i>	
“I finally figured out how to do it!” Math and maker identity development	430
<i>Nuria Jaumot-Pascual, Jennifer Knudsen, Elise Levin-Güracar, & Sarah Grams</i>	
Mobile apps for mental health: Best practices and ethical considerations for guideline development	435
<i>Rosina Mete, & Yonghong Tong</i>	
Grade 12 life sciences teachers' understanding of smartboard affordances in teaching genetics	440
<i>Esther Ntombifuthi Gumede, & Lydia Mavuru</i>	
Integrating maker education and project-based learning in business English textbook development: An innovative approach for higher education	445
<i>Fujun Li</i>	
Artificial Intelligence, the ultimate opportunity or threat to the essence and integrity of education	450
<i>Tholani Tshuma</i>	
<u>Teaching and Learning</u>	
University propaedeutic physics: Engineering degrees experience	455
<i>Jason Daza, Lluisa Escoda, Marianna Soler, Jesús Planella, & Joan-Josep Suñol</i>	
Perceived media literacy of first year undergraduate students at a University in Latvia	460
<i>Joseph Jack Horgan</i>	
Motivating dentistry students: A biofilm project to foster engagement and interdisciplinary learning	465
<i>Riánsares Arriazu Navarro, Encarnación Amusquivar Arias, Carlos Bocos de Prada, María José Borrego Gutiérrez, Lucía Guerra Menéndez, Elisa Jiménez Cabré, Esther Lantero Bringas, Úrsula Muñoz Morón, María del Nogal Ávila, María Isabel Panadero Antón, Sergio Portal Núñez, & Julio Sevillano Fernández</i>	
Leveraging H5P to design innovative online learning environments: a case study at a South African university	470
<i>Patrick Thabo Makhubalo, Maglin Moodley, & Alex Mbanze</i>	
An inclusive approach to inspire creativity and team building through modular architecture drawing	475
<i>Francesca Maria Ugliotti, Michele Zucco, & Margherita Cassis</i>	
Teaching and learning philosophies that secondary school teachers use to develop critical-thinking skills in learners in South Africa	480
<i>Bianca Williams, & Celestin Mayombe</i>	
Education of physiotherapy students in the field of movement patterns and analysis of their level	485
<i>Rút Lenková, Stanislava Ivanová, & Marek Kokinda</i>	
The body as a vector of knowledge: The psychomotor approach in the development of the school-age child	490
<i>Rosanna Perrone, Maria Virginia Marchesano, Matteo Abate, & Carmen Palumbo</i>	

