# Book of Abstracts
# DIGIAI SOCIETY 2025

## Disclaimer

This book contains abstracts approved by the Congress Review Committee. Authors are responsible for the content and accuracy.

Opinions expressed may not necessarily reflect the position of the international scientific council of DIGIAI SOCIETY 2025.

# International Congress on Digitalization, Artificial Intelligence, and Society (DIGIAI SOCIETY)


**Oludeniz, Turkey**

**October 21-27, 2025**

## Invited Speakers

| | |
|---|---|
| Nataliya Venelinova | University of Ruse, Bulgaria |
| Jesús Martínez | UAB, Spain |
| Karin Wolf-Ostermann | Universität Bremen, Germany |
| Nor Hasliza Md Saad | Universiti Sains Malaysia, Malaysia |
| Plamen Zahariev | University of Ruse, Bulgaria |
| Muhuntha Sri-Ganeshan | Monash University, Australia |
| Tsvetelina D. Georgieva | University of Ruse, Bulgaria |
| Daniel Bratanov | University of Ruse, Bulgaria |
| Miglena Koleva | University of Ruse, Bulgaria |
| Irina Kostadinova | University of Ruse, Bulgaria |
| Teodora Hristova | University of Ruse, Bulgaria |
| Iliya Iliev | University of Ruse, Bulgaria |
| Alexandar K. Ivanov | University of Ruse, Bulgaria |
| Maria P. Nikolova | University of Ruse, Bulgaria |
| María Luisa García Torres | Universidad Alfonso X el Sabio, Spain |
| Emy Ezura A. Jalil | Universiti Utara Malaysia, Malaysia |
| Joan Navarro | Ramon Llull University, Barcelona, Spain |
| Syed Amir Hamza | Heilbronn University, Germany |
| Donghan Wang | Communication University of China, China |
| Zakaria Abdiwali Mohamed | University of Kabridahar, Ethiopia |
| Dragan Peraković | University of Zagreb, Croatia |
| Judit Oláh | John von Neumann University, Hungary |
| Alexandrina Mangau | Technical University of Cluj-Napoca, Romania |
| Deepika Chaudhary | K.R. Mangalam University, India |

| | |
|---|---|
| Musab Rabi | Jerash University, Jordan |
| Noor Sawalmeh | University of Jordan, Jordan |
| Abdifetah Ahmed Rabi | University of Kabridahar, Ethiopia |
| Zhiyong Li | Communication University of China, China |
| Lin Wang | Communication University of China, China |
| Magdalena Grobler | North-West University, South Africa |
| Chenghu Zhang | Communication University of China, China |
| Monika Gwozdz-Lason | University of Bielsko-Biala, Poland |
| Hassan Kaya | University of KwaZulu-Natal, South Africa |
| Vhulenda Negota | University of Venda, South Africa |
| Iliya Iliev | Angel Kanchev University of Ruse, Bulgaria |
| Mayashree Chinsamy | African Institute in Indigenous Knowledge Systems, South Africa |
| Evgeniia Kashina | Lomonosov Moscow State University, Russian Federation |
| Roberta Pierfederici | London School of Economics, UK |
| Ivan Cvitić | Faculty of Transport and Traffic Sciences, University of Zagreb, Croatia |

## Chair

Ersin Kayahan Kocaeli University, Turkey

## Organizing Committee

| | |
|---|---|
| Ersin Kayahan (Chair) | Kocaeli University, Turkey |
| A. Yavuz Oral | Gebze Technical University, Turkey |
| Desislava Atanasova | University of Ruse, Bulgaria |
| Karin Wolf-Ostermann | Universität Bremen, Germany |
| Nataliya Venelinova | University of Ruse, Bulgaria |
| Hassan Kaya | University of KwaZulu-Natal, South Africa |

