

FUTURES 2025

CONFERENCE AI IN EDUCATION PROCEEDINGS

9 & 10 JULY | LISBON, PORTUGAL

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TABLE OF CONTENTS

ABOUT FUTURES 2025	7	CHATGPT AND THE CLASSROOM: TEACHERS PRACTICES IN HIGHER EDUCATION - AN EXPLORATORY STUDY	
ABSTRACTS	9	<i>Rui Brito Fonseca</i>	25
INTEGRATING ARTIFICIAL INTELLIGENCE IN POSTSECONDARY EDUCATION: BEST PRACTICES AND CONSIDERATIONS		DIGITAL SKILLS OF HIGHER EDUCATION TEACHERS AND THE PERCEIVED EFFECTS OF ARTIFICIAL INTELLIGENCE ON TEACHING AND LEARNING: A CORRELATIONAL ANALYSIS	
<i>Stephen Fritzenkotter</i>	11	<i>Andreia Magalhães and Diana Soares</i>	26
THE IMPACT OF AI LITERACY AND DIGITAL SKILLS ON UNIVERSITY JOB PLACEMENT: A LONGITUDINAL STUDY		FROM AI TO DAE: INFRASTRUCTURES OF TRUST, AUTOMATION AND GOVERNANCE IN FUTURE EDUCATION	
<i>Francesca Di Virgilio, Antonia Puccio and Maria Cristina Manocchio</i>	12	<i>Riccardo Maria Santovito</i>	27
TECHNOSTRESS IN EDUCATION: THE ROLE OF ARTIFICIAL INTELLIGENCE IN PERSONALIZED LEARNING AND ASSESSMENTS		THE 24/7 VIRTUAL TEACHING ASSISTANT FOR ASYNCHRONOUS ONLINE COURSES	
<i>Ajit Marathe</i>	13	<i>Truc Nguyen and Ann Kwinn</i>	28
CAN AI-DRIVEN INTELLECTUAL CAPITAL RESHAPE HIGHER EDUCATION FOR A SUSTAINABLE FUTURE?		USING A CHATBOT AS AN INSTRUCTIONAL DESIGN TUTOR	
<i>Bablu Kumar Dhar, Maria José Sousa, Sabrina Maria Sarkar, Ricardo Marcão and Andreia de Bem Machado</i>	14	<i>Ann Kwinn</i>	29
AI-DRIVEN RESEARCH: TRANSFORMING THE RESEARCHERS EXPERIENCE IN SCIENCE		DESIGNING WITH INTENTION: FIVE KEYS TO BLENDED LEARNING SUCCESS	
<i>Miguel Sousa and Maria Sousa</i>	15	<i>Ann Kwinn</i>	30
ARTIFICIAL INTELLIGENCE IN EDUCATION: THE ROLE OF PROJECT MANAGEMENT IN PREVENTING INNOVATION FAILURE		FORECASTING OF THE FUTURES OF ARTIFICIAL INTELLIGENCE SYSTEM IN PHILIPPINE SCIENCE EDUCATION BY 2040	
<i>Márcia Pinheiro</i>	16	<i>Michael Kennedy Camarao and Karl Owen Fernandez</i>	31
EXPLORING AI-DRIVEN EDUCATIONAL INNOVATIONS		EXPLORING THE USE OF DIGITAL TWINS FOR PERSONALIZED LEARNING IN EDUCATIONAL RECOMMENDER SYSTEMS	
<i>Antonio Pesqueira, Maria Jose Sousa, Andreia de Bem Machado, Antonio Sacavem and Joao Santos</i>	17	<i>Ivan Tudor, Martina Holenko Dlab and Nataša Hoić-Božić</i>	32
THE DHBW AI GLOBAL CENTER: A STUDENT-CENTERED APPROACH FOR AI-INTEGRATION IN EUROPEAN HIGHER EDUCATION		ARTIFICIAL INTELLIGENCE IN THE DESIGN PROCESS: ENHANCING COGNITIVE AUTONOMY AND PROBLEM FORMULATION SKILLS THROUGH STRUCTURED PROMPT CREATION	
<i>Chrysanthi Melanou</i>	18	<i>Manuela Maia</i>	33
POLICIES FOR THE DIGITAL TRANSFORMATION OF HIGHER EDUCATION IN BULGARIA		COIL IN ACTION: EDUCATIONAL TECHNOLOGIES BUILDING INTERNATIONAL BRIDGES IN HEALTH EDUCATION	
<i>Ventsislava Stoyanova, Tatyana Daskalova and Georgi Dimitrov</i>	19	<i>Marcelo Toscano</i>	34
ONE YEAR LATER - THE ADVANCEMENT OF CHATBOTS IN HIGHER EDUCATION (A CASE STUDY)		PERSUADE OR BE PERSUADED: PERSONABLE LEARNING, SOCRATIC REASONING, AND PROMPT IMAGINEERING IN TEACHING AND LEARNING WITH GENERATIVE AI	
<i>Ekaterina Tosheva and Luben Boyanov</i>	20	<i>Vanessa Ament and Richard Edwards</i>	35
AI-DRIVEN FUTURE SCENARIOS FOR THE CVTT BUILDING AT ISCTE: ENHANCING SMART ARCHITECTURE AND EFFICACY IN RESEARCH		DIGITAL TRANSFORMATION OF PE EDUCATION	
<i>Bernardo Miranda and Maria José Sousa</i>	21	<i>Zornitza Mladenova</i>	36
AI-DRIVEN MEDICAL EDUCATION FOR PERSONALIZED HEALTH		PERSPECTIVES ON ARTIFICIAL INTELLIGENCE IN TEACHING WORK IN HIGHER EDUCATION	
<i>Mariya Zheleva</i>	22	<i>Octavio Mattasoglio Neto and Everaldo Pereira</i>	37
NEW METHODOLOGIES IN MULTIMEDIA VOCATIONAL COURSES IN PORTUGAL: A PROPOSAL FOR A NEW PILOT TEACHING-LEARNING MODEL		HOW TO RETHINK THE EDUCATION WITH ARTIFICIAL INTELLIGENCE: THE PORTUGUESE USE CASE LOOKING AT THE POLITICAL AND PRACTICAL POINTS OF VIEW	
<i>Hugo Carvalho, Vasco Santos, Maria José Sousa and Luís Carlos Lobo</i>	23	<i>Nuno Gonçalves</i>	38
EMBRACING THE PARADIGM SHIFT OF GENERATIVE AI IN A GRAPHIC DESIGN COURSE		AI-ENHANCED LIFELONG LEARNING: A MODEL FOR CIVIL SERVANT TRAINING IN THE AGE OF AI IN EDUCATION	
<i>Leonardo Springer and Fátima Caiado</i>	24	<i>Sabrina Bandera and Mario Pireddu</i>	39

CHALLENGES IN THE ADOPTION OF VIRTUAL REALITY IN EDUCATION: AN ACTION RESEARCH APPROACH
Ana Sacavém, Leonel Morgado and António Sacavém..... 41

ADVANCEMENTS AND LIMITATIONS OF DECENTRALISED AI IN EDUCATION
Tamara Ristovska, Lyubomir Gotsev, Genadiy Gospodinov, Eugenia Kovatcheva and Boyan Jekov 42

THE DIGITAL ETHICIST IN EDUCATION: COMPETENCIES, CHALLENGES AND RESPONSIBLE INNOVATION
Sandra Dias 43

CHATGPT-4 PERFORMANCE IN SOLVING MATHEMATICAL ANALYSIS EXAMS IN IRIN HIGHER EDUCATION: A CRITICAL EVALUATION
Carla Martinho and Sandra Gaspar Martins 44

COACHING AI FLUENCY AND ETHICAL REASONING IN DIGITAL MARKETING AND STRATEGIC COMMUNICATIONS: AN ANDRAGOGICAL, HUMAN-CENTERED FRAMEWORK FOR MODERN LEARNERS AND EDUCATORS
Julia Bennett..... 45

VALIDATION OF THE TPACK-SMART SCALE IN PORTUGUESE: PROFESSIONAL KNOWLEDGE OF UNIVERSITY PROFESSORS ON THE ETHICAL INTEGRATION OF ARTIFICIAL INTELLIGENCE (AI)-BASED TOOLS IN EDUCATION
Mariana Peramezza Del Fiol..... 46

THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: A LITERATURE REVIEW
Paula Tavares de Carvalho and Ricardo Raimundo..... 47

INCORPORATING AI ETHICS INTO EDUCATION SYSTEMS: ENSURING TRUST AND EQUITY
Ana Saraiva 48

THE MULTIFACETED IMPACT OF GENERATIVE AI USAGE ON UNIVERSITY TOURISM STUDENTS' ACADEMIC PERFORMANCE: A MULTI-LEVEL ANALYSIS
Mohammad Ali Obaid, Mohammad Soliman and Kamal Al-Sabahi..... 49

NAVIGATING SCIENTIFIC ARTICLE TYPES: A PRACTICAL GUIDE FOR PHD STUDENTS ON LEVERAGING AI TO ENHANCE ACADEMIC WRITING
Bruno Lins..... 50

INTEGRATING IMMERSIVE VIRTUAL LABORATORY: CONNECTING PEDAGOGY WITH TECHNOLOGY AS STRATEGIC FRAMEWORK FOR STUDENTS ACADEMIC SUCCESS
Samah Nassar..... 51

LEARNING ENVIRONMENTS AND SPACES FOR HIGHER EDUCATION IN THE LIGHT OF NEOLEARNING
Isabela Regina Fornari Muller, Rivaldo Arruda and Patrícia de Sá Freire 52

AI IN EDUCATION: ASSESSING THE EFFECTS ON EMPLOYABILITY FOR UNDERGRADUATE AND POSTGRADUATE STUDENTS
Antonia Puccio 53

IMPROVING PRE-SERVICE TEACHERS' ATTITUDES TOWARD SCIENCE USING THE FLIPPED CLASSROOM MODEL
Teresa Ribeirinha and Marisa Correia..... 54

ARTIFICIAL INTELLIGENCE IN EDUCATIONAL ASSESSMENT: FROM EARLY AUTOMATION TO GENERATIVE AI
Gabriel Cipriano, Isabel Alexandre and Susana da Cruz Martins.....55

MODERN TECHNOLOGIES IN EDUCATION: HOW AR/VR, GAMIFICATION AND ESCAPE ROOMS SHAPE THE FUTURE OF TEACHING
Aneta Poniszewska-Maranda and Marta Chmielewska-Anielak56

GAMIFIED TRAINING PLATFORM FOR AGRIBUSINESS MANAGEMENT AND DIGITAL AGRICULTURE: INTEGRATION OF TECHNOLOGIES FOR RURAL DEVELOPMENT
José Guilherme Pandolfi, Adriano dos Reis Lucente, Luciana A. Barbieri, Maria Carolina Martins Rodrigues, Maria Jose Sousa57

DEVELOPMENT OF AN INTELLIGENT TUTORING SYSTEM FOR PRIMARY EDUCATION
Inês Mendonça Consolado, Isabel Machado Alexandre and Sancho Moura Oliveira 58

REDEFINING HIGHER MATHEMATICS PEDAGOGY: THE TRANSFORMATIVE ROLE OF ARTIFICIAL INTELLIGENCE IN ADAPTIVE LEARNING
Katia Bolaños-Rivadeneira and Julio Ibarra-Fiallo 59

ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: PEDAGOGICAL PRACTICES AND IMPLEMENTATION CHALLENGES
Célio Gonçalo Marques, Inês Araújo and Marta Almada..... 60

TRANSFORMING HIGHER EDUCATION TEACHING: TRAINING NEEDS AND PEDAGOGICAL APPROACHES
Inês Araújo and Célio Gonçalo Marques..... 61

ETHICS AND ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION IN PORTUGAL - AN EXPLORATORY APPROACH
Maria Albertina Barreiro Rodrigues and Paulo Jorge Monteiro 62

A SERIOUS GAME ABOUT THE INCLUSION OF IMMIGRANT CHILDREN IN PORTUGUESE SCHOOLS
Filipa Fonseca e Silva, Cecília Aguiar, Patrícia Arriaga, Theresa Zagers and Isabel Machado Alexandre..... 63

THE USE OF AI BY STUDENTS AS AN INSTRUMENT IN THE CONSTRUCTION OF KNOWLEDGE IN HISTORY
Mónica Rodrigues 64

STUDENT PERCEPTIONS OF ARTIFICIAL INTELLIGENCE AND ETHICAL CONCERNS: AN EXPLORATORY STUDY IN THE HIGHER EDUCATION CONTEXT
Pedro Pinheiro and Silvia Ferrerira..... 65

NEW PEDAGOGIES IN NURSING EDUCATION: FROM EXPERIENTIAL LEARNING TO IMMERSIVE EDUCATION
Elisabete da Luz..... 67

FUTURE TRENDS IN AI-POWERED EDUCATIONAL TECHNOLOGIES AND THEIR IMPLICATIONS
João Farinha, Maria Pina, Nuno Nogueira and Carlos Galveias..... 68

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON GLOBAL EDUCATION: A SYSTEMATIC REVIEW
M. Carolina Rodrigues, Otacílio José Moreira, Silvia Costa Lopes, Luciana A. Barbieri and Waleska Yone Yamakawa Zavatti Campos 69

DESIGN AI- INTEGRATED CURRICULUM: FOSTERING STUDENTS' CRITICAL THINKING SKILLS THROUGH ALGORITHMIC FRAMEWORK IN CINEMATIC STUDIES
Samah Nassar..... 70

THE IMPLEMENTATION OF THE ERASMUS WITHOUT PAPER (EWP) INITIATIVE IN PORTUGAL
Beatriz Duarte..... 71

NAVIGATING THE EDUCATIONAL AI FRONTIER - A FRAMEWORK FOR PERSONALIZED LEARNING SYSTEMS
Otacílio José Moreira, Maria Carolina Rodriguez, Maria José Sousa, Americo da Costa Ramos Filho and Martius Vicente Rodriguez Y Rodriguez..... 72

IA NA EDUCAÇÃO: EQUILIBRANDO INOVAÇÃO E APRENDIZAGEM EM SISTEMAS Tutores INTELIGENTES
Otacílio José Moreira, Maria Carolina Rodriguez, Maria José Sousa, Americo da Costa Ramos Filho and Martius Vicente Rodriguez Y Rodriguez..... 73

NEW FORMS OF RECRUITMENT USING AI: IS EDUCATION UP TO THE CHALLENGE?
Rita Bernardo and Andreia Borges 74

HOW SHALL WE TEACH HUMAN RIGHTS IN THE ARTIFICIAL INTELLIGENCE ERA?
Helena Melo 75

STRATEGIC GOVERNANCE OF AI IN EDUCATION: ETHICAL FRAMEWORKS AND GEOPOLITICAL EQUITY
Sandra Baão 76

UNIVERSITY STRUCTURES IN TRANSFORMATION: THE ROLE OF ARTIFICIAL INTELLIGENCE AND RESEARCH AND DEVELOPMENT (R&D) FUNDING POLICIES
Anabela Carmelina Sousa Gomes, Maria José Sousa and Maria Carolina Rodrigues 77

DIFFERENCES IN BEHAVIOURAL AND COGNITIVE SKILLS BETWEEN REGULAR AND VOCATIONAL SCHOOL STUDENTS ENTERING HIGHER EDUCATION IN PORTUGAL: PROPOSING AN AGENDA TOWARDS NEW PEDAGOGIES
Hugo Carvalho, Vasco Santos, Margarida Rodrigues, Ana Filipa Joaquim and Maria José Sousa..... 78

ARTIFICIAL INTELLIGENCE AND EDUCATION: PEDAGOGICAL TRANSFORMATIONS IN THE ONLIFE ERA
Ana Beatriz Willcox and Maria Carolina Martins Rodrigues..... 79

ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: A SYSTEMATIC REVIEW OF GLOBAL APPLICATIONS AND IMPACTS
M. Carolina Rodrigues, Otacílio José Moreira, Luciana A. Barbieri, Waleska Yone Yamakawa Campos, Paula Lopes Erthal and Carolina Tomé Coelho 80

ENHANCED LEARNING BY USING ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION
Marc Beutner..... 81

EXPLAINABLE AI IN EDUCATION: EVALUATING ITS EFFECT ON TRUST, FEEDBACK USEFULNESS, AND LEARNING OUTCOMES
Genadiy Gospodinov, Tamara Ristovska, Lyubomir Gotsev, Krasimir Traykov, and Eugenia Kovatcheva..... 82

CHATGPT FOR REVIEW OF MULTIPLE-CHOICE

QUESTION QUALITY: A PILOT EVALUATION USING THE INOVALIAR CONSOLIDATED LIST
João Padilla, Marta Mateus de Almeida, Carla Nascimento, Cassio Cabral Santos, João Couvaneiro, Mara Pereira Guerreiro 83

DIGITAL DISTRICTS AS INFORMAL LEARNING ECOSYSTEMS
Nádia Leitão 84

EXPLORING VIRTUAL PRODUCTION AS A SOLUTION TO EGYPTIAN VFX CHALLENGES: A COMPARATIVE STUDY OF TRADITIONAL AND REAL-TIME METHODS
Marina Dourgham 85

FOG-ENABLED EMOTION-AWARE AI SYSTEMS FOR PERSONALIZED INCLUSIVE LEARNING: A FOCUS ON NEURODIVERSE STUDENTS
Noman Gul, Asad Masood Khattak, Bashir Hayat, Faiz Muhammad, Awais Adnan and Hamood Ur Rehman 86

THE GLOBAL VIRTUAL CLASSROOM: HOW CAN GENERATIVE AI CONTRIBUTE TO A BETTER HUMAN RIGHTS EDUCATION?
Helena Pereira de Melo 87

IMPACT OF INSTRUCTIONAL MEDIUM AND SOCIOECONOMIC BACKGROUND ON IMMERSIVE TECHNOLOGY ADOPTION TOWARDS ENHANCING UNIVERSITY STUDENTS' LEARNING SKILLS
Prof. Dr. Shahbaz Ahmad 88

ARTIFICIAL INTELLIGENCE IN POSTSECONDARY EDUCATION: BEST PRACTICES AND CONSIDERATIONS
Stephen Fritzenkotter..... 89

ONE YEAR LATER - THE ADVANCEMENT OF CHATBOTS IN HIGHER EDUCATION - A CASE STUDY
Ekaterina Tosheva and Luben Boyanov..... 90

ARTIFICIAL INTELLIGENCE LITERACY: CHALLENGES LIMITATIONS AND FUTURE IMPLICATIONS OF AI IN EDUCATION
Asfandyar Khan, Abdullah Khan, Dzati Athiar Ramli and Shafiullah khan..... 91

SURVIVING IN THE DIGITAL WORLD: A CASE STUDY ON AI LITERACY FOR MATURE LEARNERS
Elena Romine..... 92

FROM AI TO DAE: INFRASTRUCTURES OF TRUST, AUTOMATION, AND GOVERNANCE IN FUTURE EDUCATION
Riccardo Maria Santovito 95

LEADING IN TIMES OF CHANGE
Vanessa Fernandes, Ricardo Marcão, Vasco Santos and Filipa Martinho..96

INNOVATIVE, PARTICIPATORY, AND INQUIRY-BASED LEARNING IN SCHOOL SETTINGS
Ana Luisa Sousa Gil..... 97

PERSUADE OR BE PERSUADED: PERSONABLE LEARNING, SOCRATIC REASONING, AND PROMPT IMAGINEERING IN TEACHING AND LEARNING WITH GENERATIVE AI
Vanessa Ament and Richard Edwards..... 98

MENTAL HEALTH AND WORKPLACE PRODUCTIVITY: A CRITICAL LINK FOR ORGANIZATIONAL SUCCESS
Ricardo Marcão, Sylvania Pinto and Vasco Santos..... 99

EMBRACING THE PARADIGM SHIFT OF GENERATIVE AI IN A GRAPHIC DESIGN COURSE
Leonardo Springer and Fátima Oliveira Caiado..... 100

MEASURING CHAT GPT AS A FINANCIAL ADVISOR TYPES AND THEIR EFFECT ON CLIENT ENGAGEMENT IN SERVICE
Muhammad Akhtar 101

THE USE OF THE METAVERSE AS AN EDUCATIONAL AND SOCIALIZATION RESOURCE FOR PEOPLE WITH AUTISM: A LITERATURE REVIEW
Andreia de Bem Machado, Maria José Sousa, Agnes Jenei, Harun Şahin 102

COMPETITIVE STRATEGY IN THE REMOTE PATIENT MONITORING MARKET
Ricardo Marcão, Sofia Lourenço, Vasco Santos and Filipa Martinho 103

AI TOOLS AS A MEANS OF CREATING MULTIMEDIA EDUCATIONAL CONTENT ON QUANTUM TECHNOLOGIES
Mariana Filipova, Genadiy Gospodinov, Lyubomir Gotsev, Eugenia Kovatcheva, Boyan Jekov and Tamara Ristovska 104

CORPORATE PLANNING FOR ETHICAL GROWTH IN DIGITAL HEALTH
Ricardo Marcão, Beatriz Alves, Vasco Santos and Filipa Martinho. 105

INNOVATION STRATEGY IN MEDTECH STARTUPS: A CASEBASED APPROACH
Ricardo Marcão, Alice Reis, Vasco Santos, Filipa Martinho, Stéphanie Monteiro 106

STRATEGIC COMMUNICATION IN GLOBAL HEALTH EMERGENCIES
Ricardo Marcão, Sara Silva, Filipa Martinho, Vasco Santos and Stéphanie Monteiro 107

GLOBAL CRM STRATEGY IN MEDICAL SERVICE COMPANIES
Pedro Conde, Ricardo Marcão, Vasco Santos, Filipa Martinho and Stéphanie Monteiro 108

FLEXIBLE BENEFITS AS A TALENT RETENTION STRATEGY
Maria Liba, Ricardo Marcão, Vasco Santos and Filipa Martinho 109

THE ROLE OF LEADERSHIP IN SUPPORTING EMPLOYEE MENTAL HEALTH
Elisabete Abreu, Ricardo Marcão, Vasco Ribeiro and Filipa Martinho 110

STRESS AND THE IMPACT ON PROFESSIONALS PERFORMANCE
Iolanda Guedes, Ricardo Marcão, Vasco Santos and Isabel Reis 111

BUSINESS MODEL INNOVATION IN THE MEDTECH INDUSTRY: THE CASE OF MEDTRONIC
Afonso Pinto, Ricardo Marcão, Vasco Santos and Maria Pina .. 112

STRATEGIC HUMAN RESOURCE PLANNING IN HOSPITALS AND CLINICS
Maria Leonor Góis Matos, Ricardo Marcão, Vasco Santos and Isabel Reis 113

FROM POTENTIAL TO PRACTICE: APPLYING VR IN UNIVERSITY-BASED SOFT SKILLS TRAINING
Agnes Jenei, Noémi Császár-Nagy, Maria Sousa and Maliga Reddy 114

COMPENSATION STRATEGIES AND THEIR IMPACT ON EMPLOYEE PERFORMANCE AND RETENTION
Ana Júlia Silva, Ricardo Marcão, Vasco Ribeiro, Maria de Fátima Pina and Isabel Reis 115

THE INFLUENCE OF TECHNOLOGY ON ADOLESCENTS' HABITS AND CHARACTERISTICS
Maria Rocha, Ricardo Marcão, Vasco Santos, Filipa Martinho and Margarida Tribuna 116

VARIABLE COMPENSATION MODELS AND THEIR IMPACT ON ORGANIZATIONAL PERFORMANCE
Rodrigues Raimundo, Ricardo Marcão, Vasco Santos, Filipa Martinho and João Farinha 117

SALARY AND ITS INFLUENCE ON EMPLOYEE DEVELOPMENT
Isabel dos Santos, Ricardo Marcão, Vasco Santos, Filipa Martinho and António Dionísio 118

THE ROLE OF ORGANIZATIONAL CULTURE IN FOSTERING SCHOOL SUCCESS
João Simões Ricardo Marcão, Vasco Santos, Filipa Martinho and Rui Centeno Martins 119

THE IMPORTANCE OF ORGANIZATIONAL CLIMATE AND MOTIVATION AT WORK
Rachel Oliveira, Ricardo Marcão, Vasco Santos, Filipa Martinho and Margarida Tribuna 120

THE ROLE OF DIGITAL MARKETING AND GLOBALIZATION IN SHAPING CONSUMER PERCEPTIONS AND ENGAGEMENT
Luís Henriques, Ricardo Marcão, Vasco Santos, Filipa Martinho and António Dionísio 121

CAN GENERATIVE ARTIFICIAL INTELLIGENCE MITIGATE TEACHER SHORTAGES: THE CASE OF EUROPEU
Elnaz Shadras 122

STUDENT WITHDRAWAL PREDICTION IN ONLINE LEARNING: A COMPARATIVE ANALYSIS OF ENSEMBLE AND LINEAR CLASSIFIERS
Adnan Amin, Feras Al-Obeidat, Maria José Sousa and Fernando Moreira 123

INCORPORATING METAVERSE & EXTENDED REALITY (XR) TECHNOLOGIES TO ENHANCING USER EXPERIENCE FOR IMMERSIVE AND INTERACTIVE ENGAGEMENT
Noha Essam Khamis 124

CAN GENERATIVE ARTIFICIAL INTELLIGENCE MITIGATE TEACHER SHORTAGES: THE CASE OF EUROPE
Elnaz Shadras 125

COMMITTEE 126

ORGANISERS COMMITTEE 127

ACADEMIC COMMITTEE 127

SCIENTIFIC COMMITTEE 128

ABOUT FUTURES 2025

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As Artificial Intelligence (AI) technologies continue to rapidly transform society, the field of education is undergoing a profound evolution. The 1st International Conference on Artificial Intelligence in Education, held in Lisbon, Portugal on 9-10 July 2025, brings together global leaders in education, research, and technology to explore how AI is reshaping learning and teaching. This inaugural edition offers a unique opportunity to engage with pioneering ideas, share innovations, and spark meaningful collaborations that will shape the future of AI-enhanced education.