HealthTEK eLearning platform: An online approach to on biomedical engineering <i>Begonya García-Zapirain Soto, Jolanta Pauk, Michel Bakni, Javier Sierra, & Aline Dupuy</i>	495
Presentation design for the course tunnel engineering <i>Jianqin Ma</i>	499
Growth through education: A perspective research on short-cycle programs <i>Cristina Coutinho, Cláudia Rodrigues, Ana Francisca Monteiro, Filipe Chaves, Liliana Pereira, & Rúben Carvalho</i>	504
Incorporating GeoGebra discovery into teacher training for the plane geometry study <i>Celina Aparecida Almeida Pereira Abar, & Daniel Mendes Inácio de Souza</i>	509
'Narratives of belonging': Visual literacy through the wordless picturebook 'Clown' <i>Christina Kalaitzi, & Rosy-Triantafyllia Angelaki</i>	513
Self-efficacy and motor performance: The impact of motor-expressive activities in primary school <i>Maria Virginia Marchesano, Valeria Minghelli, & Lucia Pallonetto</i>	518
The role of STEM in data-driven learning in the social sciences <i>Juan Luis Peñaloza Figueroa, & Adolfo Hernández</i>	523
Satisfaction level of Portuguese public primary and secondary school teachers with teaching performance evaluation process <i>Elisa Figueiredo, & Catarina Gonçalves</i>	528
Innovative use of Artificial Intelligence in a materials science subject for analyzing results <i>Jaume Gomez-Caturla, Lourdes Sanchez-Nacher, Teodomiro Boronat, Octavio Fenollar, Carlos Lazaro-Hdez, & Rafael Balart</i>	533
Digital children's literature anthologies: Engaging new literacies with teacher candidates in an introductory course <i>Diane Watt</i>	537
Empowering mental health literacy among vocational education and training-teaching students in Germany <i>Janine Michele, Natalie Banek, & Ariane Steuber</i>	541
Physical education and personalized learning in line with European Union and national standards <i>Matteo Abate, Rosanna Perrone, & Carmen Palumbo</i>	546
Exploring the role of Artificial Intelligence in technical degrees: Insights from building materials subjects <i>César Porras-Amores, Manuel Alejandro Pedreño-Rojas, Marta Rodríguez Aybar, Paola Villoria-Sáez, & María Jesús Morales-Conde</i>	551
Through a child's eyes: Literature as a bridge to understanding post-trauma <i>Yaakova Sacerdoti</i>	555
Growth mindset interventions to enhance phonics learning in early years education: An exploratory study <i>Leah Dawn Rock</i>	560
Health 4.0 paradigm learning using HealthTEK virtual campus <i>Begonya García-Zapirain Soto, Juan Alberto Monasterio, Ainhoa Osa-Sanchez, Ibon Oleagordia-Ruiz, Paulina Cárcamo, & Amaia Mendez-Zorrilla</i>	565

Perceptions of future kindergarten teachers on the use of embodied learning when approaching works of art in preschool education	570
<i>Kalliopi Trouli, & Sofia Trouli</i>	
Remote learning in virtual biology education: Science process skills acquisition in microscopy	575
<i>Mafor Penn</i>	

WORKSHOPS

Teachers and Students

- The 5 CS Framework for effective assessment communication in higher education** 583
Elaine Walsh, & John Knight

Teaching and Learning

- Teaching creative presentations** 586
Izabela Walczak

- Go and Gamify Away** 589
Bárbara Andrez, Paula Menino Homem, & Maria Manuela Pinto

-
- AUTHOR INDEX** 593

AN INCLUSIVE APPROACH TO INSPIRE CREATIVITY AND TEAM BUILDING THROUGH MODULAR ARCHITECTURE DRAWING

Francesca Maria Ugliotti, Michele Zucco, & Margherita Cassis

Department of Structural, Geotechnical and Building, Politecnico di Torino (Italy)

Abstract

Integrating pedagogical innovations and inclusive approaches in university education represents a meaningful strategy to foster active and cooperative learning. Developing transversal skills such as collaboration and critical problem-solving is essential for the technical professions, such as engineers and architects, who face the increasingly complex problems of this millennium. This article describes a team-building experience as part of a first-year course in Building Drawing at Politecnico di Torino, aiming to enhance transversal skills and foster interaction between students from heterogeneous backgrounds. The experiential activity proposes a creative challenge in the field of modular architecture by using the 3D-printed basic element proposed by the architect Walter Gropius. The analysis of the results, conducted using questionnaires and qualitative observations, showed improved relational skills and strengthened student motivation. This experience shows how innovative teaching methodologies can contribute to academic success and prepare students to manage group dynamics in the professional context of building engineering.

Keywords: *Creative design experience, 3D printing, active learning, student engagement, higher education.*