## Scientific Committee

**PLENARY SPEAKER**

**Id-51**

# Artificial Intelligence in Nursing Care - Opportunities and Challenges for Research and Practice

K. WOLF-OSTERMANN*

Universität Bremen, Germany

*Corresponding author: wolf-ostermann@uni-bremen.de

**Abstract.** In many countries, providing care for a growing number of older adults poses a significant challenge—particularly due to the shortage of nurses and other healthcare professionals. One clear solution is the targeted and expanded use of innovative technologies such as artificial intelligence (AI). The main goal of integrating AI into nursing care is clear: to support healthcare workers and family caregivers, while also enhancing the autonomy and quality of life of those in need of care. Access to high-quality, representative data is a fundamental requirement for the effective use of AI, and outside hospitals often make this challenging. Implementing AI in care processes demands the active involvement of all relevant stakeholders, including healthcare institutions, educational organizations, nurses, and patients. This will require new approaches to training and cooperation. But implementation challenges extend beyond technical and regulatory requirements; social, ethical, and practical factors must also be addressed. Although use-cases outside hospitals and have not been explored extensively, AI has a great and increasing potential to support nurses, informal cares but also care dependent persons in acute and long-term care. The presentation will provide a concise overview of the needs and challenges for AI in nursing care and show case examples of AI's applications in nursing practice. Since AI projects in nursing often fail to address requirements and known pitfalls, a newly developed AI-Nursing-Care-Readiness-Assessment tool to support planning, implementing, and evaluating AI projects will be presented.

**Keywords:** AI-Nursing-Care-Readiness-Assessment; Hybrid Systems; Long-term Care; Machine Learning; Nursing Care.

**PLENARY SPEAKER**

**Id-58**

# E-Commerce: Urban Logistics Factors and Last-Mile Delivery Performance

E. E. A. JALIL*

Universiti Utara Malaysia, Malaysia

*Corresponding author: ezura@uum.edu.my

**Abstract:** This study examines the influence of urban logistics elements on last-mile delivery efficacy for e-commerce in Malaysia. With the increasing popularity of online purchasing, there is a heightened demand for fast last-mile delivery. This study examines four critical aspects that affect delivery performance: traffic conditions, infrastructure, technology, and regulation. To assess those ties, 390 respondents, comprising merchants and couriers, were administered structured questionnaires. The results indicate that infrastructure is the paramount factor influencing last-mile delivery performance, whereas traffic circumstances are the least significant among the four key variables. Investment in infrastructure, including improved road networks and delivery hubs, will raise operating standards and customer satisfaction. The utilization of technology, including GPS tracking and automation, enhances delivery precision and time management. Efficient rules and optimized traffic circumstances facilitate the enhancement of delivery operations. The paper emphasizes the necessity for investments in urban logistics systems and collaborative initiatives among policymakers, logistics providers, and stakeholders to address these challenges. By understanding the critical elements influencing last-mile delivery strategies, this paper offers practical solutions for enhancing e-commerce logistics strategies to ensure sustained growth and customer satisfaction.

**Keywords:** Urban Logistics; E-Commerce; Logistics Strategies.

**INVITED SPEAKER**

**Id-60**

# Engagemate: Towards the Digitalization of Educational Environments to Improve Teaching and Learning Experiences

J. NAVARRO[1], O. GÓMEZ-CARMONA[2], M. FERNÁNDEZ-DE-RETANA[3], X. SOLÉ-BETETA[4] , E. VİDAÑA-VİLA[3] , D. CASADO-MANSİLLA[3], D. LÓPEZ-DE-IPİÑA[3]

[1]Smart Society, La Salle Campus Barcelona, Ramon Llull University, Barcelona, Spain,

[2]Deustotech - University of Deusto, Bilbao, Spain

[3]Faculty of Engineering - University of Deusto, Bilbao, Spain,

[4]Smart Society, La Salle Campus Barcelona, Ramon Llull University, Barcelona, Spain, Human Environment Research, La Salle Campus Barcelona (Ramon Llull University), Barcelona, Spain