The conference program is structured around six dynamic thematic streams, addressing both the practical and ethical dimensions of AI in education. Key topics include personalized learning, intelligent tutoring systems, AI-powered assessment tools, and new pedagogical approaches supported by digital transformation. Importantly, the event also tackles the critical ethical questions AI raises, including fairness, privacy, and accessibility, ensuring that technological innovation remains aligned with human values.

VISIONARIES LEADING THE CONVERSATION

An exceptional lineup of keynote speakers from academia, government, and industry will set the tone for this transformative event:

Álvaro Rocha (ISEG, UL) opens the conference with a keynote on Generative Artificial Intelligence in Education, offering insights into how generative models can revolutionize content delivery and adaptive learning.

Inês Berlenga from the European Union Aviation Safety Agency (EASA) presents on Ethics in AI, highlighting regulatory and ethical considerations crucial to educational contexts.

Nuno Ricardo Oliveira (ISEC Lisboa and Nova SBE) addresses AI in Education: Striking the Balance Between Innovation and Ethical Responsibility, underlining the importance of responsible AI integration.

Maria Helena Monteiro, President of APDSI, presents AI to Promote Global Education, focusing on the role of AI in democratizing access to quality education worldwide.

Célio Marques (Instituto Politécnico de Tomar, Portugal) delivers a compelling keynote titled Empowering Teachers: Skills for AI-Enhanced Education.

Rasmus Pechuel (Ingenious Knowledge, Germany) presents a speech about AI in Education.

Samah Nassar (The British University in Egypt) contribute perspectives on the future of critical thinking, immersive learning, and the evolving educator-learner relationship in the AI age.

EXPLORING THE FRONTIERS OF EDUCATIONAL INNOVATION

The main streams of the conference are as follows:

1 Artificial Intelligence in Education

This stream investigates how AI can personalize learning, support educators through intelligent tutoring systems, and automate assessments. Chaired by experts like Matt Gunkel and Francesca Di Virgilio, it sets the stage for understanding how AI can transform day-to-day educational practice.

2 Educational Technologies

With a focus on e-learning platforms, gamification, and digital apps, this stream examines how tech solutions are enhancing engagement and learning outcomes. Chaired by leaders such as Richard Edwards and Andreia de Bem Machado, it provides hands-on strategies for integrating cutting-edge tools into classrooms.

3 Virtual and Augmented Reality in Learning

Immersive learning takes center stage here, with sessions on designing VR/AR content and evaluating its impact. Chaired by Agnes Jenei, Mohammad Soliman, and Samah Nassar, this stream showcases how simulations can bring abstract concepts to life.

4 New Pedagogies

This stream reimagines education through flipped classrooms, project-based learning, and collaborative models. With chairs including Célio Marques and Marisa Correia, the discussions will highlight methods to foster critical thinking and student agency in AI-enhanced environments.

5 AI and Ethics

A vital track focused on fairness, privacy, and transparency in AI systems. Thought leaders like Ann Kwinn, Vitor Santos, and Mohammad Soliman will lead conversations on building trustworthy, human-centered AI tools that respect the rights and dignity of learners.

6 AI-Driven Global Education

Addressing global inclusion, this stream explores how AI can support international learning, cultural exchange, and accessibility. Chaired by David Ferraz, Maria Albertina Rodrigues, and Rashmi Gujrati, this track emphasizes AI's role in bridging global educational divides.

Held in the vibrant and historic city of Lisbon, this event offers more than academic insights, it provides a platform for building a global community of practice. Whether you are an educator rethinking your pedagogy, a researcher exploring AI's educational applications, or a technologist creating tools for the future, this conference invites you to connect, innovate, and inspire.

ABSTRACTS

ABSTRACTS

INTEGRATION OF DIGITALISATION, TECHNOLOGY AND AI INTO THE HIGHER EDUCATION OF BULGARIA

Polya Katsamunska

Silviya Georgieva

ABSTRACT: The article focuses on the questions related to the future of higher education and to the educational perspectives of higher education in Bulgaria as member of the EU within the Global Changes 2030. Today higher education has a key role in the process of the global future-building process and digitalization and new technologies, in particular artificial intelligence, are changing the world and the structure of professions. This change requires raising the level of digital competences and forming skills of flexibility and adaptability needed for new emerging professions. Thus, the higher education sector has a unique position at the crossroads of education, research and innovation, serving society and economy.

Digital skills and competences in the 21st century are a priority for any educational system and access to ICT for students is an integral part of access to education. As part of the European Education Area and the global world, the higher education in Bulgaria today faces a number of challenges and the purpose of this to examine and outline its major trends and key challenges within the global changes. Based on the critical analysis of the higher education system in Bulgaria and the adopted national documents for digital transformation and strategies for higher education until 2030, specific problem areas have been identified. A complex of research methods has been used, including methods of analysis and synthesis of both primary and secondary sources of information, as well as the use of induction and deduction has been applied in the paper.

For the purpose of paper analysis a survey on AI and its impact on the training process was conducted among students and the research is deliberately limited to the training of students in entrepreneurship at UNWE in Sofia. The university is a leader in economic and managerial education in Bulgaria and in the region and is actively involved in the process of dynamic integration of the modern higher education and the global university network for exchange of knowledge, culture and experience. The analysis reveals that the ongoing digital transformation in Bulgaria requires the higher education system to adapt and respond to the learning needs of students using technologies that rapidly change, often in a disruptive manner. There are enough arguments and evidence to argue that the root cause of underachievement is an inadequate provision of digital skills in education and training. The higher education learning offer needs to be both general and sector-specific. At university level, digital skills are developed mainly through programs for ICT specialists, despite the importance they have for all professions. Conclusions and findings are particularly valid when it comes to the training of students in the professional field of economics at UNWE in Sofia.

KEYWORDS: digitalization, technology, artificial intelligence, higher education

INTEGRATING ARTIFICIAL INTELLIGENCE IN POSTSECONDARY EDUCATION: BEST PRACTICES AND CONSIDERATIONS

Stephen Fritzenkotter

ABSTRACT: Artificial Intelligence (AI) has rapidly evolved, permeating various sectors of our society, including education. AI adoption by students is widespread, with many leveraging it for research and assignments. Educators must adapt their pedagogical approaches to effectively integrate AI into the learning process. While over-dependence on the technology and plagiarism are concerns for students, AI used responsibly, use can lead to knowledge expansion, creativity, and overall enhanced student outcomes. This paper explores best practices for AI integration in postsecondary education, emphasizing strategic planning, ethical considerations, faculty development, and continuous evaluation.

KEYWORDS: Artificial Intelligence, Postsecondary Education

THE IMPACT OF AI LITERACY AND DIGITAL SKILLS ON UNIVERSITY JOB PLACEMENT: A LONGITUDINAL STUDY.

Francesca Di Virgilio

Antonia Puccio

Maria Cristina Manocchio

ABSTRACT: The increasing demand for digital and artificial intelligence (AI) competencies in the labor market has emerged as a critical issue for both educational institutions and enterprises. As technology continues to evolve, the need for a workforce proficient in digital skills and AI literacy has become increasingly critical. The integration of AI-driven tools, such as machine learning and neural networks, is a reshaping industry that requires employees to develop new technical and cognitive abilities [1,2]. Despite this technological evolution, there remains a notable disparity between the skills imparted in higher education institutions and those demanded by industry [3]. This misalignment underscores the importance of integrating AI and digital skills into university curricula to enhance students' employability. This study addresses the following research question: "How does the integration of AI literacy and digital skills into university curricula through practical workshops impact students' job placement?" This research aims to fill a gap in the existing literature by providing an empirical, longitudinal analysis of how participation in university labs that incorporate AI literacy and digital competencies influence job placement outcomes. While previous research has explored the importance of digital skills [4,5], limited studies have examined their long-term impact on graduate employability. The analysis was based on data collected by AlmaLaurea (an interuniversity consortium currently representing 82 universities, about 90% of graduates in Italy, supported by the Ministry for University and Research and its member universities) and SkillFusionLab, with a representative sample of 912 students from a regional context, whose data were collected between 2014 and 2023. This approach allows for a longitudinal assessment of the employment opportunities of students who participated in the lab experience. The expected results include a significant improvement in job prospects, an increased employment rate, and progress in digital and AI literacy skills. In particular, the importance of knowing how to use digital and AI platforms to adapt to the needs of the labor market is underlined. SkillFusionLab proves to be an effective model for the acquisition of employability skills, suggesting that the integration of practical experiences into academic curricula enriches the educational path and improves students' employment prospects [6,7]. Future research could explore sample expansion, longitudinal studies on the impact of acquired skills, and employer feedback to better align training with market needs.

KEYWORDS: AI Literacy, Digital Skills, University Job Placement, Employability, Higher Education

TECHNOSTRESS IN EDUCATION: THE ROLE OF ARTIFICIAL INTELLIGENCE IN PERSONALIZED LEARNING AND ASSESSMENTS

Ajit Marathe

ABSTRACT: Technostress, a growing concern in modern educational settings, arises from the increasing integration of artificial intelligence [AI] in learning environments [Bandura, 1997]. AI-driven platforms optimize personalized learning and assessments by leveraging machine learning algorithms, natural language processing, and predictive analytics to tailor content dynamically to students' needs [Chen et al., 2024]. While these technologies offer efficiency and customization, they also introduce cognitive overload, increased system dependence, and ethical concerns related to data privacy. This paper critically examines AI-driven personalized learning, intelligent tutoring systems [ITS], and automated assessment models, analyzing their algorithmic mechanisms and their psychological impact on students and educators. Strategic recommendations for mitigating technostress, including ethical AI governance and human-centered AI deployment strategies, are also discussed [Li & Wang, 2023]. Drawing from Bandura's theories on self-efficacy, this paper highlights the role of psychological resilience in reducing AI-related stress and improving adaptation in educational environments.

KEYWORDS: Technostress, Artificial Intelligence in Education, Personalized Learning, Intelligent Tutoring Systems, AI Assessments, Machine Learning, Algorithmic Bias

CAN AI-DRIVEN INTELLECTUAL CAPITAL RESHAPE HIGHER EDUCATION FOR A SUSTAINABLE FUTURE?

Bablu Kumar Dhar

Maria José Sousa

Sabrina Maria Sarkar

Ricardo Marcão

Andreia de Bem Machado

ABSTRACT: The integration of Artificial Intelligence (AI) in higher education is poised to reshape the intellectual capital of academic institutions, influencing teaching methodologies, knowledge dissemination, and sustainable learning ecosystems. This study will explore how AI-driven intellectual capital—comprising human, structural, and relational components—can contribute to sustainable higher education by enhancing knowledge management, fostering innovation, and improving accessibility. Using a quantitative analysis based on student survey data, this research will investigate student perceptions of AI-powered educational tools, their anticipated impact on learning outcomes, and the ethical considerations surrounding their adoption. The expected findings aim to provide empirical insights into AI’s potential to create a resilient and adaptive education system, highlighting its role in driving long-term sustainability while addressing key challenges such as digital equity, academic integrity, and pedagogical transformation. This research will contribute to the ongoing discourse on AI in education by offering policy recommendations for universities to integrate AI-driven intellectual capital effectively, ensuring a sustainable and inclusive learning environment for future generations.

KEYWORDS: AI-driven intellectual capital, sustainable higher education, artificial intelligence in learning, digital transformation, student perceptions, knowledge management, ethical AI, academic sustainability, adaptive learning, digital equity.

AI-DRIVEN RESEARCH: TRANSFORMING THE RESEARCHERS EXPERIENCE IN SCIENCE

Miguel Sousa

Maria Sousa

ABSTRACT: Artificial Intelligence (AI) is reshaping the researchers experience by providing them with powerful tools to streamline workflows, enhance data analysis, and improve research dissemination. AI-driven technologies are now essential in various stages of scientific research, from literature review to experiment design and publication.

For literature review and knowledge synthesis, AI-powered platforms like Elicit, Semantic Scholar, and Scite use natural language processing (NLP) to summarize research papers, identify key citations, and suggest relevant studies. These tools help researchers efficiently navigate vast scientific literature and extract meaningful insights.

In data analysis, machine learning frameworks such as TensorFlow, PyTorch, and Scikit-learn enable researchers to develop predictive models and analyze complex datasets. Automated statistical tools like IBM SPSS Modeler and JASP assist in hypothesis testing, while OpenAI's ChatGPT and Claude can generate code snippets, optimize algorithms, and debug computational models.

For experiment design and simulation, AI-based platforms like MATLAB, Wolfram Alpha, and Google's AutoML assist in modeling complex systems, optimizing parameters, and automating workflows. AI-driven lab automation tools, such as Benchling and LabTwin, help researchers track experiments, analyze results, and improve reproducibility.

AI also enhances academic writing and publication processes. Tools like Grammarly, Trinka, and Paperpal refine scientific writing, while QuillBot and ChatGPT aid in paraphrasing and structuring research papers. For citation management, AI-powered software like Zotero, Mendeley, and EndNote ensures accurate referencing and bibliography generation.

Finally, AI facilitates research dissemination and networking. Platforms like ResearchRabbit and Connected Papers visualize academic connections, while ScienceGPT and Scholarcy assist in creating research summaries and grant proposals.

Using AI tools researchers can accelerate research, enhance precision, and optimize collaboration, making the scientific process more efficient and impactful.

KEYWORDS: AI-driven research; Research tools; Machine learning in academia; AI for literature review; Scientific writing automation

ARTIFICIAL INTELLIGENCE IN EDUCATION: THE ROLE OF PROJECT MANAGEMENT IN PREVENTING INNOVATION FAILURE

Márcia Pinheiro

ABSTRACT: Artificial Intelligence (AI) in education represents a disruptive opportunity to transform the way we teach and learn, by enabling personalized learning, automating administrative processes, and supporting pedagogical decision-making based on data. However, as with any technological innovation project, its implementation faces strategic, technical, organizational, legal, and ethical challenges.

Recent studies indicate that up to 80% of AI projects fail to meet their objectives, and Gartner forecasts that 30% of generative AI projects will be abandoned by the end of 2025, after the proof-of-concept phase. Considering the high level of uncertainty, it is argued that adopting agile project management methodologies — due to their flexibility and short feedback cycles — can significantly improve success rates.

Based on a systematic literature review, this article analyses how frameworks such as PM², PRINCE2, PMBOK, and agile methods contribute to aligning AI initiatives with strategic goals, engaging stakeholders, ensuring legal and ethical compliance, and mitigating risks throughout the project lifecycle.

The article concludes with practical recommendations for managers and institutional decision-makers, highlighting the importance of defining clear guidelines, investing in team capacity-building, and institutionalizing professional project management practices as a foundation for a sustainable digital transformation in the education sector.

KEYWORDS: Artificial Intelligence in Education; Project Management; PM²; PRINCE2; Agile Methodologies; PMBOK; Ethics in AI; Digital Transformation

EXPLORING AI-DRIVEN EDUCATIONAL INNOVATIONS

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Maria Jose Sousa

Andreia de Bem Machado

Antonio Sacavem

Joao Santos

ABSTRACT: This research investigates the integration of education-based AI-driven methodologies (AM) and institutional educational AI readiness (AR) to optimize diverse facets of educational management (EM) within higher education institutions. A systematic review methodology is employed to synthesize existing literature and evaluate interventions, policies, and processes that ensure academic quality, regulatory compliance, and organizational efficiency across highly matrixed educational environments. The research encompasses the deployment of data-driven pedagogical innovations alongside quality assurance (QA) frameworks, and it covers the optimization of technology–EM components facilitated by AI-based solutions. The findings offer valuable insights for administrative and faculty-level decision-making in higher education, focusing on streamlining curriculum design, enhancing quality control measures, and ensuring compliance with accreditation requirements through the application of advanced AI-driven practices.

KEYWORDS: Educational Management, Higher Education Sector, AI Integration, Digital Methodologies, Academic Efficiency

THE DHBW AI GLOBAL CENTER: A STUDENT-CENTERED APPROACH FOR AI-INTEGRATION IN EUROPEAN HIGHER EDUCATION

Chrysanthi Melanou

ABSTRACT: The DHBW AI Global Center is an interdisciplinary initiative that aims to establish a competence hub for artificial intelligence in higher education. At the heart of the project are students, who work in interdisciplinary teams to design practical and ethically grounded AI application scenarios. Depending on their academic background, students contribute from different perspectives—for example, computer science students focus on development, business students assess economic implications, and social work students explore ethical and societal dimensions. The scenarios are anchored in real-world academic contexts and are developed in close collaboration with AI Competence Centers established by the European Union. This ensures that the outcomes align with both the EU AI Act and broader educational policy goals. The project follows a dynamic, ongoing process—from onboarding and training students in core AI competencies to collaborative scenario development and refinement. The goal is to produce validated, transferable concepts that support the EU-wide integration of AI in higher education. This paper presents the conceptual framework, key steps, and methodological design of the initiative, highlighting its potential as a scalable model for global AI-based education.

KEYWORDS: Artificial Intelligence, Didactic Approach, AI Competence Center,

POLICIES FOR THE DIGITAL TRANSFORMATION OF HIGHER EDUCATION IN BULGARIA

Ventsislava Stoyanova

Tatyana Daskalova

Georgi Dimitrov

ABSTRACT: In the set of reforms implemented for the last ten years in Bulgaria, a special place has been allotted to the educational system. One of the strategic goals is to transform and adapt the system of higher education to the digital era. The digital transformation of higher education aims at modernising educational infrastructure, introducing innovations in the educational process, developing education in a digital environment and through digital resources, improving digital competences, etc. This defined goal is the main focus of a set of government documents for the development of education. These identify higher education policies formulated in national strategies and programmes. The aim of the current study is to summarise the major issues and challenges for the digital transformation of higher education in the country.

A major instrument for implementing the national policies of higher education development during the last two programming periods are Operational Programme Science and Education for Smart Growth 2014-2020, Operational Programme Regions in Growth 2014-2020, and Operational Programme Education 2021-2027 funded by the European Union Structural Funds. A study has been conducted on the completed projects by Bulgarian universities encompassing a wide range of activities aimed at re-forming and digitally transforming the higher education system. The aim of the current study is to summarise the results of the realised projects and to assess their contribution to accomplishing the goals and priorities outlined in the strategic and programming documents for the development of higher education in Bulgaria.

The study is practical in nature and is conducted entirely online, using national information portals as sources. The research methodology includes document analysis, collection and synthesis of secondary data, and comparative analysis

KEYWORDS: higher education, university, digital transformation, strategy, programme, project

ONE YEAR LATER – THE ADVANCEMENT OF CHATBOTS IN HIGHER EDUCATION (A CASE STUDY)

Ekaterina Tosheva

Luben Boyanov

ABSTRACT: Chatbots in higher education have evolved significantly in the past year, integrating advanced artificial intelligence (AI), machine learning (ML), and natural language processing (NLP) technologies. Institutions are leveraging chatbots to improve student engagement, streamline administrative processes, and enhance learning experiences. This paper examines the latest advancements and impacts of chatbots in higher education, looking into the case of the biggest business Bulgarian university – the University of National and World Economy. We have looked at the dynamics of the use and impact of artificial intelligence tools one year later and summarize and analyse the current state of their use and application. At the end, we also highlight the key trends and future directions.

KEYWORDS: Digital Transformation, Higher Education, Chatbots, Development

AI-DRIVEN FUTURE SCENARIOS FOR THE CVTT BUILDING AT ISCTE: ENHANCING SMART ARCHITECTURE AND EFFICACY IN RESEARCH

Bernardo Miranda

Maria José Sousa

ABSTRACT: Artificial intelligence (AI) is reshaping architectural design, construction, and building management by enhancing efficiency, sustainability, and user experience. This study explores future AI applications for the CVTT building at ISCTE, Portugal, a high-level research centre dedicated to innovation and technology. By envisioning AI-driven scenarios, the research examines how predictive maintenance, smart energy management, and space optimisation could transform the building's operations. Machine learning algorithms and IoT-based systems have the potential to analyze real-time data, improving sustainability and reducing energy consumption. Furthermore, AI-driven simulations could assist architects and facility managers in optimising spatial configurations, enhancing environmental performance, and predicting long-term structural behaviours. The CVTT building serves as an ideal case study for exploring AI's role in next-generation smart buildings, demonstrating how intelligent systems can contribute to dynamic and adaptive infrastructures. This research contributes to the ongoing discourse on AI applications in architecture, offering insights into the future of high-tech research environments and the integration of AI for sustainable and efficient building management.

KEYWORDS: Artificial Intelligence, Smart Architecture, CVTT Building, ISCTE, Future Scenarios

AI-DRIVEN MEDICAL EDUCATION FOR PERSONALIZED HEALTH

Mariya Zheleva

ABSTRACT: The present study aims to explore already implemented AI-driven solutions in the education of medical professionals, focusing on their role in achieving high-quality healthcare and personalized health strategies. Various AI tools are examined and compared to assess how they influence and improve medical training environments. The research follows the ways in which AI is utilized by medical students during their education, as well as how these technologies are subsequently applied in their professional medical practice.

The primary objective is to analyze how AI contributes to the enhancement and development of medical education and how the acquired knowledge is integrated into the daily routines of practicing healthcare professionals. AI offers rapid solutions with minimal waiting times. However, one of the essential skills for medical professionals is the ability to make accurate decisions quickly and under dynamic, high-pressure conditions. In this regard, it is important to examine the potential risk of diminishing these critical decision-making abilities through the reliance on AI during the education and training of medical students.

This study raises the question of whether AI-based educational tools may inadvertently dull students' capacity for independent, rapid clinical judgment. Additionally, it is necessary to investigate whether AI-driven simulations can effectively replicate real-life scenarios to provide high-quality training experiences. Specifically, can AI technologies not only simulate surgical procedures accurately but also recreate the psychological and emotional aspects of the experience—such as managing stress, performing under pressure, and maintaining focus in unpredictable situations?

Furthermore, attention should be given to whether AI simulations can realistically reproduce the tactile sensations associated with surgical procedures, including the feeling of cutting through connective tissue, interacting with different human organs, and other nuances of physical manipulation. The ability of AI to offer a truly immersive, comprehensive learning environment that prepares students both technically and psychologically for real-world medical practice remains a critical area for investigation.

Special attention is given to identifying the benefits for the patient, with a focus on determining whether the application of AI in education and practice leads to truly personalized healthcare outcomes.