1. Introduction

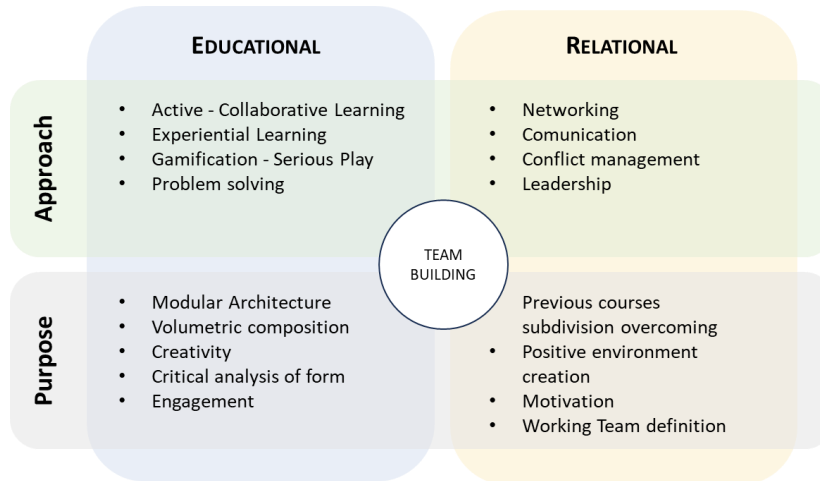
In recent years, team-building activities have emerged as effective tools for improving group dynamics and transversal skills in educational contexts, including university programs. In the field of building engineering, where multidisciplinary collaboration is a fundamental requirement for professional practice, the ability to work in teams is as crucial as technical expertise. However, traditional university courses tend to favour an individualistic approach to learning, overlooking the potential of cooperative methodologies in enhancing both student engagement and their preparation for the workforce. The scientific literature highlights that integrating team-building experiences into higher education can improve academic performance, foster a sense of belonging to the group, and enhance communication skills (Oakley et al., 2004). Recent studies show that approaches such as cooperative learning (Johnson & Johnson, 2017) and problem-based learning promote active learning and collaborative problem-solving for complex issues, thereby improving teamwork management skills. In particular, experiences in the engineering field have demonstrated that practical exercises and project challenges based on collaboration increase student motivation and engagement. Within this context, the present study describes a team-building activity designed for first-year Building Engineering students to develop transversal skills and promote a more cooperative learning process.

2. Methods

The team-building approach was experienced in the Building Drawing course at Politecnico di Torino, which lays the methodological foundations of Drawing as a communication language for engineers. As the first core course of the Building Engineering Bachelor's program, it brings together students who were previously distributed according to different criteria. Concerning this point, the objective of the experiential activity is to establish a collaborative environment and foster students' mutual acquaintance. These aspects are considered essential both for the course, which involves practical work in groups and for establishing effective interpersonal relationships that are fruitful for subsequent teaching. Sixty-five students from diverse educational backgrounds, including high schools, technical institutes, and surveyor schools, attended the experience.

The participatory activity proposes a creative challenge in the field of modular architecture and involves the definition of volumetric forms using the basic modules proposed by the architect Walter Gropius (Seelow, 2018). It has been designed with the dual objective of strengthening the educational experience and developing relational skills, as summarized in Figure 1.

Figure 1. Methodological approach.



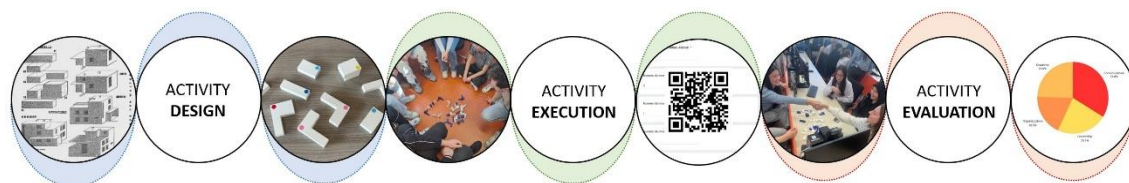
From a pedagogical perspective, adopting active approaches within the course (Ugliotti et al., 2023) is investigated to directly involve students in the educational process, stimulating their participation, reflection, and collaboration. Various techniques such as collaborative and experiential learning, gamification and serious play, and problem solving have been integrated into the experience to establish a synergy between theory and practice in order to facilitate the simultaneous development of disciplinary and transversal soft skills.