Corresponding author: jnavarro@salleurl.edu

**Abstract:** The advent of the Internet of Things (IoT), combined with artificial intelligence (AI) and the rapid advancement of edge computing technologies, has significantly expanded the range of domains that can leverage these innovations to improve societal well-being: from smart agriculture and environmental monitoring to urban traffic optimization or assisted healthcare. However, educational environments—particularly physical classrooms—have largely remained untouched by these advances. Apart from the incorporation of digital technologies such as digital whiteboards, audience response systems (e.g., clickers), learning management systems, and classroom occupancy sensors—often grouped under the “smart campus” paradigm—most innovations in this area have primarily focused on infrastructure management and energy efficiency, while largely overlooking their potential to directly enhance the teaching and learning experience. As a result, the core layout and pedagogical functionality of classrooms have remained relatively unchanged despite the potential offered by these innovations. In this work, we present the outcomes of a five-year research initiative in which we have reconceptualized educational environments as IoT ecosystems capable of autonomously sensing the development of the lecture being carried in the classroom and providing valuable Big Data and insights to enhance both teaching and learning experiences. Specifically, we explore the deployment of an in-classroom IoT domain consisting of a network of low-cost, embedded devices that collect multimodal data, including ambient light levels, noise, temperature, humidity, air quality, teacher and student engagement, and the nature of ongoing learning activities. The Big Data generated by this IoT domain are processed locally using a suite of AI algorithms, from classical models such as support vector machines to advanced deep learning architectures for computer vision tasks. The insights obtained are delivered through a unified, web-based dashboard designed to provide lecturers with real-time, actionable feedback. This interface enables teachers to objectively monitor the progress of the lecture and adapt their teaching strategies dynamically to improve the learning and teaching experiences. Our research follows a dual-perspective approach. First, we investigate the acceptance, usability, and perceived value of the proposed system among both students and lecturers, particularly in terms of its capacity to monitor environmental and behavioral classroom dynamics. Second, we assess the system’s potential to augment the pedagogical capabilities of instructors, again from the perspective of both types of users. Importantly, this research has been conducted in full compliance with ethical guidelines and current European regulations, including the constraints and requirements imposed by the AI Act, ensuring responsible data collection, privacy protection, and transparency in algorithmic decision-making. Results indicate promising avenues for integrating edge-AI-powered IoT systems in education, paving

the way for more adaptive and responsive teaching environments committed not only to improve energy efficiency and resource management, but also to enhance the teaching and learning experience of their users. Unlike traditional smart campus solutions, our approach places users—not infrastructure—at the center of technological innovation in educational spaces. Future work will focus on integrating all the devices into a single and portable platform while exploring long-term impacts on learning outcomes (e.g., academic performance) across diverse educational settings.

**Keywords:** IoT in Education; Edge Computing; Artificial Intelligence; Smart Classrooms; Big Data and Learning Analytics

**INVITED SPEAKER**

**Id-67**

# Adoption of Artificial Intelligence (AI) in Marketing to Attain Sustainability in the Digital Business Era: Evidence from E-Commerce Business in an Emerging Economy

M. B. AMIN[1], H. IMAM[1], J. DR. OLÁH[2]*

[1]Doctoral School of Management and Business, Faculty of Economics and Business, University of Debrecen, Hungary

[2]Faculty of Economics and Business, University of Debrecen; Doctoral School of Management and Business Administration, John von Neumann University; College of Business and Economics, University of Johannesburg, Johannesburg 2006, South Africa, Hungary

*Corresponding author: olah.judit@econ.unideb.hu

**Abstract.** In this present digital revolution, e-commerce organizations must adopt digital transformation by integrating advanced technologies, such as AI-driven marketing strategies, supported by a culture of technological information and capabilities to improve operational efficiency, customer engagement, and sustainability. This study aims to examine the effects of technologies and digital information culture on organizational sustainability, considering the mediating function of artificial intelligence (AI) in marketing and the moderating effect of ethical considerations about AI. A sample of 418 Bangladeshi e-commerce organization's managers was chosen to examine the findings, and PLS-SEM (version 4) was used to evaluate the hypotheses of the suggested structural model. The findings demonstrated that technical information culture and skills significantly influence AI adoption for marketing and sustained organizational success. Additionally, AI adoption for marketing (AIAM) serves as a partial mediator between technological information culture and sustainable performance, as well as between technological capabilities and sustainable performance. However, the ethical consideration of AI demonstrated an insignificant moderating effect on the relationship between technological information culture and AI adoption for marketing. The findings indicate that, in the digital revolution, the success of e-commerce enterprises relies on the use of cutting-edge technology, artificial intelligence, and an information-centric culture.