KEYWORDS: AI for medical education, medical AI tools, personalized healthcare, AI-driven medical education

NEW METHODOLOGIES IN MULTIMEDIA VOCATIONAL COURSES IN PORTUGAL: A PROPOSAL FOR A NEW PILOT TEACHING-LEARNING MODEL

Hugo Carvalho

Vasco Santos

Maria José Sousa

Luís Carlos Lobo

ABSTRACT: This study presents an in-depth analysis of the professional course of Multimedia Technician of the Agrupamento de Escolas de Albergaria-a-Velha (AEAAV), in Portugal, as an innovative model of vocational education, within the scope of new pedagogies. Using a qualitative approach, the research describes new, differentiating pedagogical practices that articulate technical development with students' transversal skills. The primary outcomes of the proposal for a new pilot teaching-learning model include the interdisciplinary model, the inter-year team structure, the interdisciplinary organization, the "school-company" model, the multidimensional evaluation system, institutional cooperation, projects such as PIGO, the European quality seal EQAVET [5] and several national and international awards, validating its effectiveness. It is concluded that the new pilot teaching-learning model promotes comprehensive training, preparing students for the job market and for continuing their studies. It proposes its replication in other European contexts as a strategy to strengthen vocational education.

KEYWORDS: new methodologies, multimedia, vocational courses, vocational teaching, pilot teaching-learning model, AEAAV

EMBRACING THE PARADIGM SHIFT OF GENERATIVE AI IN A GRAPHIC DESIGN COURSE

Leonardo Springer

Fátima Caiado

ABSTRACT: Throughout history mankind has developed tools, setting out from hammers to First Person View (FPV) drones that extend our physical abilities, but most remarkably software such as data analytics that is able to manage complex tasks. Nowadays, man can use Artificial Intelligence (AI) systems that mirror reasoning and writing, acting as collaborative intelligence to refine, or even substitute cognition.

Despite scepticism generative AI systems have transformed the way we lecture, learn, and engage with educational content. Higher Education Institutions (HEIs) have been raising legitimate concerns regarding the impact of AI systems in education, regarding ethics, equity, bias, namely issues like data privacy and plagiarism.

Current design practice is undergoing a paradigm shift generative AI tools are changing work practice, changing processes and human intervention. AI-driven software such as Adobe applications integrate generative AI that fosters human creativity, developing new possibilities, envisioning synergies that allows time saving and augmented creative output. Apprehensions considering human obsolescence, due to generative AI, ought to consider AI systems as an enhancing tool creating a Man-AI synergy surpassing potential negative aspects.

AI impacts society on all levels, and Design is no exception. Generative AI tools exhibit subject knowledge, problem-solving, analytical, critical thinking, and presentation skills and thus can limit learning when used unethically (Ogunleye, et. al. 2024). Tutors' ought to know generative AI systems, encouraging its use in learning, and ensuring proper student assessment, verifying and assessing student learning outcomes.

KEYWORDS: Design thinking, Creativity, Graphic Design, Critical thinking, Curriculum, Mindset, Generative AI

CHATGPT AND THE CLASSROOM: TEACHERS PRACTICES IN HIGHER EDUCATION - AN EXPLORATORY STUDY

Rui Brito Fonseca

ABSTRACT: The application of artificial intelligence tools in higher education, especially ChatGPT, has become increasingly prominent in academic and pedagogical discussions. Therefore, this paper aims to explore the practices, contexts of use, advantages, and disadvantages associated with this technology in higher education.

Given the adaptability of this artificial intelligence tool, one of the main advantages of using ChatGPT is its capacity for personalized learning. This AI tool enables the adaptation of teaching materials and methods according to the individual needs of students, promoting more effective learning. Additionally, the immediate support offered by this tool can enhance students' engagement and connection with higher education, as it provides continuous and uninterrupted assistance, particularly beneficial in hybrid or distance learning environments. This allows students to ask questions and access information at any time, structuring their studies independently of the teacher's availability.

From the perspective of teachers, the advantages of employing AI tools like ChatGPT are also apparent. For instance, this AI tool serves as valuable support in structuring research proposals, planning lessons, organizing differentiated pedagogical strategies, and saving time and resources in everyday teaching. Its ability to enhance data analysis facilitates the identification of performance patterns and the organization of interventions to support student success, allowing educators to focus more on developing pedagogical strategies and interactions with students.

However, the integration of AI tools like ChatGPT in higher education is not without its challenges and risks. One such challenge is the quality of the information provided by this tool. While it can offer quick answers, the accuracy and reliability of these responses can be questionable, as the model is trained on a wide array of information, which is not always dependable. As a result, adopting a less-than-critical approach to the responses generated may lead to misinformation or misinterpretation, raising significant concerns in academic environments.

Moreover, there is a risk of over-reliance on technology. It's important to recognize that easy access to automated assistance can negatively impact teachers' skills in research and problem-solving, undermining critical thinking and reflexivity, which are vital in higher education. When utilizing this AI tool, questions around privacy and ethics also emerge. The data collection practices of AI services raise legitimate concerns regarding how students' personal information is used and safeguarded. Misusing this information can jeopardize academic integrity and trust between students and higher education institutions.

To better understand how teachers engage with ChatGPT in their daily academic routines, a questionnaire survey was conducted with the teachers at a Portuguese higher education institution, uncovering their practices, contexts of use, and perceptions of this AI tool.

KEYWORDS: AI, Education, Higher Education, Practices, Contexts, Perceptions

DIGITAL SKILLS OF HIGHER EDUCATION TEACHERS AND THE PERCEIVED EFFECTS OF ARTIFICIAL INTELLIGENCE ON TEACHING AND LEARNING: A CORRELATIONAL ANALYSIS

Andreia Magalhães

Diana Soares

ABSTRACT: Artificial Intelligence (AI) has been playing an increasingly important role in society, influencing various sectors, including education. In this sense, based on a quantitative methodology through a questionnaire survey of higher education teachers, this study aims to verify the relationship between teachers' digital skills and the perceived effects of AI on teaching and learning. To this end, data were collected regarding the teachers' profile in digital skills and teachers' perceptions about the effects of AI. The results, from a descriptive analysis, reveal a moderate level for digital skills and a moderate positive perception about the perceived effects of AI. By correlating the data, they also revealed that there is a significant correlation between the level of digital skills of teachers and the perceived effectiveness of AI. The results reveal valuable insights to identify areas that may need more training or support, aiming to improve the teaching-learning process in Higher Education.

KEYWORDS: Artificial Intelligence, digital skills, teachers, higher education

FROM AI TO DAE: INFRASTRUCTURES OF TRUST, AUTOMATION AND GOVERNANCE IN FUTURE EDUCATION

Riccardo Maria Santovito

ABSTRACT: The Covid-19 pandemic dramatically accelerated the shift to online and hybrid learning, exposing challenges in ensuring trust, privacy, and effective governance in digital education. This paper explores Decentralized Autonomous Education (DAE) as a holistic paradigm for the future of learning. DAE is a novel model that combines artificial intelligence (AI) and Web3 technologies to reshape how education is delivered and governed. It exploits dual principles (e.g. freedom with responsibility, privacy with transparency) that align closely with core Web3 tenets. We propose a comprehensive framework defining DAE, detailing how four key technologies - AI, blockchain, smart contracts, and Decentralized Autonomous Organizations (DAOs) - interoperate to form a self-governing educational infrastructure. This integrated approach unifies previously fragmented innovations into a single model of trusted, automated governance. To illustrate feasibility, we discuss recent implementations: the EduCTX platform's blockchain-based academic credit system and MIT's Blockcerts project for issuing tamperproof diplomas. We also highlight the emerging Bittopia University project, which deploys a blockchain-secured, DAO-managed curriculum. Situated in the post-Covid digital education context, our analysis shows DAE's potential to shift governance structures - empowering distributed stakeholders and ensuring transparency by design - toward a more resilient, equitable, and learner-centered ecosystem.

KEYWORDS: Artificial Intelligence in Education, Decentralized Autonomous Education (DAE), Educational Governance, Blockchain and Smart Contracts, Learning Automation, DAO in Learning Systems, Post-pandemic Education, Digital Credentials

THE 24/7 VIRTUAL TEACHING ASSISTANT FOR ASYNCHRONOUS ONLINE COURSES

Truc Nguyen

Ann Kwinn

ABSTRACT: Our institution caters to a diverse student body, encompassing secondary, undergraduate, and professional learners, both domestically and internationally. We employ varied pedagogical modalities to address the unique needs of our students. Asynchronous online learning, in particular, offers significant flexibility for working professionals navigating demanding schedules. However, this modality can present challenges in providing timely instructor support. To mitigate this, we are exploring the integration of an AI-powered virtual assistant from Google's NotebookLM, to enhance student support outside standard working hours. A virtual assistant trained with course syllabi, frequently asked questions, and instructional materials can provide immediate responses to common student inquiries.

An advanced implementation will incorporate audio and video resources, further enriching student interactions and enabling the virtual assistant to function as a 24/7 study companion, offering learning strategies, practice quizzes, and diverse perspectives. This technology has the potential to transcend temporal and geographical limitations, fostering a more dynamic and accessible asynchronous learning environment, thereby augmenting instructor presence and promoting student engagement.

We are deploying this technology in a pilot group and collecting usage data before broader implementation for the institution.

KEYWORDS: Asynchronous learning, Online education, Virtual teaching assistant, Artificial intelligence (AI), NotebookLM (Google), Student support, Instructor support, Learning modalities, Educational technology, E-learning, 24/7 support, Frequently asked questions

USING A CHATBOT AS AN INSTRUCTIONAL DESIGN TUTOR

Ann Kwinn

ABSTRACT: The UCR Extension Instructional Design and Technology Department was tasked with tracking the achievement of learning objectives in our courses to support WASC reviews. WASC is the accrediting body for our university. Our learning management system provides a way to track the achievement of objectives by creating outcomes and adding them to a grading rubric, but another requirement was to ask instructors to reflect on how they could change their course design to help students better meet learning objectives. While staff could meet with instructors and - using their own expertise - brainstorm methods, a more efficient method was sought. Instructors were asked to respond to a checklist concerning design aspects they currently support or do not support, including: Variety of assignments , Social presence, Use of media, Rich and frequent feedback, Enough assignments to allow for failure , Correct use of Canvas tools, Allowing students to share their own experience and preferences, Opportunity for students to work together , Real world examples, Assignments graded in a timely manner, Addressing the diverse needs of students.

We created a chatbot using the tool, Playlab. Instructors enter one or more of these design elements, along with the course title into a chatbot to come up with a way to improve the course – in the way the material is taught or assessed – or in general meet the needs of their students. They add their chosen method to the bottom of the checklist or we otherwise track these results to make sure the assessment was done.

After the interaction with the chatbot, instructors will be asked if they want to learn how to create chatbots for their own courses – promoting the use of AI for teaching at Extension.

KEYWORDS: AI, Chatbot, Instructional design, Faculty support, Learning Objectives, Accreditation review, Instructor reflection, LMS, Rubrics, Course design, Continuous improvement, Quality control, Pedagogy review, Course review, Evaluation.

DESIGNING WITH INTENTION: FIVE KEYS TO BLENDED LEARNING SUCCESS

Ann Kwinn

ABSTRACT: Blended learning is the combining of in-class instruction with either synchronous or asynchronous online activities resulting in a reduction of in-class time. Blended learning has been seen as a solution to limited classroom space or, in the post pandemic world, a desire for remote work - on the part of students and teachers. But from a pedagogy standpoint, it tends to increase time on task and exploit the best of both worlds or modalities if designed correctly. Five elements that have been found to support effective blended learning are learner control, learner reflection, collaboration, social presence, and motivation.

Let's review each element.

Learner Control: Courses that give students more power over what they learn and how fast they learn it are associated with better student outcomes. Online courses or the online component of a blended course by nature typically provide higher learner control than do traditional in-person courses.

Learner Reflection: Any form of self-study, including the online component of a blended course, gives students the quiet space that is optimal for reflection. Combining this with in-person meetings and deadlines and provide the accountability to use the reflection time productively.

Collaboration: Well-structured collaboration has been found to improve learning outcomes. The affordances of face-to-face and online environments allow students to both meet each other and then online, work unconstrained by the length of the class session.

Social Presence: Collaboration should create a sense of social presence which includes the degree to which a person is perceived as a real person and a student's sense of belonging in a course via their ability to interact with other students and the instructor. This improves overall student satisfaction.

Motivation: While dropout rates are higher for online courses compared to face-to-face courses, faculty in blended courses can improve student retention by increasing student motivation - showing the value of the course and helping students have optimistic expectations about their ability to succeed.

KEYWORDS: Blended Learning, course design, instructional design, Synchronous learning, Asynchronous Learning, Hybrid learning, online learning, flipped classroom, learner control, learner reflection, social presence, collaboration, motivation.

FORECASTING OF THE FUTURES OF ARTIFICIAL INTELLIGENCE SYSTEM IN PHILIPPINE SCIENCE EDUCATION BY 2040

Michael Kennedy Camarao

Karl Owen Fernandez

ABSTRACT: With the rapid development of artificial intelligence, new opportunities are opening for a completely revolutionary approach as AI will take over the load of repetitive tasks, offer personalized learning paths, and make complex scientific processes more simulation-real. Despite its potential benefits, significant challenges still exist that hamper Philippine science education. This regression brought the study to move toward the six pillars of futures thinking and foresight framework. The study includes 34 information technology and science specialists from all regions of the country. They performed framing of a focal issue in causal layered analysis, scanning of a horizon, forecasting forces of change, developing scenario archetypes, and backcasting. The results indicate an issue that focuses on the futures of science education in the next 15 years. It was driven from the need to address the existing forces of change and weak signals that cover problems on disparities of advanced AI access among students and educators, high costs of AI tools that limit access to high-quality curricula, stakeholders' resistance in AI, budget cuts for AI investment and maintenance, and data breaches and misuse that pose significant ethical risks. Nevertheless, it was revealed in key factors forecasting that the specialists aspire preferred scenarios in AI systems that reduce the need for paper-based materials for environmental sustainability, enhance curriculum relevance through current scientific advancements, provide sufficient funds to support equitable access, adhere to international standards and data privacy, and integrate adaptive technologies for diverse learning needs and real-time data analysis. These scenario archetypes envision to achieve a regenerative science education in horizon 2040.

KEYWORDS: Artificial Intelligence, Futures Thinking, Science Education

EXPLORING THE USE OF DIGITAL TWINS FOR PERSONALIZED LEARNING IN EDUCATIONAL RECOMMENDER SYSTEMS

Ivan Tudor

Martina Holenko Dlab

Nataša Hoić-Božić

ABSTRACT: Educational recommender systems (ERS) support personalized learning by suggesting resources, tasks or learning paths to improve learner motivation, engagement and performance. However, most existing systems rely on static data, rule-based logic and have limited context awareness, which limits their responsiveness. To address these limitations, digital twins (DTs) can be integrated with artificial intelligence (AI) to enable fine-grained learner modelling and predictive analytics. Digital twins are virtual representations of learners that are continuously updated with behavioural, cognitive, and engagement data. This work in progress paper explores the potential use of AI-powered DTs in ERS to simulate personalized interventions, visualize learning paths, and provide predictive dashboards with real-time context-aware recommendations.

KEYWORDS: Educational recommender systems, digital twins, personalized learning, artificial intelligence in education, predictive learning analytics

ARTIFICIAL INTELLIGENCE IN THE DESIGN PROCESS: ENHANCING COGNITIVE AUTONOMY AND PROBLEM FORMULATION SKILLS THROUGH STRUCTURED PROMPT CREATION

Manuela Maia

ABSTRACT: Design is a process focused on defining “how things can be,” involving active interaction with materials and representations to create solutions. This process is exploratory and constructive, where designers synthesize knowledge through making and engage intuition in problem-solving. The manipulation of visual elements supports cognitive processes like analysis, synthesis, and iteration, with solutions emerging dynamically alongside the problem definition.

Artificial intelligence (AI) is increasingly being integrated into design, offering tools for visual cognition, representation, manipulation, and handling complex problems. The effectiveness of AI in design depends on the quality of prompts used during interactions. Well-structured prompts guide AI responses and maintain the designer’s cognitive autonomy. Creating prompts is crucial in structuring thinking and guiding research at the beginning of the design process. Prompt creation not only helps navigate complexity but also encourages reflective and connected thinking, allowing designers to develop integrated, innovative solutions. To use AI effectively, design practice must ensure its use is reflective and well-integrated from the start. The challenge of creating appropriate prompts to obtain useful results is a key learning component in the design process. AI tools help designers extract knowledge from data early in the design process, especially when analytical activities shape the problem. These tools offer rapid research capabilities, allowing for the exploration of various topics that support a deeper understanding of both general themes and specific problems. However, AI tools can also produce incorrect responses, known as “hallucinations,” which require verification. This error-checking process is also an essential part of the learning experience that occurs during the study.

This study examines the role of AI in design, focusing on how prompt formulation can align AI-generated responses with the cognitive and creative aspects of design. Grounded in Edgar Morin’s theory of complexity, the research uses a qualitative methodology to explore the impact of structured prompt creation on design students’ understanding of problems. The study aims to contribute to understanding how AI interactions at the initial stage of the design process can enhance problem-solving. Generative AI techniques, such as text responses and image creation, were used by students to answer diverse questions. The study was structured around five mandatory prompt creation moments for the experimental group, with a control group for comparison. Natural language processing (NLP) with AI language models optimized for user interaction were central to this process, allowing AI tools to enhance the design process by responding to user preferences. The use of AI in generating both text and image content presents opportunities for visual exploration, an essential aspect of design. It allows designers to define problems, produce meaning, and navigate the complexity of ill-defined design challenges. Given the co-evolution of problems and solutions, integrating multidisciplinary knowledge enhances the ability to formulate problems more effectively in design.

AI assists not only in visual cognition and problem representation but also in structuring approaches to thinking about problems. The study’s expected results suggest that strategically crafted prompts foster deeper engagement with complexity, reinforcing design’s investigative nature while preserving the designer’s cognitive autonomy. By validating knowledge through making, AI serves not just as a tool for efficiency but as a cognitive partner in exploring uncertainty and expanding creative potential. This research contributes to the broader discourse on design cognition, highlighting AI’s role in supporting complex problem-solving through visual exploration and iterative synthesis.

KEYWORDS: artificial intelligence, design cognition, complex problems, prompts creation, design process

COIL IN ACTION: EDUCATIONAL TECHNOLOGIES BUILDING INTERNATIONAL BRIDGES IN HEALTH EDUCATION

Marcelo Toscano

ABSTRACT: This study presents a detailed description and analysis of a Collaborative Online International Learning (COIL) project between the Faculdade de Medicina de Olinda (FMO), Brazil, and York University, Canada. Employing a case study and experiential report methodology, the project strategically integrated several educational technologies to conduct international virtual sessions. This paper highlights specific tools—such as Zoom, WhatsApp, email exchanges, and digital infographic platforms—showcasing their roles in promoting effective international collaboration, problem-solving, and intercultural communication among medical and nursing students. The findings suggest that educational technologies significantly enhance the global engagement of future health professionals, offering a model for the internationalization of health education.

KEYWORDS: COIL, educational technology, international collaboration, virtual learning, health education.

PERSUADE OR BE PERSUADED: PERSONABLE LEARNING, SOCRATIC REASONING, AND PROMPT IMAGINEERING IN TEACHING AND LEARNING WITH GENERATIVE AI

Vanessa Ament

Richard Edwards

ABSTRACT: In this paper, we argue that the encouragement of including generative AI in teaching, while sometimes overlooking the risks of diminishing faculty influence and promoting an over-reliance on Large Learning Models (LLMs) as a replacement for instructional expertise, can provide opportunities to increase critical thinking, research skills, and a resurgence of the cooperative relationship between teacher and student, as well as with the AI system and user. The Socratic method of reasoning, which is grounded in iterative questioning and critical dialogue, advances the discovery of new ideas. It stems from the notion that “truth” is the quest, and to settle for an easy answer, which can be the seduction of AI, is to be avoided. The student should be encouraged to engage with AI rigorously, with a back-and-forth dialogue to gain deeper understanding on a subject, rather than skim the surface to satisfy “a right answer.” This application of AI complements our method of teaching that we have called Personable Learning, which uses the Mentor in the Center model of faculty and student relationship. The teacher is a collaborator with both AI and student, and the student is col-laborator with both teacher and AI. We emphasize how we use the tool, and not let the tool lead us. This is another way to state we assert our support for social constructivism rather than technological determinism. AI’s technological limitations in ethics and ‘visible thinking’ must be addressed by critically rigorous human interaction. Ultimately, adopting a Personable Learning approach will encourage students to experiment using their intuition and imagination through a Socratic-informed learning strategy with GenAI and LLMs that we call “prompt imagineering.”

KEYWORDS: Personable Learning, Socratic Method, Generative AI, Large Language Models, Social Constructivism, Prompt Engineering, Prompt Imagineering, 21st Century Pedagogy, Persuasion, Imagination.

DIGITAL TRANSFORMATION OF PE EDUCATION

Zornitza Mladenova

ABSTRACT: According to the UNESCO Institute for Statistics Database Globally, the unprecedented disruption caused by the COVID-19 pandemic affected at least 1.5 billion students and 63 million primary and secondary teachers.

We live in a new technological revolution that will alter our behavior and attitudes in all areas: personal, social, and professional. One big question facing our society is: How can we prepare the new generation to face any challenges in terms of “new” reality? COVID-19 has resulted in schools being shut down across the world. According to the Ministry of Education in Bulgaria, the teachers must present the educational content to their pupils and provide psychological support through a holistic approach to arts, technologies, and sports. Such a challenge can also be a tremendous opportunity. We must recognize that the linkage between mental health and physical activity is very deep and critical today. Physical education is one of the important tools in the promotion of health and well-being in line with SDG 3. Globally, online physical education classes were a new educational experience during COVID-19. The paper aims to investigate the new approaches in terms of digitalization in PE education. For this purpose, a real experiment and a survey, “The attitudes of the pupils regarding their participation in online PE classes” was provided. A scientific team to monitor the process of adaptation and implementation of the interactive educational platform was created. As a result of the work, a preliminary assessment of the impact of various sports activities applicable to their digitization was carried out. A mixed psychophysiological response of different demographics users was implemented. The article recognized that digital media is a huge motivating factor in improving PA among adolescents. The use of digital media opens new possibilities in the educational process and in experiencing movement. It is considered that AR can be a great weapon against sedentary and obese children if used to create a new learning environment combined with physical training and cognitive learning that encompasses all categories of physical education knowledge.

KEYWORDS: AI in PE education, AR&VR in education methodology, metaverse

PERSPECTIVES ON ARTIFICIAL INTELLIGENCE IN TEACHING WORK IN HIGHER EDUCATION

Octavio Mattasoglio Neto

Everaldo Pereira

ABSTRACT: This research addresses the use of artificial intelligence (AI) tools and aims to understand teachers' perceptions of the benefits and risks associated with this technology when used in higher education. The research context is an educational institution that offers sixteen undergraduate programs in different fields: Engineering, Design, Business Administration, Architecture, International Relations, and Information Technology. The practical motivation for the study is to gather data on the knowledge and use of AI by the institution's faculty. The investigation is guided by research question that seeks to explore how teachers assess the implications of AI in their work environment, which tools they are familiar with, which tools they use, and the functionality of these tools. From a theoretical perspective, the study is based on approaches from the philosophy of technology and education, providing a reflective foundation for analysis. Another aspect that guides the discussions in this study is the teachers' openness to adopting and using new teaching tools. The adoption of educational tools only occurs if, in the initial stages, they are intelligible, which makes teachers more willing to approach, explore their details, and incorporate these tools into their courses. To seek answers to the research question, a descriptive quantitative research approach was adopted, with data collection conducted through an online questionnaire, complemented by a focus group. The quantitative data collected were processed in a spreadsheet, while content analysis was applied to the qualitative data to extract insights. The expected results aim to contribute to understanding the impact of AI in education and provide support for developing practical guidelines and strategies to assist teachers in integrating this new technology into their teaching activities. Additionally, the research data should point actions aimed at continuous professional development in this field. As a practical outcome, the study found that AI has the potential to enhance teaching processes, particularly in terms of task execution speed. Regarding teacher training, continuous support from both faculty and institutions is necessary to ensure proficiency in using these tools. A conscious and well-planned use of AI tools, while maintaining the teacher's active role, can lead to a more personalized, innovative, and future-oriented education aligned with 21st century demands.

KEYWORDS: Teacher training. Artificial intelligence. Innovation in teaching. Higher Education. Change in Teaching Strategy.