Engaging in active learning experiences compels students to confront and solve complex problems in collaborative contexts, thereby stimulating critical thinking, and adaptability. In this case, the activity was also able to foster the critical analysis of form, creativity, volumetric composition, and the use of modular architecture, prompting a deep reflection on expressive and constructive methodologies.

This type of learning impacts on the relational dimension of the students, stimulating skills of communication and networking and bringing out the predisposition to leadership and the need for conflict management. Creating a positive environment, and cultivating shared motivation contribute to forming cohesive and functional workgroups thereby rendering the team building experience a central and transversal component of the educational journey that integrates pedagogical goals with relational needs.

The activity involved three main phases: an initial design phase, a practical execution phase, and a subsequent evaluation phase (Figure 2).

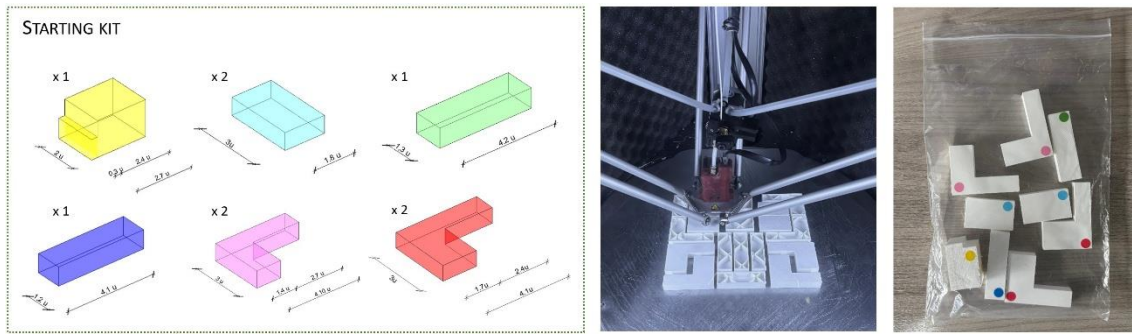
Figure 2. Activity phases.



2.1. Design of the activity

The preparatory phase of the activity entailed the digitalization of Walter Gropius’s 1922 “Baukasten im Großen” modular forms, which were modeled in 3D using Autodesk Revit software. A basic kit consisting of 9 modules was then defined and 40 identical kits were printed via a 3D printer. A simulation conducted with a small group of individuals allowed for the optimal organization of timing, scheduling and dynamics of the activity, identifying its strengths and proactively addressing its weaknesses.

Figure 3. Design phase.

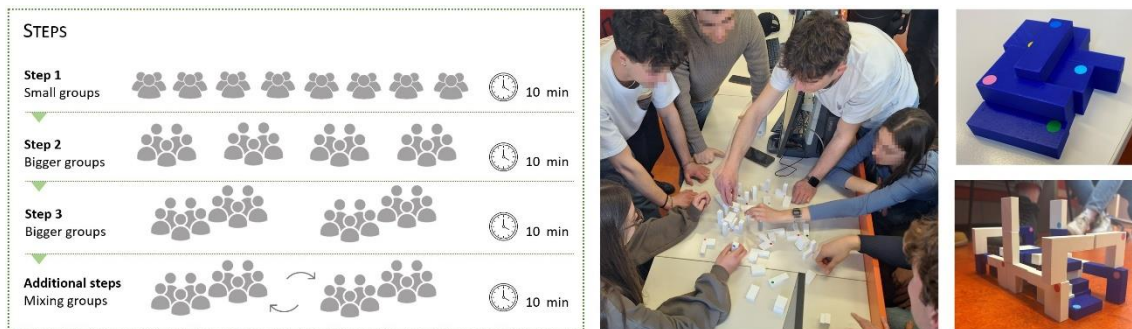


2.2. Execution of the activity

The team-building activity was structured into multiple phases. Initially, the students were divided into groups of two or three individuals based on their physical proximity to each other. Each group was provided with a starter kit and given specific instructions to assemble the modules into free compositions. To ensure a comprehensive record of the activity, each composition created was meticulously documented via the completion of a form specifying the students' names, the number and type of pieces used, the name given to the composition, and the attachment of a photograph. In the subsequent stage of the experiment, the small groups were joined two by two, thereby providing the students with the opportunity to construct using twice the number of modules. The groups were then further reunited without utilizing the logic of proximity, with the aim of fostering new interactions and increasing the number of available pieces. In the following phases, the groups were reorganized without increasing the number of participants, with the sole objective of facilitating interactions among as many individuals as possible.