**Keywords:** AI adoption in marketing; Organizational sustainability; Technological information culture; Technological capabilities; Ethical consideration of AI

**INVITED SPEAKER**

**Id-68**

# The Role of AI in Circular Economy Systems

A. MANGAU

Technical University of Cluj-Napoca, Romania

*Corresponding author: alexandra_alexa198@yahoo.com

**Abstract:** The image of modern society has undergone dramatic changes over time, determined by the occurrence of key-events within its evolutionary process, such as economic expansion, excessive technologization, exacerbation of the political-social component and the accentuation of environmental problems. Consequently, the aforementioned context has facilitated in recent decades the theoretical imposition of a relatively new concept, in continuous metamorphosis, favorable to debate in the academic environment and extremely attractive to practitioners everywhere: the Circular Economy (CE) . In relation to the economic, social and environmental dimensions of the contingent reality, CE is perceived as a viable tool for managing the main problems of today's society and for ameliorating the climate crisis. The implementation of CE is a complex and long-term process, which involves both the collaboration of all responsible actors and the application of the most appropriate measures, actions and means (at the technical, economic, legislative, psycho-social levels). By virtue of the dynamic nature of CE, its application in various fields aims at adapting to technology, science and innovation. Technology is currently seen as a “catalyst of CE”. Transforming an economic system into a high-performance and sustainable one involves interactions with various emerging concepts, within which Artificial Intelligence (AI) occupies a well-defined position. Research in the field identifies the rising trend of involving AI in all dimensions of the CE ; innovative digital technologies such as AI are considered indispensable ways to solve certain aspects associated with creating an intelligent CE. The results of a study initiated by the Ellen MacArthur Foundation highlight the contribution of AI in terms of the possibility of creating a regenerative CE and of easier resizing of this economic system. It is appreciated that AI mechanisms have the capacity to “chisel” the strategies characteristic of the circular economic model (especially in the recycling industry) and, at a theoretical level, they can bring changes in the paradigm associated with the field of resource recovery and waste management. The estimated material benefits resulting from waste reduction due to the application of AI in industries such as agri-food and electronics are considered significant. Other opinions connect the integration of AI in different economic sectors with: boosting economic performance, increasing operational efficiency, optimizing production and supply chains, reducing times in production processes, developing new categories of services and products and the emergence of new business models. Despite the enthusiasm expressed, some opinions nevertheless express reservations about the intensive use of AI mechanisms in industrial sectors, which, for example, could disrupt the labor market in the future, negatively impacting the human factor (massive layoffs, social and financial consequences, affecting the quality of human life). In such a hypothesis, the following research question arises as legitimate: What is the threshold of acceptability of AI involvement in the sphere of economic circularity, so that the application of such a mechanism guarantees the simultaneous achievement of the highest standards of safety, efficiency and progress. The exploitation of the research methodology applied to the working hypothesis (especially the comparative analysis carried out on case studies related to the CE field) leads to highlighting the most important conclusions (research results), which capture: the attestation of CE and AI as modern symbiotic concepts ; the affirmation of the usefulness of AI "interference" in the CE field, giving "added value" to the effective application process ; the identification of some limits related to the admission of AI action

in the CE field, in accordance with two aspects: the precautionary-preventive character incorporated by the notion of CE and the implications on the human factor. The scientific approach undertaken can serve as a useful starting point for further research in the field.

