

TE&ET

**Journal of Technology Education
& Education in Technology**

Revista Iberoamericana de Tecnología en Educación
& Educación en Tecnología

Abstracts

Accepted Papers
2025

Universidad Nacional de La Plata. Facultad de Informática. Secretaría de Postgrado.
Abstracts Accepted Papers 2025 : Journal of Technology Education & Education in
Technology ; Coordinación general de Armando De Giusti. - 1a ed. - La Plata :
Universidad Nacional de La Plata. Facultad de Informática, 2026.
Libro digital, PDF

Archivo Digital: descarga y online
ISBN 978-950-34-2767-5

1. Educación. 2. Tecnología. I. De Giusti, Armando, coord.
CDD 370

Journal of Technology Education & Education in Technology

Revista Iberoamericana de Tecnología en Educación
& Educación en Tecnología

Abstracts Accepted Papers 2025

The editorial team of the TE&ET Journal, together with the Postgraduate Administrative Secretariat, presents in this publication the Abstracts in English of the papers accepted and published in the 2025 issues of the TE&ET Journal.

We consider that this publication increases the visibility of papers and their authors.

In total there are 47 abstracts corresponding to numbers 40, 41 and 42 of the Journal. The 47 contributions mentioned have as authors teachers-researchers from Universities of Argentina, Brazil, Chile, Costa Rica, Puerto Rico, Cuba, Colombia, Ecuador, Mexico, Peru, Uruguay, Spain and also from Science and Technology Institutions of these countries, linked to the topic of the Journal.

Index

Presentation	5
Editorial Team	10
Abstracts	17
<i>Gamification as an active methodology for meaningful learning of Literature in the International Baccalaureate Program.</i> Diana Karina Toro Becerra	17
<i>Digitization of evaluation: Recovering teaching experiences to promote post-pandemic innovation</i> Ma. Fernanda Barranquero, Ma. Alejandra Pedragosa	18
<i>Distance Education at the National University of Entre Ríos during and after the pandemic</i> Gonzalo D. Andrés	19
<i>Effect of a Propaedeutic Course on the Mathematical Skills of Prospective Computer Engineering Students.</i> Blanca Esthela Solís Recéndez, Gabriela de Jesús Córdova Lara, María de León Sigg, Juan Luis Villa Cisneros, Daniel Humberto Solís Recéndez	20
<i>IoT Platforms in Perspective: Evaluating Azure IoT, IBM Watson IoT Platform, and Google IoT.</i> José Jesús Alejandro Montejo	21
<i>Educational robotics: a survey.</i> Rebeca Solís-Ortega, Cindy Calderón-Arce, Juan Carlos Brenes-Torres, Cristhian Chavez-Montoya, Kenneth Mejía-Luna, José Pablo Calderón Gairaud	22
<i>Exploring new frontiers: Training experiences through immersive videos.</i> Carlos Busón, Lucilene Machado García Arf, Katherin Pérez Mendoza	23
<i>Influence of role models on the choices of systems engineering students: A multigroup approach by gender and type of university.</i> William Peña	24
<i>English language teaching mediated by WhatsApp as a pedagogical strategy in a public school in Brasília, Brazil, post COVID-19.</i> Carla Moreira de Sousa Freire, Enaldo da Silva Freire	25
<i>Financial Applications and their Implementation in Mexican higher Education Institutions.</i> Isael Martínez Silva, Luis Miguel González García	26
<i>Computational Thinking Challenges: A Workshop to Diagnose and Enhance Skills in Incoming University Students</i> Hugo Viano, Mariela Zuñiga, María V. Rosas	27