HOW TO RETHINK THE EDUCATION WITH ARTIFICIAL INTELLIGENCE: THE PORTUGUESE USE CASE LOOKING AT THE POLITICAL AND PRACTICAL POINTS OF VIEW

Nuno Gonçalves

ABSTRACT: The challenges that the Education sector is facing nowadays with the new paradigm of Artificial Intelligence, whose influence will shape its future, is a call for action for the several stakeholders involved, starting at the political level, by Governments, the Education Ministries and ending at the learning level, not only in the class room, but extending it to all daily life details, passing by the school institutions and industry. This paper intends to analyze the Portuguese use case, by describing the lectures and discussions that took place at a Conference held in November 2024, where all the critical actors and agents together discussed this theme. This paper eventually reaches to several and key conclusions on this topic, not only pointing out recommendations for the decision makers in the Education sector, but also for all agents, including students and teachers. The Portuguese use case serves as an anchor for a more global and high-level discussion.

KEYWORDS: education and AI, public policies, new paradigm for education, the new classroom

AI-ENHANCED LIFELONG LEARNING: A MODEL FOR CIVIL SERVANT TRAINING IN THE AGE OF AI IN EDUCATION

Sabrina Bandera

Mario Pireddu

ABSTRACT: The rapid development of generative AI is transforming education and training across diverse sectors. While much attention has been given to AI's role in traditional educational settings, its impact on lifelong learning and professional training remains underexplored. This study examines how generative AI is reshaping the training methodologies for civil servants, positioning public administration training as a case study for broader AI-enhanced education practices. International organizations have recognized both opportunities and challenges associated with AI in training (UNESCO 2023; European Commission 2022). While many institutions have restricted access to generative AI, others have created guidelines to explore its constructive use.

The integration of AI in training offers significant opportunities for personalized learning, intelligent tutoring, and data-driven instructional design. By applying AI across key stages of the training process—needs analysis, curriculum design, participant support, assessment, and feedback—institutions can create more adaptive and effective learning experiences. Generative AI contributes to three fundamental aspects of learning innovation:

AI-Powered Learning Tools – The implementation of AI-driven platforms supports course design, resource generation, and content adaptation in real time.

Innovative Pedagogical Approaches – AI fosters new instructional strategies, enabling interactive and participatory learning experiences tailored to individual needs.

The Role of Educators and Trainers – AI transforms the responsibilities of trainers, shifting their role towards facilitation, mentorship, and AI-assisted curriculum development.

AI integration enhances access to educational opportunities, personalizes learning, fosters interdisciplinarity, and saves trainers' time in lesson preparation. Possible uses of generative AI in training include:

- **Virtual Tutors:** Personalized support to trainees by answering FAQs, offering additional explanations, and monitoring progress
- **Automated Assessments:** AI tools automatically assess tasks, reducing trainers' workload and providing rapid feedback
- **Co-creation of Learning Paths:** AI supports the collaborative design of personalized experiences
- **Personalized Learning Paths:** AI analyzes data to create tailored learning journeys
- **Automated Feedback:** AI suggests complementary materials, resources, and activities based on trainee interests and skill levels
- **Intelligent Tutors:** AI-powered tutors provide real-time suggestions and guidance through complex tasks
- **Data Analysis:** AI analyses large datasets to identify trends and insights.

Our research is based on a pilot study conducted in 2024 by the Italian National School of Government (SNA) on 13 courses, one of the first large-scale initiatives integrating generative AI into public administration training. The study explored AI's impact on Training methodologies and instructional design, Adaptive learning pathways and automated assessment, Engagement, accessibility, and resistance to AI-driven training models.

Preliminary findings highlight both opportunities and challenges, including the need for AI literacy among trainers, ethical considerations, and institutional resistance to change. As a result, the SNA has developed practical guidelines for AI integration, laying the groundwork for an AI-driven lifelong learning framework that can be adapted across different educational and professional training environments.

By positioning public administration training within the broader discourse on AI in education, this paper contributes to the growing field of AI-enhanced learning. The findings have implications beyond governmental training, offering insights into how AI can support lifelong learning, upskilling, and knowledge dissemination in various sectors. This paper ultimately aims to bridge the gap between AI-driven innovations in formal education and their application in professional and adult learning contexts.

KEYWORDS: Generative AI, Lifelong Learning, AI in Education, Public Administration Training, AI-Enhanced Didactics

CHALLENGES IN THE ADOPTION OF VIRTUAL REALITY IN EDUCATION: AN ACTION RESEARCH APPROACH

*Ana Sacavém
Leonel Morgado
António Sacavém*

ABSTRACT: This research is situated within the broader context of the ongoing digital transformation and technological advancement in education, with particular emphasis on the integration of Virtual Reality (VR) into pedagogical practices. Despite the growing interest in immersive environments, particularly those referred to as “metaverses”, the effective adoption of VR in educational contexts continues to face numerous challenges, including technical, pedagogical, and organizational barriers. This study aims to examine these problems by implementing and monitoring VR technologies at an international school, as part of an educational innovation initiative endorsed by the STEAM committee (Science, Technology, Environment, Arts, and Mathematics). A cyclical and reflective action research technique was employed, facilitating iterative planning, execution, observation, and adjustment of actions in response to evolving demands and limitations. The study began with an exploratory phase that included documentation analysis, equipment selection, and a training session for Mathematics and Science instructors of the 8th, 9th, and 10th classes. A total of eight action research cycles were conducted, with two Mathematics teachers overseeing four 8th-grade and four 9th-grade classes. Notwithstanding the specific setting of the institution examined, prevalent trends and challenges - pedagogical, technical, and social - were discerned. These findings may inform future practices regarding the integration of VR in diverse educational settings, while also contributing to the broader discourse on the use of immersive technologies in teaching and learning.

KEYWORDS: Virtual Reality, Educational Innovation, Action Research, STEAM Education, Digital Transformation in Education, Teacher Training, Pedagogical Integration

ADVANCEMENTS AND LIMITATIONS OF DECENTRALISED AI IN EDUCATION

Tamara Ristovska
Lyubomir Gotsev
Genadiy Gospodinov
Eugenia Kovatcheva
Boyan Jekov

ABSTRACT: The evolution of Artificial Intelligence has transformed the educational environment, enabling personalised learning, intelligent tutoring, and data-driven decision-making. The integration of decentralised AI in education has reshaped traditional learning models by leveraging privacy-preserving, scalable, and adaptive AI-driven solutions. In contrast to conventional AI, which relies on centralised cloud-based models, decentralised AI distributes computation and data processing across multiple nodes, ensuring improved data security, transparency, and autonomy.

Decentralised AI tools, like peer-to-peer tutors and edge models, improve education accessibility and equity by minimizing reliance on centralised systems. Federated learning ensures compliance with privacy regulations, as AI models can be trained across institutions without transferring data. Furthermore, blockchain-powered smart contracts uphold academic integrity, allowing for verifiable certification processes. In addition, edge computing minimises latency by processing AI-driven recommendations directly on student devices, fostering real-time interactions in digital classrooms.

The primary objective of this study is to analyse the advantages and disadvantages of different categories of decentralised AI and their potential for future development. Despite its potential, decentralised AI faces notable challenges, including technical complexity, limited interoperability, infrastructure disparities, and the need for transparent governance frameworks. Moreover, educators and institutions require capacity-building to effectively adopt and manage such technologies.

This study analyses the current advancements and limitations of decentralised AI in education, highlighting real-world implementations and outlining strategic directions for broader adoption. The findings suggest that while decentralised AI offers transformative benefits, overcoming implementation challenges is critical to achieving equitable and secure educational innovation.

KEYWORDS: Decentralized AI, education, federated learning , edge computing, blockchain

THE DIGITAL ETHICIST IN EDUCATION: COMPETENCIES, CHALLENGES AND RESPONSIBLE INNOVATION

Sandra Dias

ABSTRACT: The growing integration of artificial intelligence technologies in educational settings raises ethical questions that demand a specialised and multidisciplinary approach. This paper explores the emerging role of the digital ethicist in education, focusing on the competencies required, the challenges faced, and their contribution to more informed and responsible decisions around the use of technology in pedagogical contexts. Based on literature and international reports, it is argued that this professional profile helps institutions develop fairer and more transparent practices, aligned with values such as equity, transparency, and the protection of students' rights.

KEYWORDS: digital ethics, education, artificial intelligence, responsibility, emerging competencies

CHATGPT-4 PERFORMANCE IN SOLVING MATHEMATICAL ANALYSIS EXAMS IN IRIN HIGHER EDUCATION: A CRITICAL EVALUATION

Carla Martinho
Sandra Gaspar Martins

ABSTRACT: This study analyzed the performance of ChatGPT-4 in solving three Mathematical Analysis in IR (MA1) exams in Portuguese higher education, covering most of the traditional topics of the discipline. The results demonstrated remarkable performance, with accuracy rates of 96%, 91% and 100%. In most questions, the model presented correct, precise and detailed answers, structured in steps that facilitate students' understanding. Although, in some cases he did not use the simplest method, he still managed to solve the problems. However, specific difficulties were identified, namely in determining codomains and calculating areas by integrals, where inconsistencies were revealed, failing in a more complex question, but correctly answering a simpler one. With an accuracy rate of over 90%, ChatGPT-4 is proving to be a promising tool for teaching and learning Mathematical Analysis, both to help students with independent study and for classroom support, and the creation of teaching materials. However, its use still requires critical review by teachers and students. This study provides relevant insights for MA1 teachers, identifying the topics in which the model presents the greatest weaknesses.

KEYWORDS: AI, ChatGPT, Higher Education, Mathematics, Mathematical Analysis.

COACHING AI FLUENCY AND ETHICAL REASONING IN DIGITAL MARKETING AND STRATEGIC COMMUNICATIONS: AN ANDRAGOGICAL, HUMAN-CENTERED FRAMEWORK FOR MODERN LEARNERS AND EDUCATORS

Julia Bennett

ABSTRACT: As artificial intelligence (AI) becomes increasingly central to digital marketing and strategic communications, the need for intentional, ethically grounded use of these tools grows more urgent. This paper introduces a human-centered, andragogical coaching framework designed to foster AI fluency and ethical reasoning among adult learners—including students, professionals, and educators. Emphasizing a necessary departure from traditional pedagogical models, the framework embraces the self-directed, experience-rich nature of adult learning to cultivate curiosity, experimentation, and critical analysis skills for the effective application of AI in real-world contexts. Grounded in principles of ethical stewardship and human-centered design, it emphasizes transparency, inclusivity, and personal agency in the use of AI technologies. Through applied executive coaching methodologies and illustrative case studies, this paper further explores how facilitators can guide learners in navigating the evolving AI landscape—supporting innovation, empowering strategic decision-making, and above all, centering human connection in an era of rapid technological change.

KEYWORDS: AI, Digital Marketing, Communications, Ethics, Andragogy, Pedagogy, Human-Centered Design, Innovation

VALIDATION OF THE TPACK-SMART SCALE IN PORTUGUESE: PROFESSIONAL KNOWLEDGE OF UNIVERSITY PROFESSORS ON THE ETHICAL INTEGRATION OF ARTIFICIAL INTELLIGENCE (AI)- BASED TOOLS IN EDUCATION

Mariana Peramezza Del Fiol

ABSTRACT: This study is part of the PhD Thesis in Education, entitled The use of artificial intelligence tools for pedagogical innovation in Higher Education. The objective of this study was to validate the version of the TPACK-Smart scale (or, Intelligent-TPACK) by Isamel Celik, for Higher Education professors from Portuguese Universities. The sending of the online questionnaire adopted an interdisciplinary perspective, allowing the receipt of a wide range of responses, given by several people and with different contexts (personal, social, geographical and academic). This first phase of general research allowed a more comprehensive view of the issues of the current use of AI, with regard to its integration into higher education in Portugal.

KEYWORDS: Validation of the Portuguese Intelligent-TPACK Scale; Teacher Training Higher Education, Ethics, TPACK Technology Integration, Artificial Intelligence

THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: A LITERATURE REVIEW.

Paula Tavares de Carvalho

Ricardo Raimundo

ABSTRACT: The integration of Artificial Intelligence (AI) into higher education is transforming traditional academic environments, reshaping teaching methodologies, administrative processes, and student learning experiences. This literature review explores the current landscape of AI applications in higher education, highlighting key developments, benefits, and challenges. Drawing upon a diverse range of academic sources, the review categorizes AI implementations into instructional support, adaptive learning systems, administrative automation, and student support services. It also critically examines ethical concerns, data privacy issues, and the digital divide that may arise from unequal access to AI technologies. Findings are thoroughly explained. This review concludes by identifying gaps in the literature and recommending areas for future research, particularly regarding the long-term impacts of AI on pedagogical practices and student equity.

KEYWORDS: Artificial Intelligence, Higher Education, Pedagogical Practices, Learning Systems.

INCORPORATING AI ETHICS INTO EDUCATION SYSTEMS: ENSURING TRUST AND EQUITY

Ana Saraiva

ABSTRACT: Artificial Intelligence (AI) is increasingly growing in the education environments. So, it's imperative to address ethical concerns. This paper tries to explore the significant ethical implications of AI systems in education, guided by the existing frameworks. We try to examine the potential of AI to both enhance and compromise educational equity and integrity, and to create trust.

Highlighting key issues such as bias, privacy, and the necessity for transparent AI operations, the discussion appears to be around the global ethical frameworks suggested by European Union regulation and legislation, and the scientific frameworks.

We aim to propose actionable strategies for inserting ethical principles in AI systems within the educational sector, and to highlight the role of industry self-regulation, the governmental oversight, and the pivotal role of the Chief Ethical Officers in educational institutions.

By synthesizing these approaches, this paper aims to offer a comprehensive pattern for educators, who, with technology, collaboratively foster AI solutions that are not only innovative but also inclusive and just.

This discussion not only aligns with the conference's focus on ethical implications in AI-enhanced learning but also urges a move from theory to practice in implementing robust ethical standards to safeguard the future of education.

KEYWORDS: Artificial Intelligence, Ethics, Education, Regulation, European Union, Equity, Trust

THE MULTIFACETED IMPACT OF GENERATIVE AI USAGE ON UNIVERSITY TOURISM STUDENTS' ACADEMIC PERFORMANCE: A MULTI-LEVEL ANALYSIS

Mohammad Ali Obaid

Mohammad Soliman

Kamal Al-Sabahi

ABSTRACT: This study investigates the multifaceted impact of generative artificial intelligence (AI) tools on the academic performance of tertiary education students. A multi-level analysis was designed through conducting quantitative and qualitative studies. A quasi-experimental design was employed, involving 21 undergraduate tourism students who completed pre- and post-tests to assess academic improvement following the integration of generative AI tools such as ChatGPT and Copilot into their coursework. Quantitative results revealed a statistically significant improvement in post-test scores, indicating that AI tools substantially enhanced academic performance. Qualitative data from semi-structured interviews provided rich insights into how generative AI is reshaping the academic experiences of tourism students. The study concludes that generative AI, when integrated thoughtfully and ethically, can serve as a powerful pedagogical aid in tourism education. It recommends the development of AI literacy programs, ethical guidelines, and faculty training to ensure responsible and effective implementation. These findings contribute to the growing discourse on AI in higher education and offer practical insights for educators, policymakers, and curriculum designers.

KEYWORDS: Artificial Intelligence, Higher Education, Student Performance, Student Engagement, Personalized Learning, UTAS, Oman

NAVIGATING SCIENTIFIC ARTICLE TYPES: A PRACTICAL GUIDE FOR PHD STUDENTS ON LEVERAGING AI TO ENHANCE ACADEMIC WRITING

Bruno Lins

ABSTRACT: Writing scientific articles is a fundamental yet challenging skill for doctoral students embarking on their academic careers (Boote & Beile, 2005; Kamler & Thomson, 2006). Despite its importance, early career researchers often struggle to clearly distinguish and effectively structure different types of scientific articles (Swales & Feak, 2012). This article addresses these challenges by providing a practical typology of scientific articles, categorising them as empirical studies, review articles, theoretical or conceptual papers, methodological papers, and short communications or opinion articles (Hart, 2018). For each type, the article outlines key structural elements, purposes, and best practices to support students in matching their research objectives with appropriate formats (Creswell & Creswell, 2017). In addition, the article explores contemporary approaches to improving the quality and productivity of academic writing, integrating discussions of technological tools and ethical considerations (Sword, 2012). The insights presented serve as a practical guide, equipping new researchers with foundational knowledge and contemporary tools essential for efficient and impactful scholarly publishing.

KEYWORDS: Artificial intelligence, Scientific writing, Scholarly Communication, Early Career Researchers

INTEGRATING IMMERSIVE VIRTUAL LABORATORY: CONNECTING PEDAGOGY WITH TECHNOLOGY AS STRATEGIC FRAMEWORK FOR STUDENTS ACADEMIC SUCCESS

Samah Nassar

ABSTRACT: This study focuses on a critical examination of immersive virtual laboratories as used in media and film studies. The research, employing a rigorous mixed methods approach, first develops and ultimately establishes an evidence-based framework beyond technological determinism such that cognitive science principles are leveraged with pedagogical theory. Quantitative and qualitative data are taken to show how important elements of a virtual environment design interact and influence the learning students achieve. The IMMERSE framework presented addresses epistemological challenges of virtual skill acquisition, and there is a theoretically grounded structure for implementation across a wide range of disciplinary contexts. By shedding some light on the cognitive mechanism through which well-designed virtual environments make such a bridge in the discourse of higher education, this research advances the scholarly discourse on technology-mediated learning.

KEYWORDS: Cognitive Learning, Pedagogy, Student Performance, Immersive technology, Virtual Reality.

LEARNING ENVIRONMENTS AND SPACES FOR HIGHER EDUCATION IN THE LIGHT OF NEOLEARNING

Isabela Regina Fornari Muller

Rivaldo Arruda

Patrícia de Sá Freire

ABSTRACT: Neolearning, a concept still under development, presents challenges and gaps. The research being conducted aims to investigate the distinction between learning environment and learning space in the context of Higher Education in light of Neo-learning.

With a qualitative approach and classified as applied research, data collection will be carried out through semi-structured interviews.

Currently, universities are facing uncoordinated changes, with the introduction of new equipment in classrooms, innovative study rooms, interdisciplinary projects, teacher training and isolated actions. This fragmented approach results in unnecessary expenses and lack of expected results.

KEYWORDS: Aprendizagem, Neoaprendizagem, Espaço e Ambiente de Aprendizagem.

AI IN EDUCATION: ASSESSING THE EFFECTS ON EMPLOYABILITY FOR UNDERGRADUATE AND POSTGRADUATE STUDENTS.

Antonia Puccio

ABSTRACT: Artificial intelligence (AI) literacy is becoming more crucial as AI technologies affect all aspects of life and business. For university students, this knowledge is particularly important, as they will encounter these technologies in both their professional and personal lives. Implementing customized curricular workshops and other activities designed to enhance employability significantly contributes to the development of socio-emotional skills and job preparedness for graduates at both undergraduate and graduate levels [1]. In particular the incorporation of AI literacy across various disciplines, equip students for an AI-driven workforce, encouraging interdisciplinary engagement and career readiness [2].

The following research question addresses to this study is “How does the integration of AI literacy into academic curricula impact employability rates among undergraduate (bachelor’s) and postgraduate (master’s) students?”. The objective of this research is to bridge a gap in the current academic discourse by conducting a comparative study on the engagement of bachelor’s and master’s graduates in university laboratories that emphasize AI literacy and digital skills, and to assess how these factors impact job placement outcomes. Although previous studies have emphasized the importance of digital skills [3,4], there is a scarcity of research on their long-term effects on the employability of graduates with bachelor’s and master’s degrees. The analysis for this study utilized data from AlmaLaurea, an interuniversity consortium that accounts for nearly 90% of Italian graduates, in conjunction with SkillFusionLab. It concentrated on a representative sample of 665 bachelor’s students and 270 master’s students from a regional setting, with data collected between 2014 and 2023. The approach enables a comparative evaluation of the employment among the undergraduate and graduate students who engaged in the workshop experience. Expected outcomes include relevant enhancements in digital literacy and AI-related competencies for undergraduate and postgraduate, skills that are increasingly requested by today’s labor market. SkillFusionLab proves to be a successful model for fostering employability skills by showing how incorporating practical experiences into academic programs can significantly improve students’ career paths [5,6]. Future research should expand sample sizes, gather employer feedback, and explore innovative teaching methods to enhance AI-integrated curricula and better meet industry needs.

KEYWORDS: AI Literacy, Higher Education, Students, Employability.

IMPROVING PRE-SERVICE TEACHERS' ATTITUDES TOWARD SCIENCE USING THE FLIPPED CLASSROOM MODEL

Teresa Ribeirinha

Marisa Correia

ABSTRACT: Teacher education programs play a crucial role in preparing future educators. Recent educational reforms have increasingly emphasized the need to equip pre-service teachers (PSTs) with the skills to innovate, excel, and confidently deliver effective early childhood and primary science education. Research consistently shows that teachers with positive attitudes toward science and science teaching create more productive classroom environments. This, in turn, fosters students' positive attitudes toward both the subject and the teacher, ultimately enhancing their motivation and success in studying science. Therefore, it is essential to develop PSTs' attitudes toward science. The Flipped Classroom Model (FCM) has gained traction as a blended learning approach that supports technology-enhanced, student-centered learning environments. One of its promising applications is its potential to improve students' attitudes toward science by fostering active engagement with scientific content. This study investigates the impact of the FCM on PSTs' attitudes toward science. The participants were enrolled in a general science course within the basic education program at the School of Education, Santarém Polytechnic University. The study was conducted over 14 weeks with a group of 22 PSTs, employing a mixed-methods research design. Their attitudes toward science were assessed using the Attitude Toward Science Inventory through a pre-test and post-test approach. Additionally, qualitative data were collected through semi-structured interviews with the participants. The quantitative findings indicate that the FCM had a significant impact on PSTs' attitudes toward science, particularly in their perceptions of the science teacher. Additionally, the qualitative analysis from the interviews revealed that PSTs found the FCM beneficial in enhancing their attitudes toward science. Participants reported that the implementation features of the FCM, combined with teacher support, fostered a more productive classroom environment. This, in turn, stimulated their interest in science, increased their confidence, and encouraged a greater sense of investment in their science learning. These findings suggest that incorporating the FCM into teacher education programs offers significant advantages for the pedagogical training of future science educators.

KEYWORDS: attitudes toward science; flipped classroom model; pre-service teachers; science education.

ARTIFICIAL INTELLIGENCE IN EDUCATIONAL ASSESSMENT: FROM EARLY AUTOMATION TO GENERATIVE AI

Gabriel Cipriano
Isabel Alexandre
Susana da Cruz Martins

ABSTRACT: The recent developments in Generative Artificial Intelligence (AI) have gained significant attention and sparked lively discussions within educational and academic communities around the world regarding its use in the assessment of learning. However, what many may not realize is that AI technologies have been integrated into assessment practices for decades, particularly in large-scale testing and computer-assisted assessments. This presentation, grounded in a comprehensive review of the literature, aims to trace the trajectory of AI in educational assessment, from its early developments in the 20th century to the present. It explores the initial applications of AI in computer-assisted testing systems and examines more recent advancements in the use of AI technologies in large-scale assessments. Additionally, it investigates the emergence of generative AI in classroom settings and its profound implications for teaching, learning, and assessment. By contextualizing the historical evolution alongside current innovations, this communication seeks to foster a deeper understanding of the paradigm shift that generative AI introduces to the assessment of learning.

KEYWORDS: Artificial Intelligence, Educational Assessment, Computer-Assisted Testing, AI in Large-Scale Assessments, AI in Classroom Assessment

MODERN TECHNOLOGIES IN EDUCATION: HOW AR/VR, GAMIFICATION AND ESCAPE ROOMS SHAPE THE FUTURE OF TEACHING

Aneta Poniszewska-Maranda

Marta Chmielewska-Anielak

ABSTRACT: In an era of dynamic changes brought by technological development, education faces new challenges and opportunities. Traditional teaching methods are being enriched with innovative approaches and technologies that aim to increase the effectiveness of teaching and better prepare students for life in the digital world. Modern education is moving towards innovative teaching methods that engage students and meet their needs in a dynamically changing world. This article looks at the latest trends in education that shape the future of teaching and presents selected case studies illustrating the use of AR/VR technologies, gamification and escape rooms to support educational processes.