**Keywords:** Circular Economy; Artificial Intelligence; Implementation; Benefits; Research

**References:**

1. J. Korhonen, C. Nuur, A. Feldmann, S. E. Birkie, Circular economy as an essentially contested concept, J. Clean Prod. 175, 544–552 (2018). doi:10.1016/j.jclepro.2017.12.111
2. R. Merli, M. Preziosi, A. Acampora, How do scholars approach the circular economy? A systematic literature review. J. Clean Prod. 178, 703–722 (2018). doi:10.1016/j.jclepro.2017.12.112
3. D. Lazarevic, H. Valve, Narrating expectations for the circular economy: Towards a common and contested European transition, Energy Res. Soc. Sci. 31, 60–69 (2017). doi:10.1016/j.erss.2017.05.006
4. E. Dumitrașcu, "Economia Circulară în era digitală: Impactul tehnologiei asupra sustenabilității și a creșterii economice" (13.11.2023). Available online: https://www.constructiibursa.ro/economia-circulara-in-era-digitala-impactul-tehnologiei-asupra-sustenabilitatii-si-a-cresterii-ec-4021137
5. A. A. Noman, U.H. Akter, T. H. Pranto, B. AKM Haque, Machine Learning and Artificial Intelligence in Circular Economy: A Bibliometric Analysis and Systematic Literature Review. Annals of Emerging Technologies in Computing (AETiC) vol. 6, no 2 (2022). DOI:10.33166/AETiC.2022.02.002
6. Ellen MacArthur Foundation, "Artificial intelligence and the circular economy: AI as a tool to accelerate the transition" (01.01.2019). Available online: https://www.ellenmacarthurfoundation.org/artificial-intelligence-and-the-circular-economyArtificial Intelligence and the Circular Economy
7. S. Raut, N. U. I. Hossain, M. Kouhizadeh, S. A. Fazio, Aplication of artificial intelligence in circular economy: A critical analysis of the current research. Sustain. Futures vol. 9 (2025). https://doi.org/10.1016/j.sftr.2025.100784
8. L. Neagu, "Inteligența artificială în industria de reciclare. O fabrică din România, va aduce pe piață primul sistem robotizat capabil să detecteze bateriile din echipamentele electronice" (16.12.2022). Available online: https://www.economica.net/inteligenta-artificiala-in-industria-de-reciclare-o-fabrica-din-romania-va-aduce-pe-piata-primul-sistem-robotizat-capabil-sa-detecteze-bateriile-din-echipamentele-electronice_635105.html
9. C.-I. Marcu, "Inteligența artificială în domeniul economic și provocările pe care le generează" (18.04.2024). Available online: https://edict.ro/inteligenta-artificiala-in-domeniul-economic-si-provocarile-pe-care-le-genereaza/
10. M. Copilău, I. A. Bușe, "Cum ne influențează viața noile tehnologii?" (31.07.2023). Available online: https://www.juridice.ro/697977/cum-ne-influenteaza-viaţa-noile-tehnologii.html
11. H. H. Jensen, "Mastering the circular economy and AI to stay competitive". WEE (07.08.2025). Available online: https://www.weforum.org/stories/2025/08/why-you-must-master-the-circular-economy-and-ai-to-stay-competitive-by-2030/
12. J. P. Singh, Artificial Intelligence in Circular Economies: A Pathway to Sustainable Resource Management. Internat. J. Sci. and Res. (IJSR) vol. 12 Issue 12 (2023). DOI: https://dx.doi.org/10.21275/SR231214040053

**INVITED SPEAKER**

**Id-75**

# AI-Driven Digital Health Innovation for Low-Resource Settings: Scaling Impact from Clinics to Communities

M. GROBLER

North-West University, South Africa

*Corresponding author: leenta.grobler@nwu.ac.za

**Abstract.** Access to quality healthcare in low-resource environments remains constrained by limited infrastructure, workforce shortages, and fragmented service delivery. Artificial intelligence (AI) offers transformative potential to address these challenges by enabling affordable, scalable, and context-appropriate digital health solutions. This presentation explores how AI-powered innovations can extend the reach of care from clinics into communities, improving early diagnosis, monitoring, and continuity of care. Drawing on applied research at North-West University, the presentation highlights three case studies: the Monitor-T system for AI-enabled infant growth and malnutrition monitoring; the NeuHand platform for post-stroke digital rehabilitation and behavioural adherence; and PharmaFlow, a mobile-based solution for pharmaceutical stock management in public healthcare facilities . Each case illustrates how AI, integrated with mobile technologies and remote monitoring, can support both urban and rural health systems. The discussion will address regulatory compliance (including SAHPRA and international standards such as ISO 13485 and IEC 62304), design for usability by non-specialist health workers, and the ethical imperatives of data governance. Key lessons include the necessity of co-design with communities, the importance of interoperability in resource-limited digital ecosystems, and the role of partnerships in scaling sustainable impact. The presentation concludes by positioning AI not merely as a hospital-based innovation, but as a community enabler that can bridge inequities in healthcare access. By aligning scientific rigour with social responsibility, AI-driven digital health systems can catalyse equitable, scalable, and sustainable improvements in health outcomes across Africa and beyond.