<i>Automated rubrics for evaluating good practices in HTML.</i> Ana Gabriela Zúñiga Zárate	28
<i>Implementation of the Flipped Classroom Approach for Developing Projects with First-Year Engineering Students.</i> Adriana Lescano, María del Carmen Maurel, Andrés Puy	29
<i>Digital Technologies and Reading Comprehension: Challenges for Educational Intervention</i> Victoria Arnés, Verónica Zabaleta	30
<i>Artificial Intelligence and Basic Education: A Systematic Review of Applications.</i> Thiago da Silva Fialho, Christian de Vargas Silva, Fabrício Herpich, Marina Sérgio Carradore, Eliane Pozzebon	31
<i>Recommending Audio and Video Learning Objects: A Systematic Review.</i> Rodrigo Miranda Feitosa, Luiz Aurélio Batista Neto, André Macedo Santana, Vinicius Ponte Machado, André Luís Silva Santos	32
<i>Methods and techniques for validating educational products: integrative literature review.</i> Sarah Lais Rocha, Robson José de Souza Domingues, Elizabeth Teixeira, Lucas Henrique de Amorim Lima	33
<i>Maker Culture and Augmented Reality: A Bibliographic Review.</i> Jonathan Felipe da Silva, Sandro César Silveira Jucá, Solonildo Almeida da Silva	34
<i>Quality evaluation of tools used in teaching initial programming based on ISO 25000.</i> María Cecilia Espíndola, Cristina Liliam Greiner, Gladys Noemí Dapozo	35
<i>Learning the Fourier Transform through the analysis of local bird songs: a case study.</i> William Ricardo Bispo Murbak Nunes, Matheus Bonfim da Rocha, Murilo Garrido Volpato, Samuel Felipe Córdova Victório	36
<i>Search and selection of information on the Internet of adults pursuing higher education at a distance.</i> Eduardo Reuss, Karen Jiménez	37
<i>Use of Waldorf pedagogía as a post-covid learning método.</i> María Esther Quispe Mamani, Daniel Bernal Torres.	38
<i>Virtual Teaching-Learning Environment for the Caribbean Biological Corridor.</i> Yarinet Tomacen Mustelier, Soe del Carmen Márquez Montoya, Reinier Fidel Correoso Calzado, Blanca Laura Uranga Pozo	39
<i>Computer technologies applied to the study of the visiting public at the Interactive Science and Technology Center abremate (National University of Lanús, Argentina).</i> Fabián Bognanni, Analía Dávila, Ezequiel Scordamaglia y Germán Infiesta	40
<i>Usability test of a technological resource focused on oral language.</i> Thiago Mathias de Oliveira, Amauri Amorin Assef, Joaquim Miguel Maia, Juliana De Conto, Daniele Santana Carmo Cardoso da Silva Serra, Ana Cristina Guarinello, Adriana Bender Moreira de Lacerda	41

<i>Artificial intelligence in science learning</i> Ema E. Aveleyra, Diego Racero, Laura Chiabrando	42
<i>Content validity of CHAEA through expert judgment supported by Generative Artificial Intelligence.</i> Gustavo Javier Astudillo, Paula Dieser, Silvia Bast	43
<i>Assessment of the responsibility trait through a serious game on chemistry and mathematics.</i> Paula A. Ferreyra, Paula Dieser, Cecilia V. Sanz, Teresa Coma-Roselló	44
<i>Design and Psychometric Validation of the Teachers' Perception of the Use of AI in Education Questionnaire (TPU-AIED-Q).</i> Thomaz Edson Veloso da Silva	45
<i>Teaching strategies for concurrent programming: a case study on the use of semaphores in an operating systems course.</i> Alejandro Miños	46
<i>Impact of Teaching about Artificial Intelligence and Computational Thinking in Basic Education – Literature Review.</i> Douglas Martins Erdmann, Gustavo Gehrke Graffunder, Christian Brackmann	47
<i>What integrates the Integrating Project? Analysis of difficulties with the module within the Virtual University of State of São Paulo</i> Jéssica dos Anjos Januário, Romário Melquíades Resende, Bruno Boroto Neves, Thomaz Carvalho Lima	48
<i>Embeddings of Tutoring Guides via Inference in E-Learning.</i> Aluisio José Pereira, Alex Sandro Gomes, Tiago Thompsen Primo	49
<i>Virtual Simulators for Professional Practice in Psychological Interviews.</i> Georgina Cárdenas-López, Raúl Durón-Figueroa, Mario Derian Mandujano Torres	50
<i>Kano model of satisfaction with the educational process and the implementation of information and communication technologies (ICT) in Microbiology courses, 2018-2024.</i> Alonso Zuñiga-Agüero, Jose Arturo Molina Mora	51
<i>Analysis of the impact of emotional intelligence on academic performance in different educational areas in elementary school students. A case study.</i> Luis Arturo Espín Pazmiño, Armando De Giusti	52
<i>Evaluation of VARK Learning Styles in the Context of a MOOC Applied in a Hybrid Way in Technical Education.</i> Thainara Marques da Costa, Cynthia Pinheiro Santiago	53
<i>The inclusion of the NAP of Digital Education, Programming and Robotics in the curriculum designs of the primary level in Argentina</i> Nerina Menchón, María Carmen Leonardi, María Virginia Mauco	54