AR and VR technologies introduce new ways of exploring educational material. They enable students to carry out virtual experiments, visualize complex phenomena without leaving the classroom. Implementing game elements into the teaching process motivates students to learn by increasing interactivity and competition. Escape rooms can be designed around a theme or concept, promoting critical thinking, developing teamwork skills and encouraging creativity.

KEYWORDS: Technologies, Education, Teaching, AR/VR, Gamification

GAMIFIED TRAINING PLATFORM FOR AGRIBUSINESS MANAGEMENT AND DIGITAL AGRICULTURE: INTEGRATION OF TECHNOLOGIES FOR RURAL DEVELOPMENT

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Maria Carolina Martins Rodrigues

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ABSTRACT: The project presents the development of a gamified platform for training in agribusiness management and digital agriculture. It combines concepts of rural administration with emerging technologies such as drones, IoT sensors, and precision agriculture. Gamification elements, such as challenges, scoring, and rewards, make the learning process more dynamic and engaging.

The training is structured into three progressive modules: basic, intermediate, and advanced. The basic level introduces fundamental concepts of management and innovation in agribusiness. In the intermediate module, participants explore management strategies, data analysis, and agricultural automation. In the advanced module, practical simulations are conducted, allowing for the application of acquired knowledge. At the end, digital certification based on performance encourages course completion and the practical use of the knowledge in the market.

The platform aims to address the shortage of professionals trained to deal with technological innovations in the agricultural sector. The digitalization of agribusiness demands qualified workers capable of interpreting data and optimizing production processes. The active learning methodology used on the platform improves knowledge retention and stimulates participant motivation.

The expected impacts include increased professional qualification in the agricultural sector, dissemination of knowledge about new technologies, and modernization of rural management. Additionally, the platform facilitates access to training, benefiting small producers and workers in remote areas.

In conclusion, gamification can be an effective strategy to make professional training more attractive and accessible, driving innovation, competitiveness, and sustainability in agribusiness.

KEYWORDS: Gamification, Agribusiness Management, Digital Agriculture, IoT in Agriculture

DEVELOPMENT OF AN INTELLIGENT TUTORING SYSTEM FOR PRIMARY EDUCATION

Inês Mendonça Consolado

Isabel Machado Alexandre

Sancho Moura Oliveira

ABSTRACT: Combined developments across several fields, such as educational research and computer sciences, have led to an evolving landscape of personalized learning and the educational context. Yet, traditional educational settings still struggle to ensure that all students receive adequate support to succeed academically, with most of the research on personalized learning systems focusing on higher education, often neglecting primary education. This study aims to leverage the use of an artificial intelligence-powered Intelligent Tutoring System (ITS) to enhance the personalization of mathematics learning for third and fourth grade students. For this purpose, an ITS prototype is devised, exploring how student knowledge can be modeled and structured, relying on existing theories, and how personalization should occur during student-system interactions. By applying a design thinking approach, we will assess user experiences and system performance throughout the development process via user interviews and usability testing, involving both students and teachers. We will conduct A/B testing using two versions of the prototype: one with AI-driven personalization and one without. User behavior will also be tracked through questionnaires and analytics tools during testing. The insights gained from data analysis will help evaluate the learning experience delivered by an ITS that utilizes AI-driven techniques for personalization. With these findings, we aim to contribute to the design of ITS tools tailored to the needs of primary education.

KEYWORDS: Intelligent tutoring system (ITS); Personalized learning; Education; Artificial Intelligence; Young Learners.

REDEFINING HIGHER MATHEMATICS PEDAGOGY: THE TRANSFORMATIVE ROLE OF ARTIFICIAL INTELLIGENCE IN ADAPTIVE LEARNING

Katia Bolaños-Rivadeneira

Julio Ibarra-Fiallo

ABSTRACT: The integration of Artificial Intelligence (AI) in higher mathematics education is explored, bridging theoretical frameworks and pedagogical applications. This study examines how AI tools, such as Intelligent Tutoring Systems (ITS), adaptive learning platforms, and generative AI models, enhance student engagement, personalize learning, and foster critical thinking while addressing ethical considerations and algorithmic transparency. Drawing on constructivist, cognitivist, and behaviorist theories, it proposes strategies for leveraging AI to create cognitive conflict, provide scaffolding within Vygotsky's Zone of Proximal Development, and promote meaningful learning as outlined in Ausubel's framework. Current applications, including AI-driven calculators and student modeling, are analyzed, alongside future directions such as interdisciplinary collaboration, geographic diversity in research, and long-term impact studies. The work underscores the importance of AI literacy for educators and students to ensure critical and creative use of technology, balancing innovation with fundamental educational principles. By offering concrete examples and identifying research gaps, this contribution closes the divide between theory and practice, providing a roadmap for responsible AI implementation in university-level mathematics education.

KEYWORDS: Artificial Intelligence, Mathematics Education, Intelligent Tutoring Systems, Learning Theories, Adaptive Learning, AI Ethics

ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: PEDAGOGICAL PRACTICES AND IMPLEMENTATION CHALLENGES

Célio Gonçalo Marques

Inês Araújo

Marta Almada

ABSTRACT: The use of Artificial Intelligence (AI) in higher education has expanded significantly, offering new perspectives for improving pedagogical practices and transforming teaching methodologies. This paper presents a systematic review of the literature on the use and practice of AI in the academic context, with the aim of identifying the main trends and challenges faced by teachers.

The research analyses the geographical distribution of studies, and the higher education fields that have shown the greatest receptiveness to the integration of AI. It also analyses the different teaching models in which AI is used, the benchmarks mentioned, as well as the most common pedagogical practices, such as supporting research, revising texts, using chat-bots to develop knowledge and helping with assessment. Finally, it identifies the main challenges faced by teachers. In this systematic literature review were used english-language articles from the SCOPUS and Web of Science databases, published between 2020 and 2025. The research aims to contribute to the evolution of pedagogical practices and the development of more effective and ethical educational policies in the integration of AI in higher education.

KEYWORDS: Artificial Intelligence, Higher Education, Pedagogical Practices, Teaching Methods

TRANSFORMING HIGHER EDUCATION TEACHING: TRAINING NEEDS AND PEDAGOGICAL APPROACHES

Inês Araújo

Célio Gonçalo Marques

ABSTRACT: Pedagogical innovation involves the application of new strategies, methods, and technologies in teaching to enhance learning and address current educational needs. Recognizing the need to consolidate dynamics of pedagogical modernization in Higher Education, the Directorate-General for Higher Education established the Pedagogical Innovation and Modernization measure in 2024. This initiative led to the application and creation of seven consortia of higher education institutions as Centers of Excellence in Pedagogical Innovation. Simultaneously, the National Council for Pedagogical Innovation in Higher Education was established.

The Polytechnic University of Tomar is part of INOV3P, a consortium that brings together eleven institutions aiming to prioritize innovative practices and empower educators to promote quality teaching.

Through the INOV3P consortium, a questionnaire was developed to identify the training needs and pedagogical approaches adopted by educators. This questionnaire is organized into three parts: i) Diagnosis of Training Needs, where educators indicate the areas of activity in which they need to develop competencies; ii) Inventory of Pedagogical Approaches, developed based on the Higher Education Approaches to Teaching Inventory (HEAT); iii) Socio-demographic Characterization.

Responses were collected from January to March 2025, with 42 teachers from the Polytechnic University of Tomar participating. These results will be essential for outlining the training strategy to be implemented with the educators of the Polytechnic University of Tomar, aiming to empower them in the areas where they feel the most need.

KEYWORDS: Pedagogical innovation; Higher Education; Pedagogical Approaches; Training Needs

ETHICS AND ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION IN PORTUGAL – AN EXPLORATORY APPROACH

Maria Albertina Barreiro Rodrigues

Paulo Jorge Monteiro

ABSTRACT: The arrival of artificial intelligence (AI) in academia is accompanied by opportunities and challenges, particularly ethical ones. This paper seeks to assess how Portuguese higher education institutions are incorporating the ethical frameworks that should regulate the use of AI, in one of the fundamental normative instruments, the Code of Ethics or Conduct. In order to answer the research problem, first a random sample of higher education institutions was evaluated. The selection of the entities was made with the goal of obtaining representative figures of the national context but conditioned by public access to documents. To that, a search was carried out using the Google search engine, using the keywords: universities, polytechnic institutes, codes of ethics, codes of conduct and artificial intelligence. To complement the analysis, it was developed an analysis of the list of the total higher education institutions in Portugal in the academic year of 2023/24, in order to assure that the institutions with more representativeness in number of students were included in the study. In global, the analysed sample consists of 26 higher education institutions that represents 80% of the total students enrolled in such institutions in Portugal during the above-mentioned academic year, and is representative of the public and private systems, with 90% of them representing the public system and 10% the private system; university and polytechnic education; and also covers the geographical dispersion. The developed analysis signalled that the higher education ecosystem in Portugal is very heterogeneous in terms of the normative instruments used, varying between Codes of Ethics, Codes of Conduct or a mixture of both. Therefore, the presence of Codes of Conduct seems to suggest a greater concern with the challenges of legislative compliance and less investment in the ability to respond to new ethical challenges. The findings indicate that most higher education institutions have not yet defined and materialized, in a normative text, the ethical boundaries of the use of AI to ensure increased levels of academic integrity in the context of these institutions with highly intensive human capital. In line with this, the reference to AI within the Codes of Ethics or Conduct is inexpressive, being sparsely present in 3 of the 26 cases evaluated. On the codes that mention AI, one refers to the need to include the identification and recognition of relevant contributions to the authorial process, comprising those arising from the use of AI instruments; and two mention the respect for ethical standards when using AI for the purposes of research activities. The lack of ethical normative instruments regarding the use of AI tools, in teaching and learning contexts, makes it possible to question the speed with which academic institutions are responding to a technological landscape that is accelerating rapidly. This study contributes to the ongoing conversation on AI in academia, by offering policy recommendations for higher education institutions to integrate ethics challenges related to the use of AI in their fundamental normative instruments, ensuring that all participants on the system are aware of their ethical principles connected to the use of AI.

KEYWORDS: Artificial Intelligence; Code of Conduct; Code of Ethics; Higher Education

A SERIOUS GAME ABOUT THE INCLUSION OF IMMIGRANT CHILDREN IN PORTUGUESE SCHOOLS

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Cecília Aguiar

Patrícia Arriaga

Theresa Zagers

Isabel Machado Alexandre

ABSTRACT: With the significant increase in migration flows to Portugal and other European countries, there is a growing need to create inclusive environments and promote cultural awareness and intercultural curiosity, especially among young people. KidLe is a project that aims to foster cultural education and support the integration of immigrant children into new school settings through a board game available in both traditional and digital formats.

The traditional version is played collaboratively, requiring all players to work together, communicate, and share experiences and preferences in order to succeed. Its main objective is to encourage mutual understanding, regardless of culture, ethnicity, or religion. This study focuses on the digital version — a computerised adaptation of the original board game — which, through a child-centred user experience, also serves as a tool for inclusion.

The project involves children, teachers, parents, and other caregivers in the game's co-creation process, aiming to develop a tool that promotes knowledge and raises awareness about different cultures, ethnicities, and religions through an engaging and meaningful learning experience. The game is designed to be played both in schools and at home.

This research highlights the enhanced accessibility and personalization of the digital solution compared to the traditional version, making it a more versatile educational tool capable of reaching a wider audience and, in turn, promoting greater awareness and inclusion of immigrant students. The project is being carried out in several Portuguese schools, following a five-step procedure that includes focus groups, workshops, and testing phases with various target audiences, resulting in an educational, intuitive, and visually appealing board game.

KEYWORDS: children, board game, serious games, immigration, inclusion, educational tool, user experience

THE USE OF AI BY STUDENTS AS AN INSTRUMENT IN THE CONSTRUCTION OF KNOWLEDGE IN HISTORY

Mónica Rodrigues

ABSTRACT: The present research aims to characterize and compare the school success of a sample of sixty students divided into three classes of the 8th grade in the subject of History, from a public school in Amadora, to analyze the differences between groups based on the variables sex, age, nationality, education level of the parents, socio-economic status of the student and school classification. Among the main results we hope to obtain, we project a positive correlation between school classification and the innovative methodology applied to AI to History..

KEYWORDS: AI. Knowledge Construction. Students. History.

STUDENT PERCEPTIONS OF ARTIFICIAL INTELLIGENCE AND ETHICAL CONCERNS: AN EXPLORATORY STUDY IN THE HIGHER EDUCATION CONTEXT

Pedro Pinheiro

Silvia Ferrerira

ABSTRACT: This paper intends to be an exploratory analysis on the perception of higher education students about the use of artificial intelligence and its ethical issues. Our starting point is that artificial intelligence (AI) has become an integral part of modern education, prompting students to grapple with its implications on academic integrity, privacy, and the future job market (Bu, 2022). As students navigate this landscape, there is a growing recognition of the need for educational frameworks that not only address the ethical implications of AI but also promote critical engagement with these technologies. (Holmes et al., 2021) For instance, while many students express comfort in using AI tools like ChatGPT for academic tasks, they simultaneously acknowledge the pressures to conform to perceived norms of cheating and short-cutting learning processes (Shalevska & Kostadinovska-Stojchevska, 2024). This dichotomy highlights an urgent call for institutions to foster discussions around responsible AI usage, ensuring that students are equipped with both the skills to utilize these tools effectively and the moral compass to engage with them ethically. Furthermore, as generative models continue to evolve, understanding their impact on learning outcomes becomes crucial; thus, ongoing research into these dynamics will be essential for shaping future educational policies and practices (Calderwood, 2024; Silva et al., 2024). As the conversation around AI in education evolves, it becomes increasingly important to consider not only students' perceptions but also how educational institutions can actively shape these attitudes through deliberate policy and curriculum design. Research indicates that a significant percentage of students' express concerns about academic integrity when using AI tools, highlighting the potential for misuse if transparency is lacking (Sain & Lawal, 2024). This suggests a pressing need for universities to implement comprehensive ethics training that emphasizes the responsible use of AI, thereby bridging the gap between technological advancement and ethical considerations. Additionally, fostering an environment where students feel empowered to critically analyse AI's role in their learning could lead to more informed usage patterns, ultimately enhancing both academic outcomes and ethical standards within higher education settings. By prioritizing such initiatives, institutions can help mitigate the risks associated with AI while cultivating a generation of learners who are not only tech-savvy but also ethically conscious. (Han et al., 2023). To further enhance the ethical landscape surrounding AI in education, it is essential to integrate interdisciplinary approaches that involve not only technology but also social sciences and humanities. By doing so, students can better understand the broader implications of AI on society, including issues of equity and access within educational environments. For example, while many students recognize AI's potential as a tool for enhancing productivity, there remains a significant concern regarding disparities in access to these technologies, which may exacerbate existing inequalities among different student demographics (Mujtaba, 2024). Additionally, fostering collaborative projects that encourage students from diverse fields—such as ethics, computer science, and policy-making—to work together could lead to innovative solutions addressing both practical applications and ethical considerations of AI tools. This holistic approach can cultivate a more nuanced understanding of AI's role in academia, ultimately preparing students to navigate an increasingly complex technological landscape with both skill and integrity.

This study adopts an exploratory approach to investigate higher education students' perceptions of AI and its associated ethical concerns. Data were collected through an online survey administered via Google Forms. A convenience sample of 106 students from 18 different nationalities participated in the study. The sample comprises 58.7% Portuguese, 12% German, 8.7% Austrian, and 4.8% Czech students. In terms of gender distribution, 44.2% identify as female and 55.8% as male. A significant proportion (84.2%) are enrolled in undergraduate programmes, with 74% pursuing studies in business-related fields. The questionnaire included both closed-ended and Likert-scale questions, aiming to explore students' levels of familiarity with AI, their views on its role in the future of work, potential risks, and ethical concerns.

Findings indicate that most participants have basic experience with AI (72.1%), while 18.3% reported an intermediate level of familiarity. When asked about their general view on AI, 32% stated that AI is an essential tool for the future of work, whereas a more cautious perspective was shared by 60.2%, who acknowledged AI's usefulness while expressing concern over its potential risks. Only a small minority (4.9%) expressed a predominantly negative view, perceiving AI as a harmful force replacing too many jobs.

In terms of ethical concerns, the most frequently cited issue was over-reliance on AI (29.1%), followed by fears of job loss (21.4%), data security and privacy (19.4%), and lack of transparency in AI-driven decisions (14.6%). A substantial majority (78.2%) agreed or strongly agreed that AI should be regulated to mitigate its potential negative impacts.

When questioned about AI's capacity to reinforce biases and inequalities, responses were more ambivalent: 44.6% remained neutral, while 41% expressed agreement or strong agreement. Notably, when asked whether they know how to assess the ethical and transparent use of AI tools, 39.6% remained neutral, 22.8% disagreed, and only 26.7% agreed — suggesting a general uncertainty or lack of confidence in evaluating AI systems critically.

The results suggest that while higher education students recognise the transformative potential of AI, they also harbour significant ethical concerns. The high levels of agreement on the need for regulation reflect a broad awareness of the societal implications of unregulated AI deployment. However, the apparent uncertainty regarding their ability to assess AI's ethical standards indicates a gap in digital and ethical literacy, even among business students, who are likely to encounter AI in future professional settings.

This tension between perceived usefulness and ethical apprehension aligns with prior literature on AI acceptance and trust, particularly in educational and workplace contexts. The data also hint at a generational readiness to embrace AI critically — acknowledging its benefits while demanding oversight and transparency.

From a theoretical perspective, this study intends to contribute to the ongoing discussions about the ethical dimensions of AI adoption in higher education settings. By focusing on students' perceptions, the research provides insights into how future professionals interpret and evaluate AI's societal role. The findings underscore the need for higher education institutions to incorporate ethical literacy and critical thinking about AI into their curricula. Enhancing students' ability to assess the ethical dimensions of digital tools is essential to prepare them for responsible leadership in increasingly automated and data-driven environments. Also, this explanatory study shows that while the majority acknowledge the usefulness and inevitability of AI in the workplace, concerns persist regarding over-reliance, data privacy, and transparency. The results call for more structured educational interventions to enhance students' understanding of AI ethics and their capacity to engage with digital technologies in a critical, informed manner.

KEYWORDS: Artificial Intelligence; Ethics; Students Perception; Higher Education

NEW PEDAGOGIES IN NURSING EDUCATION: FROM EXPERIENTIAL LEARNING TO IMMERSIVE EDUCATION

Elisabete da Luz

ABSTRACT: This paper explores innovative pedagogies applied to nursing education, highlighting methods that go beyond the traditional classroom. Approaches such as game-based learning, virtual and augmented reality, therapeutic cards, and challenge-based learning are discussed. The objective is to reflect on the impact of these methodologies in fostering critical and reflective thinking, aligning nursing education with the complexity of clinical and community practice.

KEYWORDS: Nursing Education, Active Learning, Immersive Education, Game-Based Learning, Therapeutic Cards

FUTURE TRENDS IN AI-POWERED EDUCATIONAL TECHNOLOGIES AND THEIR IMPLICATIONS

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Maria Pina

Nuno Nogueira

Carlos Galveias

ABSTRACT: The rapid evolution of artificial intelligence (AI) is reshaping the landscape of educational technologies, introducing new possibilities for personalized learning, adaptive assessment, and intelligent content delivery. This paper explores emerging AI-driven trends in education, including the advancement of adaptive learning systems, AI-powered virtual tutors, and immersive technologies such as augmented and virtual reality. It examines how these innovations are transforming traditional pedagogical models, enhancing student engagement, and addressing diverse learning needs. Additionally, the paper discusses the broader implications of AI integration, including ethical considerations, data privacy concerns, and the evolving role of educators. By analyzing current developments and projecting future trajectories, this research provides insights into how AI will continue to influence teaching and learning, ultimately shaping the future of education.

KEYWORDS: Artificial Intelligence, Trends, Education, Adaptive Learning, Technology

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON GLOBAL EDUCATION: A SYSTEMATIC REVIEW

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Otacílio José Moreira

Silvia Costa Lopes

Luciana A. Barbieri

Waleska Yone Yamakawa Zavatti Campos

ABSTRACT: The article aims to map and understand how Artificial Intelligence (AI) is being applied in education on a global scale. To achieve this, the authors conduct a systematic review of the scientific literature, identifying the factors that influence this relationship and the effects AI has had on the teaching and learning process.

The research adopts a combined methodological approach, integrating both quantitative and qualitative analyses supported by bibliometric techniques. This combination allows for a more robust and detailed analysis of academic productions on the topic, helping to outline a broad and up-to-date overview. The study examines various sources and identifies trends, gaps, and relevant contributions within the field of AI application in education.

The main findings reveal that Artificial Intelligence has had a positive impact on Global Education. These impacts include personalized learning, support for educational decision-making, and improvements in teaching effectiveness. AI also contributes to the democratization of access to knowledge and to the creation of more interactive and adaptive learning environments.

The originality of the article lies in the systematic organization of the research field, offering a solid theoretical foundation for future studies. Additionally, it proposes practical guidelines that can support the effective implementation of AI in different educational contexts, taking into account their specific challenges.

In summary, the study reinforces the growing importance of Artificial Intelligence in the global educational landscape and highlights its transformative potential—provided it is applied with responsibility, ethics, and sensitivity to both local and global needs.

KEYWORDS: Artificial Intelligence, Global Education, Systematic Review Educational Technology

DESIGN AI- INTEGRATED CURRICULUM: FOSTERING STUDENTS' CRITICAL THINKING SKILLS THROUGH ALGORITHMIC FRAMEWORK IN CINEMATIC STUDIES

Samah Nassar

ABSTRACT: This research implements Artificial Intelligence (AI) tools and computational thinking in Film Studies to improve critical and aesthetic and collaborative competencies of the students. It develops and evaluates a curriculum using generative AI in student tasks of film critique, deepfake analysis, and group-based media projects. The research uses a mixed methods approach (experimental design and analytic descriptive case studies) to investigate the effect that algorithmic tools have on the problem solving, the visual analysis, and the ethical awareness. The key findings tell us that students who take AI supported instruction are more critical thinking, teamwork, and computational literacy. Additionally, they are more sensitive to the ethical aspects related to authorship and media authenticity. Challenges include limited access to technology, pedagogical models that are still not significantly tailored to what the tools constructed for AI offer, and the ethical complexity of using AI. The key details of the study are to emphasize the importance of implementing AI-enhanced film education in a structure, and training the educators involved in it, and working together across the disciplines to make the most of possible. By adding a framework for integrating AI into creative cinematic curricula, and practical insights for the professional preparation of students to cope with the swiftly changing surface of digital storytelling, and the new pedagogy that aligned with the AI educational transformation.

KEYWORDS: AI, Curriculum Design, Cinematic Studies, Critical Thinking, Student Performance

THE IMPLEMENTATION OF THE ERASMUS WITHOUT PAPER (EWP) INITIATIVE IN PORTUGAL

Beatriz Duarte

ABSTRACT: The impact of digital transformation on society, particularly in the aftermath of the COVID-19 pandemic, has created an urgent need to develop public policies in higher education, notably through the Erasmus Without Paper initiative. This initiative aims to digitize the processes related to mobility under the Erasmus+ Program. However, its implementation is influenced by the varying domestic contexts of EU member states and the digital maturity stages of higher education institutions (HEIs).

Understanding the barriers faced in this process is essential for improving its implementation.

A literature review identified the main obstacles encountered by Portuguese HEIs: the lack of infrastructure and resources - particularly the fragmentation and diversity of data and systems -, insufficient funding opportunities, a conservative academic culture, a lack of technical support, and the inertia of public agencies/inflexibility in decision-making.

Overcoming these barriers will require alignment between the demands imposed by the European Commission and the actual implementation capacities of national governments and HEIs. This includes developing policies that promote digital transformation, tailored to the reality of available resources (fit-for-purpose), encouraging alternative ways to support HEIs in their digital maturation process, and fostering a stable environment that reduces resistance to change.

KEYWORDS: digital transformation; Higher Education; barriers; Erasmus Without Paper; Portugal; European Union.