**Keywords:** Africa; Artificial Intelligence; Community Health; Digital Health Innovation; Low-Resource Settings; Remote Patient Monitoring

International Congress on Digitalization, Artificial Intelligence, and Society

**INVITED SPEAKER**

**Id-79**

# Green and Intelligent: The Role of AI in the Climate Transition

R. PIERFEDERICI*

London School of Economics, United Kingdom

*Corresponding author: r.pierfederici@lse.ac.uk

**Abstract.** Artificial Intelligence (AI) can play a powerful role in supporting climate action while boosting sustainable and inclusive economic growth. However, limited research exists on the potential influence of AI on the low-carbon transition. Here we identify five areas through which AI can help build an effective response to climate threats. We estimate the potential for greenhouse gas (GHG) emissions reductions through AI applications in three key sectors—power, food, and mobility—which collectively contribute nearly half of global emissions. This is compared with the increase in data centre-related emissions generated by all AI-related activities.

**Keywords:** AI, Artificial Intelligence; Climate Change; Low-Carbon Transition.

**INVITED SPEAKER**

**Id-81**

# AI and Space Exploration: The New Frontier

E. KASHINA*

Lomonosov Moscow State University, Russian Federation

*Corresponding author: Kashina.evgenia@outlook.com

**Abstract.** While scholars, AI experts and professionals in many domains discussing about consequences and changes that might bring artificial intelligence to society on Earth, it is essential to find out how much this new computer-based technology might be helpful for the humanity outside of Earth. Taking into account the numerous advancements, that AI provides in medicine, governance, security, transportation, energy and education to the humanity, it is necessary to underline that nowadays the leading scientists and engineers, leading space firms and organizations who develop and provide on-edge AI technologies have made a huge leap in regard of their applying into space exploration and space science. For example, this tool can serve the space industry and reusable rocket's design composition, can improve significantly mission planning, can be applied in astrophysics as well as be useful and indispensable for human astronauts' phycological well-being and health monitoring. Thus, by exploring how AI could improve and simultaneously simplify space exploration and related tasks for humans, it could enable significant progress in this domain charting the contours of a new frontier in the development of humanity as a civilization. Considering the projects of the leading firm in this industry, such as SpaceX, that is strongly aligned with other projects of its CEO, wildly based on expansion and increase in the use of artificial Intelligence and accelerated robotization. Matching several projects within tech industry, the new step in application of new engineering solutions including the implementation of AI with the support of NASA as the primary government partner in this future implementation. Having begun as a theoretical project sketched out on paper and implemented in other practical areas, it is approaching to the real-world implementation in the space industry and will lead to a breakthrough in future space exploration. It is expected that the human's capacity of its limited understanding of space design will reach qualitatively new heights.

**Keywords:** Space Exploration; Space İndustry; Public-Private Partnership; Spacex; NASA; AI Enforcement; İnnovation; Technological Breakthrough.

**ORAL PRESENTATION**

**Id-80**

# International Workshop on Youth, Frontier Technologies and Indigenous Knowledge Systems in Disaster Risk Reduction and Resilience Management

M. CHINSAMY*, H. KAYA

African Institute in Indigenous Knowledge Systems, South Africa

*Corresponding author: Chinsamym@ukzn.ac.za

**Abstract.** international workshop focused on empowering African and Turkish youth to address global challenges through a unique synthesis of Frontier Technologies, Indigenous Knowledge Systems (IKS), And Home-Grown Philosophies. The workshop, titled "Global Challenges, Just Transition and Governance: Challenges and Opportunities," will serve as a collaborative platform to explore and co-create innovative, equitable solutions. It will move beyond a purely technical or traditional approach, instead fostering a holistic framework that integrates climate and environmental justice, disaster risk reduction, food security, and green entrepreneurship with cultural, diplomatic, and governance considerations. The core objective is to build the capacity of young leaders and establish a lasting, cross-regional network committed to driving a just and inclusive global transition.