<i>Gamification for the Strengthening of Basic Competencies in Health Students.</i> Alejandra Muñoz-Moya, Cristian Carreño-León	55
<i>Project based learning integrating data science into programming education in higher education</i> César Manuel Hernández Mendoza, Juan Pablo Serrano Rubio, Luz María Rodríguez Vidal	56
<i>Proposal for a didactic sequence for teaching Temperature and Heat with Python.</i> Jonas Guimarães Paul Neto, Jonathan Ferreira Gomes, João Cláudio Nunes Carvalho	57
<i>The integration of ICT in the improvement processes with new teachers for engineering careers in the area of agricultural sciences.</i> Misleidy Arzuaga Ramírez, Carlos Rafael Fernández Medina	58
<i>Personalized language learning with gamified microinteractions and location sensitivity.</i> Ana Carolina de Sousa Ferreira, Bruno de Sousa Monteiro, Vitor Duarte Bezerra de Oliveira	59
<i>Development of an augmented reality application that integrates voice and sound in learning and training colors in the English language.</i> Edgar Serrano-Pérez	60
<i>Acceptance and Integration of ChatGPT in Higher Education: Analysis of Faculty Perceptions in the Agronomic Engineering Program and Student Perceptions in the Agricultural Microbiology and Bioinputs Course at UNNOBA.</i> Juan Pablo de Benedetto, Claudia Fabiana Pons	61
<i>Fractal antenna: a case study on the full course of mathematical modeling cycle in linear algebra.</i> Victoria Artigue, María de los Ángeles Fanaro, Joel Gak	62
<i>Methods for Estimating Academic Workload in Virtual Environments: A Systematic Comparative Review Across Online, Blended, and Hyflex Modalities.</i> Francisco Sereño	63

Editors

Responsible Editor

Armando De Giusti

Profesor titular - Facultad de Informática - Universidad Nacional de La Plata Argentina
Investigador Principal del CONICET
degusti@lidi.info.unlp.edu.ar <https://orcid.org/0000-0002-6459-3592>

Co-Editors

Sandra Baldasarri

Universidad de Zaragoza – España
Departamento de Informática e Ingeniería de Sistemas (DIIS)
Escuela de Ingeniería y Arquitectura, Universidad de Zaragoza
Edificio Ada Byron - María de Luna 1 - Zaragoza – 50018 – España
sandra@unizar.es <https://orcid.org/0000-0002-9315-6391>

Cesar Collazos

Universidad del Cauca – Colombia
Facultad de Ingeniería Electrónica y Telecomunicaciones - Dpto de Sistemas
Calle 5 N° 4-70, NIT 891500319-2 – Popayán
<https://orcid.org/0000-0002-7099-8131>

Laura C. De Giusti

Universidad Nacional de La Plata – Argentina
Facultad de Informática – Instituto de Investigación en Informática LIDI
50 y 120 – 2do. Piso (1900) La Plata – Argentina
ldgiusti@lidi.info.unlp.edu.ar <https://orcid.org/0000-0003-2850-801X>

Fabrício Herpich

Universidade Federal de Santa Catarina - Brasil
Araranguá - Santa Catarina – HR
<https://orcid.org/0000-0002-1575-0512>

Domingo Docampo

Universidad de Vigo – España
Departamento de Teoría de la Señal y Comunicaciones
ETSE Telecomunicación - Rua Maxwell s/n - Campus Universitario - 36310 Vigo – España
ddocampo@uvigo.es <https://orcid.org/0000-0001-6864-1232>

Alberto J. Cañas

Universidad West Florida – USA
Department of Computer Science – Florida Institute for Human and Machine Cognition
40 South Alcaniz Street - Pensacola, FL 32502 – Estados Unidos

Jaime Sanchez

Universidad de Chile – Chile

Facultad de Ciencias Físicas y Matemáticas - Departamento Ciencias de la Computación