Each phase lasted 10 minutes, in every phase each composition was documented using the form.

Figure 4. Activity execution.



2.3. Evaluation of the activity

During the activity, the teacher and collaborators paid special attention to qualitative observations of the dynamics among the students and the effectiveness of the planned task. Moreover, a questionnaire was administered to the students at the end of the last session to gather impressions of the teaching approach used and understand the level of engagement achieved.

3. Discussion

The team-building experience revealed several relational dynamics with important pedagogical and social implications. During the activity, the teacher and her collaborators observed that, through a spontaneous presentation phase (Figure 5. a), participants overcame interpersonal barriers, fostering a climate of openness and reciprocity.

From the first phase, devoted to small group formation, different approaches to problem solving emerged. Most participants adopted active collaboration (Figure 5. b), while in some cases a more individualistic approach was observed (Figure 5. c), in which each member focused independently on his or her own construction, emphasizing personal operational styles. In later stages, and thus with larger groups, the relational approach took on even more diverse forms. Some groups adopted parallel methods that facilitated a synergistic and equitable distribution of tasks (Figure 5. d), while others experimented

with sequential strategies (Figure 5. e) in which one segment of the group devoted itself to constructing the form and another to prototyping the composition.

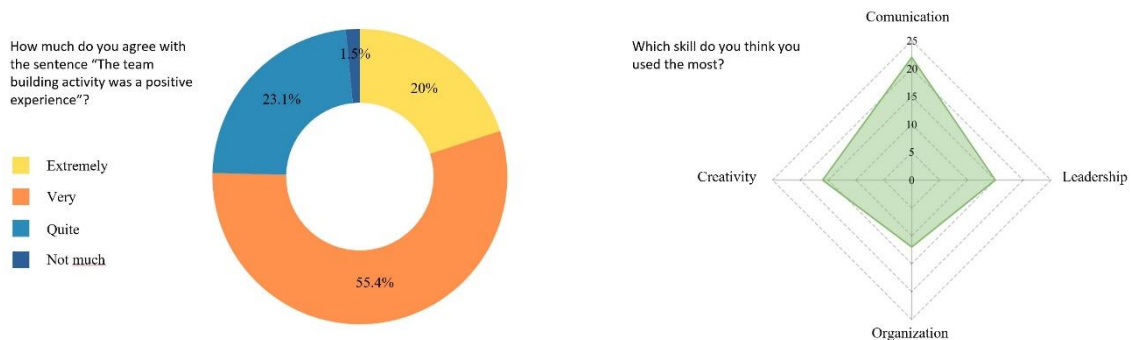
The latter dynamic is symptomatic of a spontaneous predisposition to effective coordination. Just in a few isolated cases, a lack of engagement by some participants was observed, highlighting the need to implement motivational and inclusive strategies, as well as to create an environment more conducive to collaborative activities, in order to encourage active participation and the development of optimal group dynamics.

Figure 5. Main relational dynamics observed.



The post-activity questionnaire highlighted additional experiential and relational dynamics. Over 75% of participants rated the experience as extremely or very positive. In addition, communication and creativity emerged as the most frequently utilized soft skills, proving to be essential for effective teamwork and problem-solving (Figure 6).

Figure 6. Valuation form results.



On the whole, these operational strategies contributed significantly to the development of key relational competencies and soft skills, including communication, networking, conflict management, and leadership. Such skills are indispensable for fostering cohesive and efficient teams in educational contexts, while simultaneously providing valuable preparation for the future Building Engineer.