**Keywords:** Indigenous Knowledge Systems; Frontier Technologies; Youth

International Congress on Digitalization, Artificial Intelligence, and Society

**ORAL PRESENTATION**

**Id-83**

# Youth, Frontier Technologies and Indigenous Knowledge Systems in Disaster Risk Reduction and Resilience Management

H. KAYA[1]*, M. CHINSAMY[1,] V. NEGOTA[2]

[1]University of KwaZulu-Natal, South Africa

[2]University of Venda, South Africa

*Corresponding author: kaya@ukzn.ac.za

**Abstract.** This document outlines a proposed international workshop focused on empowering African and Turkish youth to address global challenges through a unique synthesis of Frontier Technologies, Indigenous Knowledge Systems (IKS), And Home-Grown Philosophies. The workshop, titled "Global Challenges, Just Transition and Governance: Challenges and Opportunities," will serve as a collaborative platform to explore and co-create innovative, equitable solutions. It will move beyond a purely technical or traditional approach, instead fostering a holistic framework that integrates climate and environmental justice, disaster risk reduction, food security, and green entrepreneurship with cultural, diplomatic, and governance considerations. The core objective is to build the capacity of young leaders and establish a lasting, cross-regional network committed to driving a just and inclusive global transition.

**Keywords:** Youth; Frontier Technologies; Indigenous Knowledge Systems; Disaster Risk Reduction; Resilience Management; South Africa; Turkey

International Congress on Digitalization, Artificial Intelligence, and Society

**ORAL PRESENTATION**

**Id-84**

# The Social Impact of Digitalization and AI

V. NEGOTA*

University of Venda, South Africa

*Corresponding author: Vhulenda.Negota@univen.ac.za

**Abstract.** This document outlines a proposed international workshop focused on empowering African and Turkish youth to address global challenges through a unique synthesis of Frontier Technologies, Indigenous Knowledge Systems (IKS), And Home-Grown Philosophies. The workshop, titled "Global Challenges, Just Transition and Governance: Challenges and Opportunities," will serve as a collaborative platform to explore and co-create innovative, equitable solutions. It will move beyond a purely technical or traditional approach, instead fostering a holistic framework that integrates climate and environmental justice, disaster risk reduction, food security, and green entrepreneurship with cultural, diplomatic, and governance considerations. The core objective is to build the capacity of young leaders and establish a lasting, cross-regional network committed to driving a just and inclusive global transition.

**Keywords:** Youth Empowerment; Frontier Technologies; Indigenous Knowledge Systems; Disaster Risk Reduction; Resilience Management; Global Challenges.

International Congress on Digitalization, Artificial Intelligence, and Society

**POSTER PRESENTATION**

**Id-61**

# Introducing Machine Learning to Children: A Practical and Intuitive Approach Using Lego Robotics and Interactive AI Tools

E. VIDAÑA-VILA[1]*, J. NAVARRO[1], A. BARCO[2], M. ARAMBURU-GARCIA[2], A. B. LAGO[2], O. MARTÍN-CARRASQUILLA[3], E. SANTAOLALLA- PASCUAL[3], B. GARCIA-ZAPIRAIN[4], C. RODRÍGUEZ-HIDALGO[5]