Blanco Encalada 2120, Santiago - Chile

Editorial Team

Abásolo María José

Universidad Nacional de La Plata – Argentina

Comisión de Investigaciones Científicas de la Provincia de Buenos Aires

50 y 120 – (1900) La Plata, Buenos Aires, Argentina

<https://orcid.org/0000-0003-4441-3264>

Joni Amorim

Universidade Estadual de Campinas – Brasil

Campinas, Estado de São Paulo, Brasil

<https://orcid.org/0000-0002-9837-9519>

Silvia Castro

Universidad Nacional del Sur - Argentina

Departamento de Ciencias e Ingeniería de la Computación

San Andres 800 - Bahía Blanca - Buenos Aires

<https://orcid.org/0000-0002-8483-3688>

Teresa Coma-Roselló

Universidad de Zaragoza – España

Facultad de Educación

C. de Pedro Cerbuna, 12, 50009 Zaragoza, España

<https://orcid.org/0000-0002-7439-8459>

Marcelo Luis Errecaralde

Universidad Nacional de San Luis – Argentina

Av. Ejército de los Andes 950, D5700 BPB, San Luis

<https://orcid.org/0000-0001-5605-8963>

Elsa Estevez

Universidad Nacional del Sur - Argentina

Departamento de Ciencias de la Computación

Av. Alem 1253 – (8000) Bahía Blanca – Argentina

<https://orcid.org/0000-0002-2596-4397>

Guillermo Eugenio Feierherd

Universidad Nacional de Tierra Del Fuego – Argentina
Yrigoyen 879 - Ushuaia – Argentina
<https://orcid.org/0000-0002-0546-6833>

Verónica Gil Costa

Universidad Nacional de San Luis – Argentina
Av. Ejército de los Andes 950, D5700 BPB, San Luis
<https://orcid.org/0000-0003-4637-9725>

Ramiro Jordan

University of New Mexico – Estados Unidos
ISTEC (Iberoamerican Science & Technology Education Consortium)
Albuquerque, NM 87131-0001 – Estados Unidos
<https://orcid.org/0000-0001-5634-6236>

Joao Carlos Krause

Universidade Regional Integrada do Alto Uruguai e das Missões - Brasil
Campus de Santo Ângelo
Av. Universidade das Missões, 464 - Universitário, Santo Ângelo – RS
<https://orcid.org/0000-0001-8674-9634>

Horacio Kuna

Universidad Nacional de Misiones - Argentina
Facultad de Ciencias Exactas Químicas y Naturales
Posadas – Misiones
<https://orcid.org/0000-0001-7752-1515>

Emilio Luque

Universidad Autonoma de Barcelona – España
Departamento de Arquitectura de Computadores y Sistemas Operativos
Campus Bellaterra, 08193 Barcelona, España
<https://orcid.org/0000-0002-2884-3232>

Mónica G. Luque

Directora Profesora Experta en Universidad Siglo 21
Consultora Regional en organismos e instituciones educativas
luque.monica@gmail.com
<https://orcid.org/0000-0002-5319-0018>

Cristina Suemay Manresa Yee

Universidad de Islas Baleares – España
Carretera de Valldemossa, km 7.5, Nord, 07122 Palma, Illes Balears, España
<https://orcid.org/0000-0002-8482-7552>

Regina Motz

Universidad de la República – Uruguay

Facultad de Ingeniería

Julio Herrera y Reissig 565 Piso 5 – 11300 – Montevideo – Uruguay

<https://orcid.org/0000-0002-1426-562X>

R. Marcelo Naiouf

Universidad Nacional de La Plata – Argentina

Facultad de Informática – Instituto de Investigación en Informática LIDI

50 y 120 – 2do. Piso (1900) La Plata

<https://orcid.org/0000-0001-9127-3212>

Manuel Ortega Cantero

Universidad Castilla La Mancha - España

Departamento de Tecnologías y Sistemas de Información - Escuela Superior de Informática

Paseo de la Universidad 4, 13071 - Ciudad Real – España

<https://orcid.org/0000-0002-0194-7744>

Francisco Régis Vieira Alves

Instituto Federal de Educação, Ciência e Tecnologia do Ceará - Brasil

Ceará - Brasil

<https://orcid.org/0000-0003-3710-1561>

María Rita Otero

Universidad Nacional del Centro de la Pcia. de Buenos Aires – Argentina

Facultad de Ciencias Exactas UNCPBA

Núcleo de Investigación en Educación en Ciencia y Tecnología

Paraje Arroyo Seco. Campus. (7000) Tandil – Argentina

<https://orcid.org/0000-0002-1682-9142>

José Ángel Olivas Varela

Universidad de Castilla La Mancha – España

Departamento de Tecnologías y Sistemas de Información - Escuela Superior de Informática

Paseo de la Universidad 4, 13071 - Ciudad Real – España

<https://orcid.org/0000-0003-4172-4729>

Carlos E. Paldao

Académico de Número de la ANLE (www.anle.us), Editor General y miembro de la Junta Directiva. Corresponsable de la Real Academia Española
Washington, DC., USA