4. Conclusions

This study has documented and analyzed, from a pedagogical perspective, a team-building activity aimed at enhancing transversal skills and fostering interaction among students from diverse backgrounds. The creative challenge, set in the context of modular architecture, involved the use of building modules inspired by Gropius' designs, modeled and 3D printed, offering participants the opportunity to reinterpret architectural space in their own personal way. In addition, it allowed them to investigate the compositional, graphic, and spatial principles that serve as its theoretical and practical underpinnings.

This approach fostered significant social interaction, stimulating empathy and the ability to critically tackle complex design challenges through dialogue and cooperation. The results highlight a marked improvement in relational and collaborative skills, along with a notable enhancement of creativity made tangible through the use of 3D printing. Furthermore, it is evident that the instructor's role has undergone a progressive transformation, from that of a mere transmitter of knowledge to a designer of comprehensive learning experiences that effectively maximize active student engagement.

Overall, this pedagogical model, replicable in various educational settings, significantly contributes to the discourse on educational innovation, demonstrating how advanced technological tools and interdisciplinary approaches can develop academic and relational competencies on solid, critical, and collaborative foundations, break the monotony of passive listening, and promote widespread, conscious participation.

Acknowledgments

The authors are pleased to thank all the students of the Building Drawing course of the first year of Building Engineering of the Politecnico di Torino who participated enthusiastically in this advanced didactic experimentation.

This contribution is the result of a common work of the Authors. However, specific sections can be attributed as follows: F.M.U. authored the Abstract, Introduction, and Evaluation of the Activity; F.M.U. and M.Z. worked on the Methods; M.C. was responsible for the Activity Design and Execution; M.Z. contributed to the Discussion and the Conclusions

References

- Johnson, D. W., & Johnson, R. T. (2017). Cooperative learning: The foundation for active learning. *Active Learning—Beyond the Future* (pp. 13-30). Springer.
- Oakley, B., Felder, R. M., Brent, R., & Elhadj, I. (2004). Turning student groups into effective teams. *Journal of Student-Centered Learning*, 2(1), 9-34.
- Prince, M. (2004). Does Active Learning Work? A Review of the Research. *Journal of Engineering Education*, 93(3), 223-231. <https://doi.org/10.1002/j.2168-9830.2004.tb00809.x>
- Seelow, A. M. (2018). The Construction Kit and the Assembly Line—Walter Gropius' Concepts for Rationalizing Architecture. *Arts*, 7(4), 95. <https://doi.org/10.3390/arts7040095>
- Ugliotti, F. M., & Zucco, M. (2023). Foster teacher-student interaction in the classroom and active learning through instant polling within the framework of drawing courses. *Proceedings of 16th annual International Conference of Education, Research and Innovation*, 2349-2358. <https://doi.org/10.21125/iceri.2023.0647>