[1]La Salle - Ramon Llull University, Spain

[2]University of Deusto, Spain

[3]Universidad Pontificia Comillas, Spain

[4]Deusto University, Spain

[5]Universidad Adolfo Ibáñez, Chile

*Corresponding author: ester.vidana@salle.url.edu

**Abstract:** This work presents an innovative educational initiative aimed at introducing primary school students (ages 10–12) to core concepts of Artificial Intelligence (AI) and Machine Learning (ML) through accessible, hands-on, and engaging activities. The program is grounded in a progressive pedagogical approach that blends intuitive theoretical explanations, interactive web-based AI tools (such as Google Quick, Draw!) and physical robotics using LEGO Spike kits to make abstract concepts tangible and meaningful for young learners. In doing so, the initiative aligns with the broader goals of STEM education by fostering critical thinking, creativity, and collaborative problem-solving. The sessions are structured in phases that combine guided instruction, interactive experimentation, and collective reflection. Students begin with an introduction to AI through simple analogies and real-life examples to distinguish it from conventional technology. They then explore Reinforcement Learning by interacting with Quick, Draw!, observing how AI systems learn through trial, error, and pattern recognition using large datasets. Finally, they apply these ideas through physical experimentation with LEGO Spike robots, which are programmed using Python to execute behaviour based on the Q-learning algorithm. This allows students to observe how machines adapt and optimize their actions based on rewards—laying a strong foundation for understanding intelligent decision-making. Following these activities, a group discussion is held to encourage ethical reflection and dialogue about the social impact of AI, particularly in areas such as inclusion and accessibility. Children are prompted to consider how AI can support people with disabilities, improve learning experiences, or even help build more equitable societies. These conversations are essential to nurturing not just technical literacy, but also a responsible and empathetic view of emerging technologies. Two pilot sessions were conducted in a primary school in Madrid, with two groups of 27 and 28 students, respectively. Observational notes, pre/post questionnaires, and student feedback indicated a marked increase in the participants' understanding of AI-related concepts, growing interest in technological tools, and improved ability to differentiate between traditional rule-based systems and those that can "learn" from data. The students demonstrated curiosity, creativity, and strong engagement throughout the experience. New sessions are currently being developed to introduce the fundamentals of Supervised Learning using the K-Nearest Neighbors (KNN) algorithm. In this activity, students classify waste using visual features such as colour, allowing them to intuitively grasp how labelled data can be used by machines to generalize and predict outcomes. The hands-on nature of the task, combined with the visual and tangible feedback provided by the robot, aims at reinforcing their understanding of classification processes. Overall, this work illustrates the pedagogical potential of combining educational robotics, interactive AI tools, and ethical discussion to teach complex

technological ideas to children in a way that is both rigorous and joyful. By introducing AI from an early age, and anchoring it in responsible and inclusive practices, this initiative empowers the next generation to become informed, thoughtful participants in an increasingly AI-driven world.

**Keywords:** Educational Robotics; Lego Spike; AI for Kids; Teaching AI; STEM Education

## All Submissions & Topics

| | |
|---|---|
| Digitalization in Education and Training | Id- 60 - Engagemate: Towards The Digitalization of Educational Environments to Improve Teaching and Learning Experiences |
| Digitalization in Business and Economy | Id- 58 - E-Commerce: Urban Logistics Factors and Last-Mile Delivery Performance |
| The Social Impact of Artificial Intelligence | Id- 80 - International Workshop on Youth, Frontier Technologies and Indigenous Knowledge Systems in Disaster Risk Reduction and Resilience Management |
| | Id- 83 - Youth, Frontier Technologies and Indigenous Knowledge Systems in Disaster Risk Reduction and Resilience Management |
| | Id- 84 - The Social Impact of Digitalization and AI |
| AI and the Future of Work | Id- 81 - AI and Space Exploration: The New Frontier |
| AI and Sustainable Development | Id- 67 - Adoption of Artificial Intelligence (AI) in Marketing to Attain Sustainability in the Digital Business Era: Evidence from E-Commerce Business in an Emerging Economy |
| | Id- 68 - The Role of AI in Circular Economy Systems |
| | Id- 79 - Green and intelligent: the role of AI in the climate transition |
| AI and Education | Id- 61 - Introducing Machine Learning to Children: A Practical And Intuitive Approach Using Lego Robotics And Interactive AI Tools |
| AI and Healthcare Innovation | Id- 51 - Artificial Intelligence in Nursing Care - Opportunities and Challenges for Research and Practice |
| | Id- 75 - AI-Driven Digital Health Innovation for Low-Resource Settings: Scaling Impact from Clinics to Communities |