Patricia M. Pesado

Universidad Nacional de La Plata – Argentina
Facultad de Informática – Instituto de Investigación en Informática LIDI
Comisión de Investigaciones Científicas de la Provincia de Buenos Aires
50 y 120 – 2do. Piso (1900) La Plata – Argentina
<https://orcid.org/0000-0003-0000-3482>

Daniel Prieto Castillo

Universidad Nacional de Cuyo – Argentina
Facultad de Filosofía y Letras.
Centro Universitario (5500) – Mendoza – Argentina

Manuel E. Prieto Mendez

Universidad Castilla La Mancha - España
Escuela Superior de Informática
Paseo de la Universidad 4, 13071 - Ciudad Real – España
<https://orcid.org/0000-0003-0343-1482>

A. Marcela Printista

Universidad Nacional de San Luis - Argentina
Facultad de Ciencias Físico Matemáticas y Naturales
Avenida Ejército de Los Andes 950 - San Luis – Argentina
<https://orcid.org/0000-0002-6323-7051>

Dolores Isabel Rexachs del Rosario

Universidad Autónoma de Barcelona - España
Departamento de Arquitectura de Computadores y Sistemas Operativos
Campus Bellaterra, 08193 Barcelona, España
<https://orcid.org/0000-0001-5500-850X>

Rosabel Roig Vila

Universidad de Alicante – España
Facultad de Educación – Dpto. de Didáctica General y Didácticas Específicas
Ap. Correos 99 03080 – Alicante
<https://orcid.org/0000-0002-9731-430X>

Claudia Russo

Universidad Nacional del Noroeste de la Provincia de Buenos Aires - Argentina
Instituto de Investigación y Transferencia en Tecnología
Roque Saenz Peña 456 - (6000) Junín - Argentina

Cecilia Sanz

Universidad Nacional de La Plata – Argentina
Instituto de Investigación en Informática LIDI – Facultad de Informática
50 y 120 2do. Piso (1900) La Plata – Argentina
<https://orcid.org/0000-0002-9471-0008>

Guillermo Simari

Universidad Nacional del Sur – Argentina
Departamento Ciencias e Ingeniería de la Computación
Laboratorio de Investigación y Desarrollo en Inteligencia Artificial
Avda Alem N° 1253 - Bahía Blanca (8000) – Argentina
<https://orcid.org/0000-0001-6247-0428>

Fani Stylianidou

University of London – Inglaterra
Deputy Director Science Learning Centre London Institute of Education
20 Bedford way London WC1H 0AL - Inglaterra

Angelo Tartaglia

Politécnico de Torino – Italia
Facultad de Ingeniería
10129 Torino, Corso Duca degli Abruzzi, 24 – Italia
<https://orcid.org/0000-0001-9763-1615>

Mayra Urrea

Universidad de Alicante - España
Facultad de Educación
Calle Aeroplano s/n, 03690, San Vicente del Raspeig – Alicante
<https://orcid.org/0000-0001-8650-7854>

Maria Alejandra Zangara

Universidad Nacional de La Plata - Argentina
Facultad de Informática
50 y 120 – 2do. Piso (1900) La Plata- Buenos Aires
<https://orcid.org/0000-0001-6013-9790>

Coordinación Editorial

Lic. Otero Natalia

Universidad Nacional de La Plata – Argentina
Secretaría de Postgrado - Facultad de Informática
50 y 120 – 2do. Piso (1900) La Plata – Buenos Aires
notero@lidi.info.unlp.edu.ar

Gamification as an active methodology for meaningful learning of Literature in the International Baccalaureate Program.

Diana Karina Toro Becerra¹

¹ Universidad Internacional Iberoamericana, Arecibo, Puerto Rico

diakar1411@gmail.com

ORCID ID: <https://orcid.org/0009-0003-0681-5032>

This article aims to design and implement gamified teaching strategies for meaningful learning of the Literature subject of year one of the International Baccalaureate (IB) Program in an educational institution in Ecuador. The relevant theoretical contributions are gamification as an active methodology: foundations, dynamics and mechanics; IB learning approaches in Literature; Victor Vroom's theory of motivation and David Ausubel's some meaningful learning approaches. The methodology used is action research divided into five phases: approach, diagnosis, design, application, and evaluation. Data collection was carried out using quali-quanitative techniques: documentary observation (reports), objective diagnostic test and opinion survey. The gamified teaching strategies used are Deck.Toys, Ta-tum and Digital Badges. The most relevant results indicate that teaching through gamification was significant and motivating for the students in terms of their willingness to learn literature and attitudinal performance. It was concluded that the TPACK, and the support of educational institutions are needed to implement gamification as a teaching methodology.