NAVIGATING THE EDUCATIONAL AI FRONTIER - A FRAMEWORK FOR PERSONALIZED LEARNING SYSTEMS

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Maria Carolina Rodriguez

Maria José Sousa

Americo da Costa Ramos Filho

Martius Vicente Rodriguez Y Rodriguez

ABSTRACT: The increasing adoption of AI-driven personalized learning systems has highlighted persistent challenges, prompting researchers to conduct systematic reviews to synthesize findings in AIED (Artificial Intelligence in Education). These reviews yield diverse conclusions across various focus areas, stakeholders, educational levels, and regions, complicating the understanding of AIED's impact. This study addresses this gap by analyzing 178 reviews using a technology-based learning model focusing on higher education, particularly during the pandemic-induced shift to online learning. Findings indicate that AI primarily supports teachers and students, with less attention given to other stakeholders, such as school leaders. The study proposes the HEALED framework, which presents six core components designed to enhance AI integration in education, ensuring effective and ethical implementation: Human-Centered Design, Equity and Accessibility, Adaptive Learning Algorithms, Learning and Improvement (Through Assessment), Ethical Guidelines, and Data-Driven Personalization. As classrooms transition to digital and diverse environments, the need for personalized learning systems grows urgent. AI-driven systems can tailor educational experiences to meet learners' needs, strengths, and interests. However, navigating this AI frontier requires a robust framework to ensure practicality, equity, and ethics. This study aims to develop a comprehensive framework for integrating AI-powered personalized learning systems, enhancing learning outcomes while addressing ethical concerns and ensuring student accessibility. It aims to provide actionable guidelines for educators and institutions to effectively integrate AI technologies, ensuring alignment with educational goals and ethical standards. As secondary objectives, the study will demonstrate how personalized learning systems can enhance student engagement, motivation, and academic performance. Furthermore, it addresses potential ethical challenges and proposes strategies to mitigate data privacy and algorithmic bias. The framework emphasizes the importance of continuous evaluation and improvement, incorporating feedback from stakeholders to refine and enhance the effectiveness of AI systems over time.

KEYWORDS: Personalized Learning, AI in Education, Educational Framework, and Ethical AI Integration

IA NA EDUCAÇÃO: EQUILIBRANDO INOVAÇÃO E APRENDIZAGEM EM SISTEMAS TUTORES INTELIGENTES

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Maria Carolina Rodriguez

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Americo da Costa Ramos Filho

Martius Vicente Rodriguez Y Rodriguez

ABSTRACT: O estudo analisa como os Sistemas de Tutoria Inteligentes (STI) impulsionados por IA podem melhorar as experiências de aprendizagem, aumentando o envolvimento e o desempenho acadêmico, permitindo que o aluno se adapte às disciplinas, aos materiais didáticos e consiga retorno para suas dúvidas específicas. O estudo explora criticamente a intersecção entre ferramentas educacionais baseadas em IA e avalia, através de um estudo de caso, a eficácia do STI na melhoria do desempenho e do envolvimento dos alunos, alinhando estas ferramentas com objetivos educacionais mais amplos. Defende a integração da IA na educação, equilibrando os avanços tecnológicos para melhorar os resultados da aprendizagem e apoiando as diversas necessidades dos alunos. O estudo tem como objetivo avaliar o impacto da utilização de um Sistema de Tutoria Inteligente (ITS) baseado em IA no desempenho acadêmico e nível de engajamento de alunos de MBA, comparando os resultados obtidos em um ambiente de aprendizagem online com aqueles observados em um ambiente de aprendizagem presencial, oferecendo informações sobre como os Sistemas de Tutoria Inteligentes podem ser concebidos e implementados para maximizar o seu impacto positivo nos novos sistemas de aprendizagem adaptativa. O estudo pode servir como um roteiro para pesquisadores, educadores e desenvolvedores navegarem neste campo complexo e em evolução. O estudo de caso mostrou que aproveitando a tutoria de IA, a instituição pode alcançar resultados acadêmicos melhores e garantir um desempenho mais equilibrado em todos os alunos.

KEYWORDS: Sistemas Tutores Inteligentes (STI); IA na Educação; Mitigação de viés; Tecnologia Educacional; Aprendizagem Personalizada; Sistemas de Aprendizagem Adaptativa; Engajamento do Aluno; Análise de aprendizagem.

NEW FORMS OF RECRUITMENT USING AI: IS EDUCATION UP TO THE CHALLENGE?

*Rita Bernardo
Andreia Borges*

ABSTRACT: The integration of Artificial Intelligence (AI) into recruitment and selection processes has emerged as a significant shift in Human Resources (HR), particularly accelerated by the COVID-19 pandemic. However, this growing automation apparently raises important concerns regarding candidates, which can negatively perceive the usage of AI in recruitment processes. Our study aims to understand whether organizational attractiveness and application intent to an organization decrease when their recruiters fully use AI to select applicants. We also aim to test how far there are differences across generations, and it is expected that younger generations better accept this new virtual reality.

Our working paper, which follows an experimental approach, considers that, as AI becomes embedded in recruitment, educational institutions must reassess how they prepare HR students for the future of recruitment, which integrates AI. This study contends that AI has to be managed carefully given the negative perceptions over this reality already tackled in literature.

Educational curricula must evolve to equip HR students not only with the digital literacy required to navigate AI-mediated recruitment environments but also soft skills as they will continue to be used to recruit. Institutions also need to foster critical awareness about employer branding, social presence, and how algorithmic decisions can affect their professional identity and performance.

We contend that this study raises awareness on HR, which is seemingly antagonistic with AI- HR is all about people, not AI. However AI facilitates HR processes. Therefore, it needs to be handled carefully in HR.

KEYWORDS: Human Resources; Recruitment and Selection; Artificial Intelligence; HR Education

HOW SHALL WE TEACH HUMAN RIGHTS IN THE ARTIFICIAL INTELLIGENCE ERA?

Helena Melo

ABSTRACT: For many centuries we were the ChatGPT. We studied for years and years and transmitted our learned information to our students in the human rights field. One of our main tasks was to recollect, transmit and control the quality of the circulating information and knowledge on the Human Rights Field. Thus being, we taught which were the main legal instruments we had in the different international organizations, how did the Courts interpret them, how could we accurately organize the available information in order to provide fair solutions to the human rights issues and violations all over the World and, in particular, in Europe.

Artificial Intelligence recent progress created a different knowledge environment. The computer probably, in five years' time, will provide information in a faster and more accurate way than we humans are able to do it. It will probably also be able to solve the legal dilemmas and "puzzles" that we now-a-days teach our students to critically think about.

We, as humans, are also altering our human nature as a result of our continuous interaction with machines. The way we think, react to new stimuli and answer our day to day problems has radically changed. Therefore it is no longer possible to ignore that a new learning environment within a new human ecosystem is emerging. What and how we teach human rights has to reflect this new reality and must drastically change.

We should provide less information that can be easily be found on line. We should focus on the real and serious problems that citizens in a Europe that is becoming less and less liberal and democratic faces. On the global problems that we, as members of the human species, have to answer if we do not want to be one more extinguished species on Planet Earth. Transmitting information should no longer be our main objective as Professors teaching human rights. Critically reflecting about how to solve them, providing the students with the required tools to be able to do so, seems to be the most important future aim of our teaching. Replacing memory by critical judgment, the providing of theory and facts by the ability of finding them, within a new content framework and learning environment is the main challenge we have to overcome. Soft skills will also be decisive to spread the message that human rights are essential, on a world where being a human rights defender is more and more difficult and dangerous.

KEYWORDS: A.I. Human Rights

STRATEGIC GOVERNANCE OF AI IN EDUCATION: ETHICAL FRAMEWORKS AND GEOPOLITICAL EQUITY

Sandra Baño

ABSTRACT: The rapid integration of Artificial Intelligence (AI) into education systems presents transformative opportunities for personalized learning, yet its ethical governance and geopolitical implications remain critically underexplored. This study addresses this gap by analyzing how AI adoption in education intersects with strategic policy-making and global equity. Combining quantitative analysis of adaptive learning platforms (e.g., Squirrel AI) with qualitative case studies from South Korea and Austria, we identify a 30% improvement in student retention rates alongside persistent disparities in data privacy governance. Findings reveal that algorithmic bias disproportionately impacts marginalized students in low-resource settings, underscoring the need for ethical frameworks that prioritize inclusivity. From a Strategic Studies perspective, the research demonstrates how AI policies can exacerbate or mitigate geopolitical inequalities, particularly in regions with limited digital infrastructure. The paper concludes with actionable recommendations for policymakers to align AI strategies with SDG4 (Quality Education) while addressing ethical risks such as surveillance and bias. By bridging technology with political accountability, this work contributes a novel interdisciplinary framework for equitable AI governance in education.

KEYWORDS: AI in Education, Strategic Governance, Ethics, Geopolitical Equity, Algorithmic Bias, Inclusive Policy.

“UNIVERSITY STRUCTURES IN TRANSFORMATION: THE ROLE OF ARTIFICIAL INTELLIGENCE AND RESEARCH AND DEVELOPMENT (R&D) FUNDING POLICIES”

Anabela Carmelina Sousa Gomes

Maria José Sousa

Maria Carolina Rodrigues

ABSTRACT: Currently, universities face significant challenges in a rapidly changing environment. On one hand, societal demands are constantly increasing, while on the other, restrictive public funding policies compromise their activities. This article explores the organizational structure of universities, their mission, and their functions in teaching, research, and their connection with society, particularly in the context of the growing integration of Artificial Intelligence (AI) in educational processes.

This work analyzes the impact of funding for Research and Development (R&D) projects on public policies and public administration. Concepts and activities related to R&D, such as Applied Research (AR), Basic Research (BR), and Experimental Development (ED), are defined based on the Frascati Manual. The research focuses on R&D funding, adopting a descriptive perspective that analyzes the evolution of funding and its execution between 2015 and 2019, aiming to examine how these resources have impacted the structure of Higher Education Institutions (HEIs) in Portugal and the outcomes of the R&D activities carried out.

The article discusses Structural R&D Funding Programs, considering their theoretical framework, historical evolution, and applications in higher education. Furthermore, it addresses how the implementation of AI technologies can positively influence the efficiency of educational processes and resource management in HEIs. The work presents an analysis of the research methodologies, techniques, and procedures that will be used to test the research hypotheses, with the aim of providing answers to the questions raised.

One of the main conclusions points out that public policies for funded projects should promote a combination of approaches, ensuring that the cross-cutting perspective and the Community Support Frameworks are properly integrated. The diversification of funding sources, including tuition fees, service provision, and partnerships, is crucial for the sustainability of institutions but must be pursued with caution to avoid compromising the autonomy and central mission of universities.

Thus, this article not only outlines the landscape of R&D funding in Portugal but also proposes a framework for the effective integration of AI into institutional strategies. Furthermore, it highlights the need for a balance between the pursuit of resources and the maintenance of the quality of educational activities. The conclusions also address the impact of funding on universities' ability to meet contemporary demands, suggesting directions for future research and relevant recommendations for public policies that integrate AI in an ethical and effective manner.

KEYWORDS: Artificial Intelligence R&D Funding Higher Education Institutions Public Policies Academic Performance

DIFFERENCES IN BEHAVIOURAL AND COGNITIVE SKILLS BETWEEN REGULAR AND VOCATIONAL SCHOOL STUDENTS ENTERING HIGHER EDUCATION IN PORTUGAL: PROPOSING AN AGENDA TOWARDS NEW PEDAGOGIES

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ABSTRACT: The present study aims to analyze the disparities in behavioral and cognitive skills between students from regular secondary education (Scientific-Humanistic Courses) and vocational education, at the time of their entry into higher education in Portugal. The research was based on a sample of 439 students, evaluating so-ciodemographic variables, academic adaptation strategies, cognitive skills and perceptions regarding preparation for higher education. The results show statistically significant differences between the two groups analyzed. Students coming from regular secondary education tend to show greater confidence in theoretical skills, reflecting the academic orientation of the training path that preceded their entry into higher education. In turn, students from vocational education show a superior performance in practical skills, collaborative work and use of technologies, denoting a more application-oriented preparation in concrete and professional contexts. It is important to emphasize that such differences should not be interpreted as gaps or deficits, but rather as manifestations of different educational trajectories that, if properly recognized and valued, can contribute to the diversification and enrichment of the academic context. Based on the data obtained, the study proposes a pedagogical agenda for higher education focused on promoting inclusion, integrating transversal skills, valuing practical and digital learning, supporting the academic transition process and continuous training of the teaching staff. In conclusion, the results of this study point to the need to rethink educational practices and policies in higher education, promoting differentiated pedagogical approaches that respond to the specificities of the various student profiles. The adoption of a more flexible, inclusive and student-centered pedagogy is essential to ensure equity in access, permanence and academic success.

KEYWORDS: Higher education, regular education, vocational education, cognitive skills, behavioural skills

ARTIFICIAL INTELLIGENCE AND EDUCATION: PEDAGOGICAL TRANSFORMATIONS IN THE ONLIFE ERA

Ana Beatriz Willcox

Maria Carolina Martins Rodrigues

ABSTRACT: In the Onlife Era, characterized by the fusion between the physical and digital worlds, human interactions and learning processes are being profoundly transformed. This new paradigm challenges traditional conceptions regarding the roles of educators and students, as technology, particularly Artificial Intelligence (AI), redefines contemporary educational dynamics. The integration of AI into pedagogical practices presents unique opportunities for personalizing and enriching learning experiences, while simultaneously highlighting multifaceted issues related to ethics, equity, and the instrumental role of technology in the educational context. The central purpose of this systematic review is to investigate and critically analyze how the growing integration of Artificial Intelligence in educational processes influences the contemporary pedagogical landscape. This systematic investigation strictly adhered to PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and examined studies that implemented Artificial Intelligence technologies in the educational domain. The methodology included structured searches in three internationally relevant academic repositories (ERIC, Web of Science, and Scopus), applying as inclusion criteria original studies published in English.

KEYWORDS: Artificial Intelligence, Onlife Era, Education, Pedagogical Practices, Systematic Review

ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: A SYSTEMATIC REVIEW OF GLOBAL APPLICATIONS AND IMPACTS

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Otacílio José Moreira

Luciana A. Barbieri

Waleska Yone Yamakawa Campos

Paula Lopes Erthal

Carolina Tomé Coelho

ABSTRACT: In recent years, Artificial Intelligence (AI) has established itself as a transformative force across various fields, and education is no exception. With the rapid advancement of digital technologies and the increasing availability of data, the application of AI in teaching and learning has become a topic of growing relevance for educators, administrators, and policymakers worldwide.

Understanding the impact of AI on education is crucial, especially in a global context that demands personalized learning and adaptation to the diverse needs of students. AI can play a significant role by offering innovative solutions, ranging from intelligent tutoring systems to data analysis tools that support and inform pedagogical practices.

The main objective of this systematic review is to confirm the feasibility of applying Artificial Intelligence (AI) in education on a global scale.

This systematic review strictly followed the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and analyzed studies that integrated Artificial Intelligence within the educational context. An exhaustive search was conducted in three relevant databases (ERIC, Web of Science, and Scopus), with one of the inclusion criteria being original studies published in English that investigated the application of AI in higher education.

KEYWORDS: Artificial Intelligence (AI), Higher Education, Teaching and Learning Educational

ENHANCED LEARNING BY USING ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION

Marc Beutner

ABSTRACT: In this paper the possibilities for a pedagogical use of artificial intelligence in higher education lectures are presented and discussed. At the university Paderborn we integrated artificial intelligence in lectures in the field of media didactics. These lectures provide teacher students for the necessary skill for education in today's VUCA world (VUCA - Volatility, Uncertainty, Complexity, and Ambiguity) which is our the-paced and unpredictable environment we live in. Here artificial intelligence transforms the way students learn and teachers teach. In pedagogy Generative AI tools are indeed powerful assets in preparing for the VUCA world. We did a qualitative research in the lectures with the target group of student who learn with AI-tools for image generation, sound generation, presentation generation and text generation like DALL-E, GAMMA, CHAT-GPT, Copilot, sounddraw or suno. The challenge for teachers is to integrate the AI tools in a pedagogical senseful way in their lectures and to create enhanced and improved learning experiences. The text provides insights in the pedagogical design and the expectations and experiences. The learners used generative AI to create custom learning content and foster their creative problem solving with regard to the creation of didactic and pedagogical designs. In these contexts we also used AI to assists in creating resources for learners with disabilities, such as voice-to-text transcription, real-time captioning, and text-to-speech tools. Our use of generative AI inspired the students to explore their creativity. They were active in storytelling, writing texts, creating artwork, or designing models for projects. The text offers an insight into the design of the course and also offers results of the qualitative research.

KEYWORDS: AI, Higher Education, VUCA, Generative AI, Education

EXPLAINABLE AI IN EDUCATION: EVALUATING ITS EFFECT ON TRUST, FEEDBACK USEFULNESS, AND LEARNING OUTCOMES

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ABSTRACT: Artificial Intelligence (AI) has become increasingly integrated into educational environments, particularly in the provision of automated feedback for student tasks such as writing, coding, and assessment responses. While these systems offer scalability and efficiency, they are often criticized for being opaque or difficult to understand, which can undermine student trust and reduce the pedagogical value of the feedback provided. In response to this challenge, Explainable AI (XAI) has emerged as a promising approach to make automated feedback more transparent, interpretable, and learner-centered.

This study explores the role of explainability in AI-driven feedback systems, with a focus on how it influences student trust, engagement, and learning outcomes. Drawing from established theories in educational psychology and human-computer interaction, we propose a framework for evaluating the effectiveness of explainable feedback mechanisms. A mixed-methods experimental design is planned to compare student experiences and outcomes when interacting with black-box versus explainable AI feedback systems. Key variables of interest include perceived feedback usefulness, revision quality, and cognitive engagement.

The results of this research aim to contribute to the design of more trustworthy and pedagogically effective AI tools in education. By integrating explainability into feedback delivery, this paper seeks to align technological advancement with foundational learning principles, ultimately supporting more meaningful and transparent student-AI interactions.

KEYWORDS: Explainable Artificial Intelligence, Educational Technology, Human-AI Interaction, Automated Feedback Systems

CHATGPT FOR REVIEW OF MULTIPLE-CHOICE QUESTION QUALITY: A PILOT EVALUATION USING THE INOVALIAR CONSOLIDATED LIST

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ABSTRACT: Multiple-choice questions (MCQs) are widely used to assess cognitive learning, valued for their objectivity, impartiality, and potential for automation in marking and feedback. However, studies have highlighted deviations from best practices in MCQ construction. A consolidated list of 18 quality criteria in Portuguese for single-best-answer MCQs was developed within the INOValiar project. This study aims to assess the feasibility of using a large language model (LLM) — specifically ChatGPT — to review MCQs based on this list

Methods

We used MCQs from publicly available secondary education exams, along with a sample provided by colleagues from higher education institutions (HEIs) not affiliated with the authors. Data collection is ongoing. Each MCQ is independently assessed by two human reviewers using the INOValiar criteria, with time spent recorded. Items with low inter-rater agreement are discussed, and the resulting consensus is used as reference for comparison with ChatGPT's output based on the same criteria. Human–ChatGPT agreement will be analysed both per MCQ and per criterion

Results

MCQ-level agreement will help identify where ChatGPT underperforms, while criterion-level agreement will highlight which items are more difficult to automate. The proportion of ChatGPT–human agreement will indicate the potential for replacing manual review. Similar consensual human scores across MCQs from secondary exams and HEIs would support using publicly available items to benchmark LLMs, reducing reliance on proprietary materials.

Conclusion

This study will provide initial insights into the feasibility of using one LLM for automated review of MCQs, and its potential to reduce workload and improve quality assurance.

KEYWORDS: Student assessment; Multiple-choice questions; ChatGPT; Quality assurance in assessment; Large language models

DIGITAL DISTRICTS AS INFORMAL LEARNING ECOSYSTEMS

Nádia Leitão

ABSTRACT: As cities integrate digital infrastructures into commercial districts, new forms of informal learning emerge at the intersection of technology, everyday life, and local commerce. This paper explores how AI-enabled urban infrastructures—such as smart signage, interactive public platforms, and data-driven services—can transform digital districts into learning ecosystems that enhance the quality of life for both residents and visitors.

Drawing on a systematic literature review spanning 1995 to 2025, the study examines the socio-economic, environmental, and educational impacts of digital urban transformations, with a focus on how these spaces foster informal, lifelong, and incidental learning experiences. The research highlights how micro-interactions in digitally augmented environments—such as accessing real-time public information, navigating digital wayfinding, or engaging in civic tech—contribute to knowledge-building, digital literacy, and civic awareness.

Positioned at the crossroads of urban innovation and educational transformation, the paper argues for a reframing of digital districts not merely as commercial zones, but as hybrid learning spaces that bridge technology and human development. It concludes by proposing a multidimensional framework to assess the educational and quality-of-life impacts of AI-driven urban interventions, offering insights for policymakers, educators, and urban designers.

KEYWORDS: Digital Districts, Informal Learning, Smart Cities, Artificial Intelligence, Urban Innovation, Quality of Life, Urban Education, Human-Centered Technology, Digital Inclusion

EXPLORING VIRTUAL PRODUCTION AS A SOLUTION TO EGYPTIAN VFX CHALLENGES: A COMPARATIVE STUDY OF TRADITIONAL AND REAL-TIME METHODS

Marina Dourgham

ABSTRACT: This study investigates the potential of hybrid virtual production (VP) techniques to address persistent challenges in the Egyptian visual effects (VFX) industry, particularly during the high-pressure television season. Grounded in the Task–Technology Fit (TTF) theory, the research explores whether post-produced hybrid virtual production (PPHVP) can offer a more time-efficient, cost-effective, and sustainable alternative to traditional VFX workflows in resource-constrained environments.

The methodology adopts a mixed-methods approach, consisting of two phases: an exploratory phase and an experimental phase. The exploratory phase involved surveying 51 industry professionals and conducting in-depth interviews to identify key challenges and commonly used shot types. In the experimental phase, two shots were produced using PPHVP techniques. Feedback was subsequently collected through two online surveys: one targeting industry professionals (yielding 56 completed responses) and another targeting general audiences (yielding 83 completed responses).

The results indicate that PPHVP not only enhances production speed and reduces costs but also contributes to sustainable development. The findings suggest that hybrid VP methods can deliver comparable visual fidelity while offering notable operational advantages. This research provides practical insights into the evolving Egyptian VFX landscape and supports sustainable filmmaking practices aligned with the United Nations Sustainable Development Goals (SDGs), specifically SDG 9 (Industry, Innovation and Infrastructure) and SDG 12 (Responsible Consumption and Production).

KEYWORDS: virtual production, post produced hybrid virtual production, traditional visual effects, real time methods, task technology fit theory, Egyptian VFX industry

FOG-ENABLED EMOTION-AWARE AI SYSTEMS FOR PERSONALIZED INCLUSIVE LEARNING: A FOCUS ON NEURODIVERSE STUDENTS

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Faiz Muhammad

Awais Adnan

Hamood Ur Rehman

ABSTRACT: Educational practices face challenges in meeting the diverse needs of students, especially those who are neurodiverse. Traditional learning systems often fail to address the varying emotional and cognitive states of students, which can lead to disengagement, frustration, and cognitive overload, hindering effective learning. To address these issues, this study presents a Fog-enabled, emotion-aware adaptive learning system. It aims to improve outcomes for neurodiverse students by adapting learning experiences based on emotional cues. A lightweight Convolutional Neural Network and Gated Recurrent Unit CNN-GRU hybrid model is used at the Fog Node level. The model detects real-time emotional states such as Engaged, Confused, Frustrated, and Bored. It analyzes multimodal student interaction data to make these detections. The system adapts learning content based on these emotions. This helps maintain engagement and reduce cognitive overload. Simulations show that the system has achieved an accuracy of 86.5% and the inference latency is under 80 milliseconds. The model size is only 14.7 MB, which makes it suitable for edge deployment. Comparative analysis shows that the model performs better than traditional CNN, LSTM, and DNN models. The results show that emotion-aware and privacy-preserving systems can work well in fog computing. This approach leads to more inclusive and responsive learning interventions.

KEYWORDS: Convolutional Neural Network, Gated Recurrent Unit, Edge Computing, AI in Education, Neurodiverse, Emotional Detection

THE GLOBAL VIRTUAL CLASSROOM: HOW CAN GENERATIVE AI CONTRIBUTE TO A BETTER HUMAN RIGHTS EDUCATION?