AUTHOR INDEX

Abar, C.	509	Cassis, M.	475
Abate, M.	490, 546	Cautela, C.	361
Adhikari, J.	108, 175	Cavadas, B.	103
Agbenyegah, K.	69	Cavaletto, G.	199
Aguilar Rangel, G.	98	Cerdán Chacón, A.	390
Alcayde, A.	268	Cervantes, J.	356
Aliagas, I.	420	Charles, C.	356
Amusquivar Arias, E.	465	Chaves, F.	504
Anastasiou, M.	244	Christenson, S.	148, 166
Anderson, N.	108, 175	Cigala, A.	235
Andreou, L.-V.	244, 256, 271	Ciobanu, C.	128
Andreu Cabrera, E.	390	Colaço, S.	103
Andrez, B.	589	Concia, F.	250
Angelaki, R.-T.	513	Conte, M.	361
Arame, M.	84	Cornali, F.	199
Ariga, C.	371	Corsano, P.	292
Arriazu Navarro, R.	465	Coutinho, C.	504
Bakni, M.	495	D'Sa, J.	238
Balart, R.	533	Daza, J.	455
Banek, N.	541	de Souza, D.	509
Baños, R.	268	Degli Esposti, C.	235
Barbosa, C.	250	del Nogal Ávila, M.	465
Barca, A.	311	Dhliwayo, A.	326
Barradas, J.	316, 385	Dicker, A.	61
Barron, E.	148	Dimitrova, D.	351
Bautista Hernández, O.	98	Dimov, N.	341
Bembich, C.	321	Doetzel, N.-A.	259
Bersan, O.	223	Donato, D.	311
Bocos de Prada, C.	465	Du Mérac, E.	42, 65
Bokmota, T.	250	Dupuy, A.	495
Bologna, V.	321	Dyjakon, A.	250
Borges, J.	316, 385	Escoda, L.	455
Boronat, T.	533	Fenollar, O.	533
Borrego Gutiérrez, M.	465	Figueiredo, E.	528
Branco, N.	103	Foo, S.	32
Bruno, V.	42, 65	Gadzhimusieva, D.	390
Budryte, P.	250	Galani, C.	250
Canning, S.	156	Gálvez, E.	356
Cárcamo, P.	565	Galvin, C.	103
Carella, G.	361	García-Zapirain Soto, B.	495, 565
Carruba, M.	311	Garthwaite, B.	232
Carvalho, R.	316, 385, 504	Geduld, A.	161

Geduld, B.	69	Kniskern, E.	148
Germano, G.	371	Knudsen, J.	430
Gil, C.	241, 268	Kokinda, M.	485
Goda, Y.	84	Koterwas, A.	74
Gomez-Caturla, J.	533	Kronberga, G.	415
Gonçalves, B.	331	Kugel, L.	301
Gonçalves, C.	528	Kulanová, M.	217
Grams, S.	430	Kuo, L.-H.	51, 79
Grigorakis, I.	265	Kyparissi, A.	256, 271
Grigorescu (Pîrvu), F.	287	Ladd, N.	232, 262
Guerra Menéndez, L.	465	Lantero Bringas, E.	465
Guidotti, L.	292	Lara-Meloy, T.	425
Gumede, E.	440	Larivée, S.	220
Gutiérrez, E.	356	Lazaro-Hdez, C.	533
Handa, J.	84	Leith, A.	262
Hasegawa, T.	247	Lenková, R.	485
Hellsten, P.	297, 375	Levin-Güracar, E.	425, 430
Hernández, A.	523	Li, F.	445
Hičárová, V.	217	Linhares, E.	103
Homem, P.	589	Lorenzo Lledó, G.	390
Horgan, J.	460	Łubkina, V.	37
Hudáková, L.	217	Luningo, M.	395
Isanbaev, V.	268	Ma, J.	499
Ishida, Y.	400	Madiba, O.	138
Ito, Y.	247	Makhalemele, T.	138
Ivanová, S.	485	Makhubalo, P.	470
Jaumot-Pascual, N.	430	Maljevic, M.	238
Jeang, T.-C.	226	Maluleka, A.	306
Jiménez Cabré, E.	465	Maluleka, R.	306
Jita, T.	326	Mangwegape, B.	56, 123
Kai, A.	400	Mantlana, C.	395
Kai, S.	250	Mantrova, M.	415
Kalaitzi, C.	513	Marchesano, M.	490, 518
Kalogiannaki, P.	229	Margitay-Becht, A.	180
Karaoulanis, D.	143, 194	Martínez-Gil, F.	241, 268
Karlsson, N.	3, 47	Martínez-Hierrezuelo, Y.	185
Karstädt, M.	8	Martínez-Rodríguez, M.	420
Kasimati, A.	366	Mašát, M.	277
Katsanos, N.	271	Masunungure, A.	138
Kauppinen, M.	410	Matete, W.	123
Keay, R.	238	Matsuba, R.	400
Kendall, T.	232	Mavuru, L.	440
Khumalo, V.	306	Mayombe, C.	480
Kilborn, W.	3, 47	Mbanze, A.	470
Knight, J.	583	McGowan, A.	108, 175