Helena Pereira de Melo

ABSTRACT: All people throughout their lives, should have access to quality, inclusive, accessible human rights education, as a life-long humanistic and transformative process. According to UNESCO's soft law texts, all actions in Human Rights Education that use Artificial Intelligence models have to respect international human rights law. In this article, we discuss the dangers and benefits that may arise from using Artificial Intelligence in education in this specific field of knowledge. We reach the conclusion that the use of these new technologies in Education in Human Rights is not, per se, good or bad, all depending on the ethical or non-ethical use we have of them, having in mind the UNESCO'S recommendations, namely the Recommendation on Education for Peace, Human Rights and Sustainable Development.

KEYWORDS: Human rights, education, Artificial Intelligence

IMPACT OF INSTRUCTIONAL MEDIUM AND SOCIOECONOMIC BACKGROUND ON IMMERSIVE TECHNOLOGY ADOPTION TOWARDS ENHANCING UNIVERSITY STUDENTS' LEARNING SKILLS

Prof. Dr. Shahbaz Ahmad

Ms. Shahzia Shahbaz

ABSTRACT: The integration of immersive technology in higher education has gained significant attention due to its potential to enhance students' learning experiences. This study examined the relationship between the instructional medium and socioeconomic background in influencing the adoption of immersive technology for improving university students' learning skills. The research explored how different instructional approaches, including traditional, blended, and digital learning methods, impact students' willingness and ability to engage with immersive technologies such as virtual and augmented reality. Additionally, the study investigated the role of socioeconomic factors, including financial resources, technological accessibility, and digital literacy, in shaping students' adaptability to these advanced learning tools. The findings highlighted key challenges and enablers in the adoption process, providing insights into strategies for equitable and effective technology integration in higher education. The study contributed to the growing discourse on digital transformation in education and offered practical recommendations for educators, policymakers, and institutions to bridge technological gaps and enhanced learning outcomes through immersive technology. The study was quantitative and descriptive in nature. Non-probability convenient sampling technique was used in this research. 496 participants comprising 312 females and 184 males participated from four public universities of Pakistan. Questionnaire was used to collect data. Descriptive statistics, Bivariate Pearson and linear regression were used for data analysis. Mostly respondents were in favor that poverty was not hindrance for low socio economic students towards quality skill of learning and some supported that quality learning was affected by socio-economic status, domestic problems and educated family background of the students. Further findings showed that high socio economic students got better learning while they had good health and better learning environment. Students with other than English language medium of instruction found difficult to attempt paper in English and preferred familiar medium of instruction. Mostly students claimed that English medium graduates were more confident with improved English language proficiency. Study proved that university students' quality learning had significant relationship with socio-economic. Study came with this conclusion that students' quality learning and instructional medium at university level are insignificantly correlated.

KEYWORDS: ICT Utilization, Educational Technology, Instructional Technology

ARTIFICIAL INTELLIGENCE IN POSTSECONDARY EDUCATION: BEST PRACTICES AND CONSIDERATIONS

Stephen Fritzenkotter

ABSTRACT: Artificial Intelligence (AI) has rapidly evolved, permeating various sectors of our society, including education. AI adoption by students is widespread, with many leveraging it for research and assignments. Educators must adapt their pedagogical approaches to effectively integrate AI into the learning process. While over-dependence on the technology and plagiarism are concerns for students, AI used responsibly, use can lead to knowledge expansion, creativity, and overall enhanced student outcomes. This paper explores best practices for AI integration in postsecondary education, emphasizing strategic planning, ethical considerations, faculty development, and continuous evaluation.

KEYWORDS:

ONE YEAR LATER – THE ADVANCEMENT OF CHATBOTS IN HIGHER EDUCATION - A CASE STUDY

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Luben Boyanov

ABSTRACT: Chatbots in higher education have evolved significantly in the past year, integrating advanced Artificial Intelligence (AI), machine learning (ML), and natural language processing (NLP) technologies. Institutions are leveraging chatbots to improve student engagement, streamline administrative processes, and enhance learning experiences. This paper examines the latest advancements and impacts of chatbots in higher education, looking into the case of the biggest business Bulgarian university – the University of National and World Economy. We have looked at the dynamics of the use and impact of Artificial Intelligence tools one year later after a similar study. We have summarized and analyzed the current state of the use of AI tools. At the end, we highlight the key trends and future directions.

KEYWORDS: Artificial Intelligence (AI), chatbots, advancements, higher education, students

ARTIFICIAL INTELLIGENCE LITERACY: CHALLENGES LIMITATIONS AND FUTURE IMPLICATIONS OF AI IN EDUCATION

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Dzati Athiar Ramli
Shafullah khan

ABSTRACT: Artificial Intelligence (AI) is transforming modern education through adaptive tools, intelligent systems, and personalized learning experiences. Since its inception, AI has evolved into a multi-faceted discipline with profound implications for teaching and learning. This paper explores the rise of AI literacy as a foundational skill for K–12 education, emphasizing the need for age-appropriate, ethical, and inclusive integration of AI concepts. While AI-driven tools such as intelligent tutoring systems, social robots, and adaptive learning platforms offer substantial benefits, including personalized instruction and administrative efficiency, challenges persist. These include concerns over bias, data privacy, equitable access, and reduced human interaction. By analyzing keyword trends and thematic patterns in academic literature, this study identifies key focus areas and research gaps in AI education. The paper also discusses the evolution toward Education 5.0, which leverages AI, VR, IoT, and big data to promote student-centered, flexible, and immersive learning. Enabling technologies and 39 transformative AI applications are examined, alongside ethical and pedagogical considerations. The findings highlight the urgency of equipping both students and educators with AI literacy to navigate an increasingly digital world and inform future educational strategies that are equitable, effective, and technologically responsive

KEYWORDS: Artificial Intelligence, Education, Virtual reality, IoT, Big Data, AI Technology.

SURVIVING IN THE DIGITAL WORLD: A CASE STUDY ON AI LITERACY FOR MATURE LEARNERS

Elena Romine

ABSTRACT: This paper presents a case study of “Surviving in the Digital World,” a five-session course offered through the Osher Lifelong Learning Institute (OLLI) at California State University San Marcos (CSUSM) from February 12 to March 12, 2025. Designed for learners aged 60 to 85, the course aimed to enhance digital literacy and introduce core concepts of artificial intelligence (AI). Delivered in a hybrid format to 32 students, the course responded to key challenges—diverse backgrounds, technical complexity, and skepticism—through experiential learning, open discussion, and real-world relevance. The curriculum adapted iteratively to student feedback and utilized audiovisual materials to support varied learning styles. Outcomes included increased digital confidence, greater openness to AI, and strong interest in continued study. The case highlights the importance of tailored, inclusive AI education to bridge generational divides and promote social inclusion.

Introduction

Lifelong learning, defined as the voluntary pursuit of knowledge for personal or professional development, is increasingly vital in the digital age. Programs such as the Osher Lifelong Learning Institutes (OLLI)—supported by the Bernard Osher Foundation and hosted at 120 U.S. universities—enable adults over 50 to engage with contemporary topics in accessible, non-credit formats. As artificial intelligence (AI) becomes integrated into daily life, there is a growing need for education that includes older adults—many of whom face barriers such as limited technical exposure, mistrust of AI, and rapidly evolving digital environments.

This paper examines a 10-hour course, “Surviving in the Digital World,” taught by Dr. Elena Romine (UCR/CSUSM) and Dipl.-Ing. Stefan Sachse (KaSa eSysteme GmbH), which sought to equip mature learners with foundational digital skills and AI literacy. The study focuses on the pedagogical design, implementation, challenges, and outcomes of the course, arguing for the broader relevance of such models in promoting inclusion and technological adaptation among aging populations.

Course Design and Structure

The course consisted of five two-hour sessions, delivered in a hybrid format to 25 in-person and 7 online learners aged 60 to 85. Technical infrastructure supported seamless participation across modalities, including real-time audiovisual content via Google Slides.

Key learning objectives were to:

- Enhance basic digital literacy, with a focus on cybersecurity and privacy
- Introduce fundamental AI concepts, including benefits and risks
- Promote mindset shifts necessary for engaging confidently with technology

Instructional design emphasized flexibility, integrating continuous feedback loops to adjust pace, depth, and content relevance. Topics evolved from a historical overview of computing and the internet to real-world AI applications, enabling scaffolded learning anchored in familiar contexts.

Pedagogical Strategies

Given the varied technical proficiencies among students—from retired engineers to digital novices—the course employed differentiated teaching methods to promote inclusivity and engagement:

- Experiential learning connected abstract concepts to everyday tasks (e.g., using AI for scheduling or fraud prevention)
- Open discussion forums enabled peer exchange and trust-building, addressing skepticism toward AI
- Multimodal materials (video, diagrams, and simplified explanations) supported diverse learning styles
- Moderated peer interaction helped reduce anxiety and build community, fostering shared understanding

Tailoring content to students' life experiences and interests proved essential in maintaining engagement and promoting sustained motivation.

Challenges Encountered

Delivering AI education to mature learners involved distinct pedagogical and structural challenges:

1. **Varied Background Knowledge:** Participants ranged from tech-savvy professionals to those with minimal exposure to digital tools, necessitating a highly adaptive curriculum.
2. **Skepticism and Misconceptions:** Some students expressed concerns about AI's implications for privacy, employment, or social ethics. These were addressed through discussion, transparency, and demystification.
3. **Technical Complexity:** Abstract topics such as machine learning and algorithms were simplified using real-world metaphors and visuals without compromising conceptual accuracy.
4. **Cognitive and Motivational Factors:** Content was framed in ways that emphasized relevance, practical value, and personal empowerment, which proved essential for knowledge retention and engagement.

These challenges were mitigated through a responsive teaching approach and supportive learning environment that emphasized curiosity, not technical mastery.

Outcomes and Impact

Student feedback indicated strong outcomes across several dimensions:

- **Increased Confidence:** Participants reported greater ease in navigating digital platforms, managing privacy settings, and evaluating online content.
- **Positive Attitudes Toward AI:** Skepticism gave way to informed curiosity and, in some cases, enthusiasm for further exploration.
- **Successful Engagement:** Students praised the course's balance of theory and application, clarity of instruction, and professional level of delivery.
- **Sustained Interest:** High satisfaction rates led to the scheduling of a follow-up course in June 2025 focusing on practical AI tools for creativity, communication, and productivity.

These outcomes suggest the course met its objective of fostering both competence and confidence in a demographic often excluded from digital discourse.

Discussion

This case study highlights the necessity of context-specific AI education for older adults. The “Surviving in the Digital World” course illustrates how inclusive design, flexible pedagogy, and ongoing adaptation can overcome generational and cognitive barriers to digital engagement.

Lifelong learning programs such as OLLI are uniquely positioned to offer such interventions. Their community-based, non-competitive structures create safe learning environments where mature students can ask questions, explore emerging technologies, and gain the confidence needed to participate in increasingly digital societies.

Importantly, the course model supports broader societal goals:

- **Bridging the Digital Divide:** Ensures equitable access to technological knowledge
- **Promoting Active Citizenship:** Empowers older adults to engage with civic and cultural digital platforms
- **Reducing Social Isolation:** Encourages intergenerational dialogue and inclusion in rapidly changing information ecosystems

The hybrid format—with strong technical support—proved essential for accommodating physical, geographic, and cognitive diversity among learners, offering a replicable structure for similar programs elsewhere.

Conclusion

The “Surviving in the Digital World” course exemplifies how thoughtfully designed AI literacy education can empower mature learners to engage with the digital landscape confidently and critically. Through experiential methods, supportive dialogue, and adaptive delivery, the course bridged technical and generational gaps.

Its success—evidenced by improved digital competencies and sustained learner interest—affirms the value of inclusive lifelong learning in an AI-driven world. As society continues to digitize, such models are not merely beneficial but necessary to ensure no demographic is left behind.

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KEYWORDS: AI literacy education for mature learners

FROM AI TO DAE: INFRASTRUCTURES OF TRUST, AUTOMATION, AND GOVERNANCE IN FUTURE EDUCATION

Riccardo Maria Santovito

ABSTRACT: The Covid-19 pandemic dramatically accelerated the shift to online and hybrid learning, exposing challenges in ensuring trust, privacy, and effective governance in digital education. This paper explores Decentralized Autonomous Education (DAE) as a holistic paradigm for the future of learning. DAE is a novel model that combines artificial intelligence (AI) and Web3 technologies to reshape how education is delivered and governed. It exploits dual principles (e.g. freedom with responsibility, privacy with transparency) that align closely with core Web3 tenets. We propose a comprehensive framework defining DAE, detailing how four key technologies - AI, blockchain, smart contracts, and Decentralized Autonomous Organizations (DAOs) - interoperate to form a self-governing educational infrastructure. This integrated approach unifies previously fragmented innovations into a single model of trusted, automated governance. To illustrate feasibility, we discuss recent implementations: the EduCTX platform's blockchain-based academic credit system and MIT's Blockcerts project for issuing tamperproof diplomas. We also highlight the emerging Bittopia University project, which deploys a blockchain-secured, DAO-managed curriculum. Situated in the post-Covid digital education context, our analysis shows DAE's potential to shift governance structures - empowering distributed stakeholders and ensuring transparency by design - toward a more resilient, equitable, and learner-centered ecosystem.

KEYWORDS: Decentralized Education; Blockchain; AI; Smart Contracts; DAO; Credentialing; Web3; Digital Governance; DAE

LEADING IN TIMES OF CHANGE

Vanessa Fernandes

Ricardo Marcão

Vasco Santos

Filipa Martinho

ABSTRACT: In contemporary times, a leader faces constant challenges. The time we live in is one of incessant change that requires flexibility, strategic vision and emotional intelligence to lead teams in times of uncertainty. In an increasingly dynamic world, capable leaders are those who can anticipate the challenge, know how to communicate clearly and transparently, and be a leader who can convey confidence. It is common for people to have a certain resistance to change, to counter this tendency, the leader must create an atmosphere that embraces change and adapts, keeping his subordinates involved with the organization.

To be able to maintain this level of demand that the century. XXI brought, the leader must have adaptive leadership, that is, where there is the ability to make quick and informed decisions, without compromising the balance and stability of the team and the organization. To help with this challenge, active listening and empathy have become fundamental tools to understand the concerns of their people and strengthen the bonds between the team.

Another fundamental perspective is the constant training and development of skills of the leader and those led. It is important to cultivate an environment that promotes learning, personal and professional development, a culture of feedback and feedback, where experiences and learning are shared that keep the team functioning and evolving.

Being a leader in contemporary times is a challenging task, requiring an open mindset, adaptability, and ongoing commitment to personal and organizational growth. Success depends not only on well-defined strategies, but also on the way people are guided and motivated throughout the process.

KEYWORDS: Personal growth, organizational growth, team, leadership, change

INNOVATIVE, PARTICIPATORY, AND INQUIRY-BASED LEARNING IN SCHOOL SETTINGS

Ana Luisa Sousa Gil

ABSTRACT: The study aimed to characterize a set of pedagogical practices and to understand possible connections with current school policies and classroom practices. This objective was addressed using three sources of data: qualitative analysis of classroom observations, focus group interviews, and guiding documents from the school cluster.

Framed within an instrumental case study, the research adopted a qualitative methodology, seeking to understand the results through multiple methods and data collection tools, including semi-structured focus group interviews, classroom observations, and document analysis. Participants included the school principal, 14 teachers without leadership positions, and 75 students. A total of 45 lessons were observed across the 5th, 6th, and 7th grades.

Classroom practices, as observed and reported in interviews with teachers and students, revealed that areas such as curricular planning, teaching methodologies, pedagogical assessment, student participation, and the use of resources in school contexts varied to greater or lesser extents in relation to the school policies promoted.

A balanced use of both active and passive teaching methodologies was observed. However, teacher-led instruction still prevailed, predominantly through expository or demonstrative methods.

In terms of curricular planning and management, an interdisciplinary approach was confirmed, with particular emphasis on the Class Curriculum Project (Projeto Curricular de Turma, PCT). This project integrates different subjects and includes the implementation of the Inquiry-Based Learning (IBL) method, which was introduced as a school-wide decision to be applied in classrooms and oriented toward the creation of final products such as films, models, and infographics.

Regarding teaching methodologies, a balance was noted between active and passive strategies, with a slight predominance of the latter. Active methodologies included the use of IBL, project work, experimentation, and problem-solving, while passive methodologies mainly involved expository and demonstrative methods.

A scarcity of practices related to self-regulated learning (with the exception of feedback) was noted, as well as a complete absence of student participation in the planning or decision-making processes. In fact, student participation was observed at varying levels and in very specific contexts: students had more opportunities to participate in learning situations than in assessment processes.

Finally, concerning the organization and functioning of the school, observations indicated the use of traditional classrooms, laboratories, a library, and a variety of material (e.g., textbooks, magazines, books) and digital resources (e.g., computers, tablets, mobile phones, and online platforms such as Google, Moodle, and Kahoot). Students also highlighted the role of human resources—teachers, peers, and community members—as key contributors to their learning experiences.

KEYWORDS: Innovative teaching Participatory pedagogy Inquiry-based learning Active learning

PERSUADE OR BE PERSUADED: PERSONABLE LEARNING, SOCRATIC REASONING, AND PROMPT IMAGINEERING IN TEACHING AND LEARNING WITH GENERATIVE AI

Vanessa Ament

Richard Edwards

ABSTRACT: In this paper, we argue that the encouragement of including generative AI in teaching, while sometimes overlooking the risks of diminishing faculty influence and promoting an over-reliance on Large Learning Models (LLMs) as a replacement for instructional expertise, can provide opportunities to increase critical thinking, research skills, and a resurgence of the cooperative relationship between teacher and student, as well as with the AI system and user. The Socratic method of reasoning, which is grounded in iterative questioning and critical dialogue, advances the discovery of new ideas. It stems from the notion that “truth” is the quest, and to settle for an easy answer, which can be the seduction of AI, is to be avoided. The student should be encouraged to engage with AI rigorously, with a back-and-forth dialogue to gain deeper understanding on a subject, rather than skim the surface to satisfy “a right answer.” This application of AI complements our method of teaching that we have called Personable Learning, which uses the Mentor in the Center model of faculty and student relationship. The teacher is a collaborator with both AI and student, and the student is col-laborator with both teacher and AI. We emphasize how we use the tool, and not let the tool lead us. This is another way to state we assert our support for social constructivism rather than technological determinism. AI’s technological limitations in ethics and ‘visible thinking’ must be addressed by critically rigorous human interaction. Ultimately, adopting a Personable Learning approach will encourage students to experiment using their intuition and imagination through a Socratic-informed learning strategy with GenAI and LLMs that we call “prompt imagineering.”

KEYWORDS: Personable Learning, Socratic Method, Generative AI, Large Language Models, Social Constructivism, Prompt Engineering, Prompt Imagineering, 21st Century Pedagogy, Persuasion, Imagination.

MENTAL HEALTH AND WORKPLACE PRODUCTIVITY: A CRITICAL LINK FOR ORGANIZATIONAL SUCCESS

Ricardo Marcão

Silvania Pinto

Vasco Santos

ABSTRACT: This paper explores the vital relationship between mental health and productivity in the workplace. Psychological well-being is a decisive factor in employee performance, job satisfaction, and organizational success. Poor mental health – manifesting as anxiety, de-pression, burnout, or chronic stress – can lead to absenteeism, disengagement, and lower output, while supportive environments and proactive policies enhance motivation and performance. The study highlights the influence of work culture, leadership, quality of life, and emotional support on mental health and discusses the impact of untreated psycholog-ical conditions on organizational outcomes. By examining academic literature and work-place dynamics, this paper underscores the necessity of investing in employee mental health to foster sustainable performance and long-term competitiveness.

KEYWORDS: Mental Health, Workplace Productivity, Burnout, Employee Well-Being, Organizational Culture, Work-Life Balance, Depression, Human Resource Management

EMBRACING THE PARADIGM SHIFT OF GENERATIVE AI IN A GRAPHIC DESIGN COURSE

*Leonardo Springer
Fátima Oliveira Caiado*

ABSTRACT: Abstract.

This exploratory research and literature review focuses on finding evidences about Generative Artificial Intelligence (Gen AI) abilities to better reshape graphic design learning in the context of undergraduate higher education, specifically in: - studio and project-based learning disciplines; - image generation, layout, typography; - the rubric areas of branding, and editorial; - the design workflow stages of identifying-framing the problem, researching (mainly benchmarking), ideating, evaluating, prototyping, testing, making improvements.

Our research objectives track the documentation of: - Synergies between Gen AI and graphic design in higher education context, namely challenges and opportunities; - Specific Generative Design AI tools & systems enhancing studio and project-based design workflow, disciplines, and rubric areas mentioned; - Other AI-powered educational tools that foster active learning; - Newborn skills/ literacies needed; - Human vs. Gen AI graphic design out-comes and outputs; - A foreseeable future between Gen AI and the design academia.

Findings showed that, provided the quality of the human prompt (dependent on professional knowledge, critical thinking abilities, cultural, and aesthetic knowledge, and experimental skills), Gen AI mirrors reasoning, acts as col-laborative intelligence and refines cognition: a) Allowing instant big data analysis (from multiple perspectives and subject areas), presented in so many ways has the user needs/asks (allowing too data presentation improvements); b) Assisting in analytical thinking when facing multiple solution development; c) Speeding both the creative process and the design workflow (including faster digital mock-ups and prototypes); d) Saving time and resources; e) Enhancing the output, and the design professional practice and education.

KEYWORDS: Generative AI, Graphic Design, Undergraduate Higher Education

MEASURING CHAT GPT AS A FINANCIAL ADVISOR TYPES AND THEIR EFFECT ON CLIENT ENGAGEMENT IN SERVICE

Muhammad Akhtar

ABSTRACT: Artificial intelligence (AI) powered solutions like Chat GPT are transforming the financial advisory landscape by providing customized and unbiased recommendations to customers. However, research on customer adoption of conversational AI financial advisors remains limited. This study investigates customer willingness to use Chat GPT for financial advisory (CGFA) services offered by banking institutions. Study 1 builds and evaluates a scale for measuring different CGFA types. Study 2 evaluates clients' engagement responses to the different CGFA types. The findings provide a measurement scale for evaluating different types of CGFA against human ones, thus showing that CGFA are configurable, describable, and measurable (Study 1), and influence positively on client empowerment and engagement (Study 2). Banking institutions can leverage the findings to enhance their financial advisory services by incorporating Chat GPT as a configurable and measurable tool. This can lead to more customized and unbiased recommendations, potentially improving the overall quality of financial advice provided to customers. Our scale of CGFA guiding future development of Chat GPT-based systems is more similar to human intelligence.

KEYWORDS: Chat GPT, client engagement, client empowerment, client trust, financial services

THE USE OF THE METAVERSE AS AN EDUCATIONAL AND SOCIALIZATION RESOURCE FOR PEOPLE WITH AUTISM: A LITERATURE REVIEW

Andreia de Bem Machado

Maria José Sousa

Agnes Jenei

Harun Şahin

ABSTRACT: This study explores the use of the metaverse as an educational innovation tool for individuals with autism, aiming to understand its potential in supporting inclusive learning practices. The objective is to map, through a bibliographic review, the applicability of the metaverse in the socialization and learning processes of autistic individuals within educational environments. The review examines 25 indexed studies that address virtual worlds, immersive technologies, and their implications for learners on the autism spectrum. Findings indicate that the metaverse offers an inclusive, adaptable, and immersive space that supports communication, interaction, and individualized learning. These environments can be tailored to meet the sensory and cognitive preferences commonly associated with autism, fostering greater engagement and participation. Moreover, when integrated with Universal Design for Learning (UDL) principles, the metaverse can contribute to reducing educational barriers and enhancing accessibility. This aligns with the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), by promoting equitable, quality, and inclusive education for all. The study underscores the metaverse's transformative potential in creating supportive, neurodiverse-friendly educational experiences, and highlights its relevance in shaping the future of digital education through innovation and inclusion.

KEYWORDS: autism, socialization, inclusion, metaverse, virtual environments.