Mejia, A.	238	Pinto, M.	589
Meliá Beigbeder, S.	390	Planella, J.	455
Mendez-Zorrilla, A.	565	Ponce-de-León, L.	420
Merino, M.	420	Porrás-Amores, C.	380, 551
Mete, R.	435	Portal Núñez, S.	465
Miari, A.	244, 271	Privado, J.	420
Michele, J.	541	Punzi, C.	292
Minghelli, V.	518	Rafanan, K.	425
Modiba, M.	138	Ramaila, S.	151, 171
Molleda, J.	241	Rasslan, S.	113
Mollo, P.	123	Rautiainen, K.-H.	410
Monasterio, J.	565	Revyakina, E.	103
Monteiro, A.	504	Rionero, M.	214, 253
Moodley, M.	470	Rock, L.	560
Moore, J.	166	Rodrigues, C.	316, 385, 504
Morales-Conde, M.	380, 551	Rodríguez Aybar, M.	551
Mouftakhov, A.	301	Sacerdoti, Y.	555
Muñoz Morón, U.	465	Sanches, T.	27
Nisbett, N.	211	Sanchez-Nacher, L.	533
Nolasco, A.	133	Sarafi, M.-P.	244
Nolka, E.	17	Scarlat, C.	287
Noszczyk, T.	250	Sedano Muñoz, B.	185
Nowosielska, E.	74	Sénéchal, C.	220
Ojala, A.	22	Sevillano Fernández, J.	465
Okeke, U.	151, 171	Shiau, J.-P.	226
Oleagordia-Ruiz, I.	565	Sierra, J.	495
Oliveira, M.	133	Simion, A.	223
Osa-Sanchez, A.	565	Simmons, K.	148, 166
Paas, K.	203	Sincuba, L.	282, 395
Pagiatakis, G.	143, 194	Singh, L.	238
Pallonetto, L.	518	Sklaveniti, M.	366
Palumbo, C.	490, 546	Soler, M.	455
Panadero Antón, M.	465	Sposetti, P.	253
Papageorgiou, T.	366	Starlin, C.	32
Pauk, J.	495	Steuber, A.	541
Pedreño-Rojas, M.	380, 551	Stivriņa, K.	37
Peña Estrada, C.	98	Suñol, J.-J.	455
Peñaloza Figueroa, J.	523	Suzuki, Y.	400
Peng, B.	346	Szpunar, G.	253
Penn, M.	575	Sztandera, L.	61
Pereira, C.	316, 385	Taar, J.	203
Pereira, L.	316, 385, 504	Tarnai, A.	94
Pérez-Eizaguirre, M.	420	Taylor, B.	211
Perrone, R.	490, 546	Thabane, R.	118
Perry, L.	238	Thai, H.-C.	226

Toda, M.	84
Tomasini, A.	250
Tong, Y.	435
Triunfo, R.	292
Trouli, K.	570
Trouli, S.	570
Tsai, P.-H.	51, 79
Tseng, H.	13
Tshuma, T.	405, 450
Ugliotti, F.	475
Uzunidis, D.	143, 194
Vänt, T.	203
Velázquez García, L.	98
Ventura, J.	241, 268
Vettori, P.	133
Vicente-Torres, M.	189
Villoria-Sáez, P.	380, 551
Vinitsky-Pinsky, L.	301
Voudoukis, N.	143, 194
Walczak, I.	586
Walsh, E.	583
Wang, H.-Y.	226
Wang, L.	346
Watt, D.	537
Williams, B.	480
Wu, X.	346
Xu, Y.	346
Yankova, I.	351
Yueh, C.-J.	226
Zagyvane, I.	89
Zambrowska, M.	74
Zhitomirsky-Geffet, M.	301
Zoabe, S.	113
Zonenstain, I.	336
Zucco, M.	475