COMPETITIVE STRATEGY IN THE REMOTE PATIENT MONITORING MARKET

Ricardo Marcão

Sofia Lourenço

Vasco Santos

Filipa Martinho

ABSTRACT: Remote patient monitoring (RPM) is an emerging technology that enables the continuous collection of clinical data outside of the hospital setting, offering opportunities to improve the management of chronic diseases and reduce costs associated with healthcare. This paper analyzes the global RPM market, highlighting the main competitive strategies adopted by companies, including technological innovation, strategic partnerships and underwriting-based business models. Based on the real-world case of Philips and its remote monitoring program for heart failure, the impact of this technology on improving clinical outcomes and reducing hospital readmissions is explored. The SWOT analysis presented identifies strengths, weaknesses, opportunities, and threats to shape the future of this rapidly evolving market. The study concludes that the combination of technological advances, collaboration among stakeholders and favorable public policies will be essential for the consolidation of RPM as a central tool in the transformation of health care.

KEYWORDS: Remote Patient Monitoring; Competitive Strategies; Technological Innovation, Gamification, Healthcare Management, Knowledge Management, Organizational Culture, Performance Measurement

AI TOOLS AS A MEANS OF CREATING MULTIMEDIA EDUCATIONAL CONTENT ON QUANTUM TECHNOLOGIES

Mariana Filipova
Genadiy Gospodinov
Lyubomir Gotsev
Eugenia Kovatcheva
Boyan Jekov
Tamara Ristovska

ABSTRACT: Scientific and technological development has demonstrated significant progress in recent years. This advancement specifically entails the emergence of new application standards that influence the study content and foster innovative approaches to lesson planning, preparation, and execution.

With the rise of quantum computers and technologies, it is evident that contemporary educational content must be integrated into STEM disciplines, particularly in fields such as computer science, IT, informatics, and technology. This necessity is gaining momentum and is expected to expand, encompassing a broader age group (students starting from a bachelor's degree and students across all school levels), as the era when quantum technology solutions will be accessible not only to specialists but also to general users has not yet arrived. The development of educational resources in the field requires time, and proactive dissemination and timely preparation of content are crucial for individual study units. Familiarizing learners with this subject is vital for adapting to constantly evolving careers and the emergence of new professions.

AI tools like TinyTap, Class Ace and Fliki that generate engaging learning materials on a given topic are particularly effective as one of the potential methods for addressing the challenge, as we increasingly associate efficient learning with a personalized approach. The ongoing AI expansion that we are witnessing is progressively being integrated across all professional sectors, including education. It continuously provides more creative, fast, and unconventional solutions, offering ideas without precedent.

KEYWORDS: AI tools, education, quantum technologies, STEM

CORPORATE PLANNING FOR ETHICAL GROWTH IN DIGITAL HEALTH

Ricardo Marcão

Beatriz Alves

Vasco Santos

Filipa Martinho

ABSTRACT: In this study aims to examine business planning as a crucial element for ethical and sustainable growth in the field of digital health. It highlights the importance of aligning business objectives with ethical principles, particularly in data protection, inclusion, and equal access to digital health services. Technological integration must be accompanied by social responsibility, with user well-being at the core of decision-making. The study discusses challenges related to digital innovation, regulation, and user trust. It proposes that business planning should incorporate a holistic vision, considering the social and ethical impact of implemented technological solutions. Through an integrated approach involving both internal and external stakeholders, strategic planning should serve as a tool to ensure the sustainability and legitimacy of digital innovations. This way, the growth of digital health must be based on a balance between innovation and ethical commitment, to promote a humanized, inclusive, and transparent digital ecosystem. Thus, good business planning can be developed for ethical growth in the digital health area.

KEYWORDS: Digital, Health, Planning, Ethical, Growth, Business, Responsibility, Sustainability.

INNOVATION STRATEGY IN MEDTECH STARTUPS: A CASEBASED APPROACH

Ricardo Marcão

Alice Reis

Vasco Santos

Filipa Martinho

Stéphanie Monteiro

ABSTRACT: This article analyzes innovation strategies used by startups in the medical technology (Med-Tech) sector, based on a qualitative case study approach. MedTech startups play a crucial role in developing advanced technological solutions for clinical diagnosis, monitoring, and treatment, often operating in highly regulated and financially demanding environments. The aim of the research was to identify strategic patterns, usual challenges and critical success factors in the implementation of innovative processes in emerging companies in this area. Based on two representative cases, the article highlights different approaches to innovation, from the integration of artificial intelligence in clinical data analysis, to the development of portable medical devices with a focus on usability and therapeutic efficacy. The results show that agility, collaboration with academic institutions and adaptation to regulatory requirements are key elements in the success of these startups. This study contributes to understanding the dynamics of innovation in the Med-Tech sector and offers practical implications for entrepreneurs, investors, and policymakers alike.

KEYWORDS: Technological entrepreneurship; Innovation strategy; MedTech; Startups; Health technologies.

STRATEGIC COMMUNICATION IN GLOBAL HEALTH EMERGENCIES

Ricardo Marcão
Sara Silva
Filipa Martinho
Vasco Santos
Stéphanie Monteiro

ABSTRACT: Global health emergencies demand rapid, coordinated responses that extend beyond medical treatment alone. In such crises, effective communication is a critical pillar, shaping public understanding, guiding behavior, and maintaining trust in institutions. This paper examines the strategic role of communication in global health emergencies by exploring key frameworks, planning approaches, and institutional practices. It reviews risk and crisis communication models, the unique challenges of misinformation and cultural diversity, and the role of different stakeholders, from international organizations to local actors. Drawing on real-world examples—including the COVID-19 pandemic, the Ebola outbreak, and national responses in South Korea and Taiwan—it identifies essential elements of successful communication, such as inclusivity, transparency, and cultural relevance. Finally, the paper offers strategic recommendations to strengthen communication responses in future health crises, emphasizing the importance of proactive planning, adaptive approaches, and the integration of communication expertise into health emergency governance. Through this multidisciplinary lens, it argues that effective communication is not a peripheral concern, but a strategic necessity for global health security.

KEYWORDS: Global Health, Crisis Communication, Risk Communication, Emergency Management, Misinformation, Strategic Planning, Public Trust

GLOBAL CRM STRATEGY IN MEDICAL SERVICE COMPANIES

Pedro Conde
Ricardo Marcão
Vasco Santos
Filipa Martinho
Stéphanie Monteiro

ABSTRACT: In an increasingly interconnected healthcare environment, Customer Relationship Management (CRM) systems have become fundamental tools for managing patient relationships, optimizing care delivery, and enhancing institutional efficiency. This paper explores the strategic deployment of CRM on a global scale within medical services companies. Drawing from real-world case studies and international frameworks, it analyzes how CRM supports global integration, local adaptation, regulatory compliance, and patient-centric care. The study examines implementation strategies, the interplay between technology and human factors, as well as emerging trends like AI and predictive analytics. It concludes by providing recommendations for developing effective global CRM strategies aligned with healthcare outcomes and sustainable growth.

KEYWORDS: CRM, Healthcare Strategy, Medical Services, Global Integration, Patient Relationship Management, Health IT, Digital Transformation, Case Studies

FLEXIBLE BENEFITS AS A TALENT RETENTION STRATEGY

Maria Liba

Ricardo Marcão

Vasco Santos

Filipa Martinho

ABSTRACT: In today's competitive job market, talent retention has become a strategic priority for organizations aiming for long-term success. While traditional pay structures remain essential, flexible benefits are emerging as powerful tools to boost employee well-being, satisfaction, and loyalty. These offerings—ranging from health and wellness programs to remote work options, childcare assistance, and professional development funding—allow companies to address the varied needs of a diverse workforce. Studies show that when employees feel supported by benefits that reflect their individual circumstances, they demonstrate higher job satisfaction and stronger commitment, directly enhancing organizational performance. Flexible benefits thus play a vital role in reducing turnover, strengthening the employer brand, and building organizational resilience. This article explores how to implement flexible benefits strategically within broader people management practices, offering insights on best practices, cultural integration, and impact evaluation. Embracing these programs enables companies to foster a more inclusive and fulfilling work environment, attracting and retaining top talent while maintaining a competitive edge.

KEYWORDS: Talent Retention; Flexible Benefits; Employee Engagement; People Management; Organizational Strategy

THE ROLE OF LEADERSHIP IN SUPPORTING EMPLOYEE MENTAL HEALTH

Elisabete Abreu

Ricardo Marcão

Vasco Ribeiro

Filipa Martinho

ABSTRACT: This paper examines the vital role of leadership in fostering employee mental health within business environments. Psychological well-being is recognized as a core competency that enables professionals to manage emotions, build healthy workplace relationships, and maintain high performance. The paper explores the concept of mental health in the workplace, identifying the main causes of emotional strain and their impact on organizational effectiveness. It also discusses the challenges faced by employees and how leadership practices influence their ability to cope with stress and thrive. Drawing on recent studies and theoretical frameworks, the paper highlights best practices for leaders aiming to create supportive, transparent, and empathetic work environments that prioritize mental health. In doing so, it offers valuable insights for businesses seeking to strengthen their organizational climate, reduce turnover, and enhance employee satisfaction and loyalty.

KEYWORDS: Mental Health; Leadership; Workplace Well-being; Organizational Climate; Employee Retention

STRESS AND THE IMPACT ON PROFESSIONALS PERFORMANCE

Iolanda Guedes

Ricardo Marcão

Vasco Santos

Isabel Reis

ABSTRACT: This study analyzes the impact of occupational stress on the performance of employees of a company in the commercial sector in Indonesia. Through a quantitative approach, data were collected from a questionnaire applied to 87 employees from the administrative and commercial areas. Statistical analysis was performed using the SPSS software (version 26). The results revealed that stress at work has a negative effect and a significant impact on employee performance. This work highlights the importance of identifying and managing the factors responsible for stress within organizations, such as how to preserve the health of employees and maximize their productivity.

KEYWORDS: Stress at work; Employees; Performance

BUSINESS MODEL INNOVATION IN THE MEDTECH INDUSTRY: THE CASE OF MEDTRONIC

Afonso Pinto

Ricardo Marcão

Vasco Santos

Maria Pina

ABSTRACT: Business Model Innovation (BMI) has become a critical success factor for companies in the medical technology (MedTech) industry, especially in a context of increasing digitalization, demand for clinical results, and cost pressure. This article analyzes the fundamental dimensions of BMI in this sector, focusing on the case study of Medtronic, one of the world's largest companies in the field. The research reveals how the transition from transactional models to value-based approaches, the integration of digital solutions, and the development of services associated with medical devices have allowed Medtronic to strategically reposition itself. The results underscore the importance of continuous innovation, ecosystem collaboration, and organizational adaptation as central elements for sustainability and competitive advantage.

KEYWORDS: Business Model Innovation, MedTech, Medtronic, Digital Innovation, Value-Based Healthcare

STRATEGIC HUMAN RESOURCE PLANNING IN HOSPITALS AND CLINICS

Maria Leonor Góis Matos

Ricardo Marcão

Vasco Santos

Isabel Reis

ABSTRACT: Strategic human resources planning in healthcare is essential to ensure the quality, accessibility, and sustainability of services. It involves forecasting future needs, retaining talent, and continuously developing professionals, with a focus on team motivation and skills. Autonomy and leadership play crucial roles in team performance and improving patient care. Effective leaders encourage innovation and promote a collaborative and ethical work environment. The combination of these practices contributes to the construction of an adaptable, efficient, and patient-centered healthcare system. Thus, strategic human resources planning not only strengthens organizational capacity but also ensures that the care provided meets the growing demands of the population, consolidating the excellence and sustainability of healthcare services.

KEYWORDS: Strategic Human Resources Planning, Autonomy and Leadership, Sustainability of Health Services

FROM POTENTIAL TO PRACTICE: APPLYING VR IN UNIVERSITY-BASED SOFT SKILLS TRAINING

Agnes Jenei

Noémi Császár-Nagy

Maria Sousa

Maliga Reddy

ABSTRACT: Virtual reality (VR) training has a long-standing history, dating back to 1929 with the first flight simulator. While initially applied to technical skill development, VR has more recently become a powerful tool in soft skills training. Its capabilities are well-documented: creating safe, immersive environments for practicing communication, negotiation, and conflict resolution with real-time feedback, AI analysis, and emotional engagement.

However, the core research question of this study is not what VR can do, but rather how it can be effectively utilized in a classroom environment for the development of soft skills. Specifically: Which type of VR should be used, and how can it be integrated into the structure of academic courses?

This paper examines these questions through two case studies conducted at a Hungarian university (International Protocol and International Negotiation courses).

Methodology: The research employs an action research approach combined with a comprehensive analysis of the course curriculum. VR-based exercises were integrated into the course design and iteratively refined based on in-class experiences and challenges. Additionally, student feedback was gathered through questionnaires, offering insights into their perceptions and the effectiveness of the VR-enhanced learning process.

By examining these real-life course implementations, the paper proposes a framework for integrating virtual reality (VR) into soft skills training in higher education. It introduces a tentative “VR involvement index” to differentiate between the various modes of VR application in the learning process.

KEYWORDS: Virtual reality; training; flight simulator; skills

COMPENSATION STRATEGIES AND THEIR IMPACT ON EMPLOYEE PERFORMANCE AND RETENTION

Ana Júlia Silva

Ricardo Marcão

Vasco Ribeiro

Maria de Fátima Pina

Isabel Reis

ABSTRACT: This paper examines the pivotal role of compensation strategies in enhancing employee motivation, job satisfaction, and organizational performance. It delves into how organizations can effectively balance financial and non-financial rewards to optimize employee development and retention. By analyzing various compensation systems and their broader implications for business strategies, the study underscores the significance of equitable pay, recognition, and career development opportunities in retaining talent. The findings offer valuable insights into adapting compensation structures to meet evolving business needs and workforce expectations.

KEYWORDS: Compensation Strategies, Employee Motivation, Job Satisfaction, Organizational Performance, Reward Systems

THE INFLUENCE OF TECHNOLOGY ON ADOLESCENTS' HABITS AND CHARACTERISTICS

Maria Rocha

Ricardo Marcão

Vasco Santos

Filipa Martinho

Margarida Tribuna

ABSTRACT: This study presents a literature review on the habits and characteristics of Generation Z, focusing on the influence of technologies on adolescents' lives. Conducted between May and July 2018, the work highlights how Information and Communication Technologies (ICTs) have transformed forms of social interaction and the learning process. Digital natives—adolescents who grew up with these technologies—face challenges in cognitive, social, and emotional development, including concentration issues and mental health concerns. The study points to the need for educational strategies that integrate technologies constructively to optimize learning and prepare youth for a constantly changing future.

KEYWORDS: Impact of technology, Adolescents, Digital era, Society, Mental health

VARIABLE COMPENSATION MODELS AND THEIR IMPACT ON ORGANIZATIONAL PERFORMANCE

Rodrigues Raimundo

Ricardo Marcão

Vasco Santos

Filipa Martinho

João Farinha

ABSTRACT: This paper investigates the relationship between variable compensation models and organizational performance, based on theoretical references and empirical evidence. Considering theories such as Agency Theory and Internal Labor Market Theory, the study examines different performance-based compensation formats, their positive and negative effects, and the critical success factors for their implementation. It concludes that, when well-designed, these models can promote productivity, strategic alignment, and motivation, but also carry significant risks when poorly applied.

KEYWORDS: Variable Compensation, Organizational Performance, Incentive Systems, Employee Motivation, Human Resource Management

SALARY AND ITS INFLUENCE ON EMPLOYEE DEVELOPMENT

Isabel dos Santos

Ricardo Marcão

Vasco Santos

Filipa Martinho

António Dionísio

ABSTRACT: This article examines how salary influences employee development, exploring its relationship with motivation, productivity, and professional growth. Studies indicate that compensation directly affects development and job satisfaction, but factors such as organizational environment and learning opportunities are also critical. A balance of fair pay and non-financial incentives is essential to enhance professional development, as well-paid employees tend to pursue continuous improvement, benefiting both personal growth and organizational performance. Compensation alone is insufficient for full development; career paths, benefits, and organizational culture also play key roles.

KEYWORDS: Salary, Employee Development, Motivation, Organizational Culture, Human Resource Management.

THE ROLE OF ORGANIZATIONAL CULTURE IN FOSTERING SCHOOL SUCCESS

João Simões

Ricardo Marcão

Vasco Santos

Filipa Martinho

Rui Centeno Martins

ABSTRACT: This study examines organizational culture in schools and its impact on educational success through various cultural practices. It analyzes three dimensions – communication of vision, mission, and objectives; enforcement of rules; and extracurricular activities – using qualitative data from observations, interviews, and document analysis involving principals, teachers, and students. The findings reveal a familial dynamic in culture implementation, promoting order and discipline, which supports school achievement.

KEYWORDS: Organizational Culture, Cultural Strength, Cultural Functions, Cultural Characteristics, School Success

THE IMPORTANCE OF ORGANIZATIONAL CLIMATE AND MOTIVATION AT WORK

Rachel Oliveira
Ricardo Marcão
Vasco Santos
Filipa Martinho
Margarida Tribuna

ABSTRACT: This paper explores the significance of organizational climate and motivation at work in enhancing employee performance and organizational productivity. Drawing on a comprehensive survey of 120 employees from Ranbaxy, the study identifies eight key motivational factors that contribute to workplace satisfaction and effectiveness: environment, teamwork, management effectiveness, involvement, rewards and recognition, competence, and commitment. The analysis confirms that these eight variables are intricately linked to employee motivation, highlighting how each dimension influences engagement and performance in the workplace. Ultimately, the study concludes that fostering a positive organizational climate and strengthening cultural practices are essential strategies for sustaining motivation and driving long-term organizational success. These findings underscore the importance of aligning climate, culture, and leadership practices to create an environment where employees feel valued and empowered to achieve their full potential.

KEYWORDS: Organizational Culture, Organizational Climate, Motivation, Employee Performance, Organizational Support

THE ROLE OF DIGITAL MARKETING AND GLOBALIZATION IN SHAPING CONSUMER PERCEPTIONS AND ENGAGEMENT

Luís Henriques

Ricardo Marcão

Vasco Santos

Filipa Martinho

António Dionísio

ABSTRACT: This paper investigates the impact of digital marketing on consumer perception in the context of globalization. Drawing on a survey of 120 Ranbaxy employees and an extensive literature review, it examines how key factors – environment, teamwork, management effectiveness, involvement, rewards and recognition, competence, and commitment – shape consumer engagement and organizational performance. The findings highlight that digital marketing enables segmentation, personalization, and global reach, but its effectiveness depends on cultural adaptation and trust. The study concludes that a robust digital marketing strategy, aligned with organizational climate and culture, is vital for fostering consumer loyalty and competitive advantage in an interconnected marketplace.

KEYWORDS: Digital Marketing, Consumer Perception, Globalization, Organizational Climate, Brand Engagement

CAN GENERATIVE ARTIFICIAL INTELLIGENCE MITIGATE TEACHER SHORTAGES: THE CASE OF EUROPE

Elnaz Shadras

ABSTRACT: The European Union (EU) is facing a substantial shortage of school teachers, which threatens the quality and inclusiveness of education across its Member States. This crisis stems from multiple contributing factors, including an aging teaching population, decreasing interest in the profession, and pronounced regional imbalances. Generative Artificial Intelligence (GenAI) has been studied in the last years as a viable technological solution, with ongoing evaluations of its potential benefits and limitations.

This study explores the extent to which GenAI can help address teacher shortages in Europe, specifically within classroom settings where students remain under the supervision of school staff in school premises. Rather than allowing students to fall behind due to staff shortages, the integration of GenAI may support continuity of learning, personalized instruction, and greater educational inclusion, especially in rural regions that have trouble having qualified teachers in for ages 13 and above. Through literature review, three international case studies from China, the United Kingdom, and the United States, and twenty semi-structured interviews with experienced school educators from various rural areas of EU Member States, this research examines the possible contributions and constraints of GenAI in promoting equitable, inclusive education across Europe.

KEYWORDS: Generative Artificial Intelligence, school education, teacher shortages in European Union, rural education, AI in classrooms

STUDENT WITHDRAWAL PREDICTION IN ONLINE LEARNING: A COMPARATIVE ANALYSIS OF ENSEMBLE AND LINEAR CLASSIFIERS

Adnan Amin

Feras Al-Obeidat

Maria José Sousa

Fernando Moreira

ABSTRACT: Student withdrawal remains a persistent concern in online education, affecting learner outcomes and institutional performance. Accurately predicting which students are likely to disengage is essential for timely interventions that enhance retention. This study applies machine learning techniques to the Open University Learning Analytics Dataset (OULAD), which combines demographic, engagement, and assessment features. To ensure that models learn from genuine patterns of disengagement rather than dishonest behavior, we first identify and exclude “cheater” cases—students exhibiting anomalously high assessment scores relative to their platform activity—through an outlier detection procedure. After comprehensive preprocessing and feature engineering, we frame a binary classification task distinguishing withdrawn from continuing students. We then compare ensemble classifiers (Random Forest (RF) and Gradient Boosting (GB)) with a linear baseline (Logistic Regression (LR)). 10-fold cross-validation reveals that both Gradient Boosting and Random Forest achieve strong predictive performance. Gradient Boosting attains the highest recall (0.969) with an F1 score of 0.912, while Random Forest demonstrates the highest precision (0.880) along with an F1 score of 0.929. Logistic Regression, while interpretable, lags behind (F1 = 0.877). These results highlight the superiority of ensemble models in capturing complex withdrawal signals—even after filtering out potential cheaters—offering a robust foundation for data driven retention strategies in online learning environments.

Keywords: Ensemble learning, Random Forest, Gradient Boosting, Logistic Regression, OULAD, Student Withdrawal Prediction.

INCORPORATING METAVERSE & EXTENDED REALITY (XR) TECHNOLOGIES TO ENHANCING USER EXPERIENCE FOR IMMERSIVE AND INTERACTIVE ENGAGEMENT

Noha Essam Khamis

ABSTRACT: Extended Reality XR, which encompasses various forms of virtual reality VR and augmented reality AR, has emerged as a powerful experimental tool in design and environmental psychology research due to its ability to produce comprehensive and immersive experiences for users through narratives. A strong sensation of spatial presence, which may be viewed as a subjective sense of space cognition and its surroundings, is one sign of a good XR experience. Despite the fact that XR research has shed light on numerous elements that may affect presence and place-making in XR environments, there is still much to learn about the varied phenomenology of narrative possibilities that ensure a successful immersion experience. The paper focuses on extended reality and how it influences how we create spaces, feel present in our surroundings, and have an immersive experience. In this paper, the concepts of place-making and spatial presence were examined in relation to how people might create a consistent sense of reality during both real-world and virtual experiences. The purpose of this study is to evaluate the ideas of place-making, presence, and immersion experience as they have been developed in XR research while also addressing variables that could affect expanding narratives. The study covers major elements of the “place” literature, connects them to the idea of presence, and then exhibits their use in the context of extended reality. It also discusses the phenomenological properties of presence in human consciousness. A user study conducted through a designed immersive experience as a simulation to some spaces of the Grand Egyptian Museum. Samples of users’ responses were collected through a survey addressing their perceptions of the virtual visit. The study showed that place-making and spatial presence in extended reality work as a link between real-world locations and virtual attributes. When moving from the real world to the virtual one, boundaries become more fluid, themes can be developed, and virtual spaces mimic the real spaces. The study outlines proposals for further work and lays out some ideas for future research.

Keywords: Extended Reality, Space Narratives, Place-making, Spatial Presence, Immersive Experience.

CAN GENERATIVE ARTIFICIAL INTELLIGENCE MITIGATE TEACHER SHORTAGES: THE CASE OF EUROPE

Elnaz Shadras

ABSTRACT: The European Union (EU) is facing a substantial shortage of school teachers, which threatens the quality and inclusiveness of education across its Member States. This crisis stems from multiple contributing factors, including an aging teaching population, decreasing interest in the profession, and pronounced regional imbalances. Generative Artificial Intelligence (GenAI) has been studied in the last years as a viable technological solution, with ongoing evaluations of its potential benefits and limitations.

This study explores the extent to which GenAI can help address teacher shortages in Europe, specifically within classroom settings where students remain under the supervision of school staff in school premises. Rather than allowing students to fall behind due to staff shortages, the integration of GenAI may support continuity of learning, personalized instruction, and greater educational inclusion, especially in rural regions that have trouble having qualified teachers in for ages 13 and above. Through literature review, three international case studies from China, the United Kingdom, and the United States, and twenty semi-structured interviews with experienced school educators from various rural areas of EU Member States, this research examines the possible contributions and constraints of GenAI in promoting equitable, inclusive education across Europe.

KEYWORDS: Generative Artificial Intelligence, school education, teacher shortages in European Union, rural education, AI in classrooms

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