Keywords: Gamification; Meaningful learning; Literature; Teaching strategies, Baccalaureate.

Digitization of evaluation: Recovering teaching experiences to promote post-pandemic innovation.

Ma. Fernanda Barranquero¹, Ma. Alejandra Pedragosa²

¹ Universidad Nacional de La Plata, Facultad de Ciencias Económicas, La Plata, Argentina

² Universidad Nacional de La Plata, Instituto de Investigaciones en Humanidades y Ciencias Sociales, Facultad de Humanidades y Ciencias de la Educación, La Plata, Argentina

fernanda.barranquero@econo.unlp.edu.ar, mapedragosa@fahce.unlp.edu.ar

ORCID ID: <https://orcid.org/0000-0002-2814-5338> <https://orcid.org/0000-0002-9844-7972>

Virtualization during pandemic showed the need to enhance digital transformation of educational processes in Higher Education. Particularly, strong concerns raised regarding the digitalization of assessment. This work presents the experiences of 65 higher education teachers on concerns, difficulties, achievements and changes introduced regarding the digitization of evaluation. Teachers were surveyed and the responses were analysed using QDA Miner. The results show that the main worries are related to: methodological aspects of evaluations design that exceed mastery of technological tools; reliability; and in some cases, the need for collecting evidence of learning processes and not only results. The difficulties are associated to communication with students; while achievements, are related to the possibility of sustaining educational continuity during a pandemic. The last result signals the potential digitalization has on educational processes. Innovations are related to global changes in the evaluation strategy used. The findings point to the need for developing more powerful instances of teacher education and educational orientation for higher education teachers. This would contribute to capitalizing the progress made in the digitalization of evaluation, from a pedagogical approach.

Keywords: Educational process digitalization; Evaluation; Educational innovation; Higher education.

Distance Education at the National University of Entre Ríos during and after the pandemic.

Gonzalo D. Andrés¹

¹ Universidad Nacional de Entre Ríos, Instituto de Estudios Sociales, Consejo Nacional de Investigaciones Científicas y Técnicas, Paraná, Argentina.

gonzalo.andres@uner.edu.ar

ORCID ID: <https://orcid.org/0000-0003-4993-6080>

This article analyses the institutional policies and actions of the Universidad Nacional de Entre Ríos aimed at promoting distance education. In particular, it emphasized is placed on the forms taken by the structural trends of the informational paradigm, especially during and after the forced virtualization experienced in 2020 and 2021 due to the COVID-19 pandemic. It is argued that the tendencies of digitization, automation and platformisation at this university have had a new impulse during this period as a result of the massive migration to virtual platforms to continue the pedagogical link and the adoption of digital educational resources. After the health crisis, these trends continued with a growing mediatization of education, which was accompanied by investment in technological infrastructure, curriculum reforms, the creation of distance learning courses and the strengthening of management areas. It is concluded that these socio-technical transformations are changing the ways of accessing knowledge, the work and role of teachers and the instances of communication, learning and evaluation of students.

Keywords: Higher education; Digital technologies; Pandemic; Educative Technology; Platforms; Digitization.

Effect of a Propaedeutic Course on the Mathematical Skills of Prospective Computer Engineering Students.

Blanca Esthela Solís Recéndez¹, Gabriela de Jesús Córdova Lara¹, María de León Sigg¹, Juan Luis Villa Cisneros¹, Daniel Humberto Solís Recéndez²

¹ Universidad Autónoma de Zacatecas, Zacatecas, México

² Instituto Politécnico Nacional, Zacatecas, México

blsolis@uaz.edu.mx, icegaby@uaz.edu.mx, mleonsigg@uaz.edu.mx, jlvilla@uaz.edu.mx, dsolis@ipn.mx

In engineering and technology careers, skills and knowledge in mathematics are fundamental. However, a high percentage of incoming students exhibit significant deficiencies in this field, resulting in a high failure rate in mathematics-focused subjects. The ultimate effect may be dropout. Many universities offer a propaedeutic course to prospective students; however, while it is expected to positively influence their academic performance, little is known about its impact on improving students' mathematical skills. The objective of this study was to determine the impact of a propaedeutic course for prospective computer engineering students. To assess its effectiveness, an online pre-test was administered, followed by an in-person course, and upon completion, an equivalent online post-test. A dependent samples paired t-test indicated that the propaedeutic course had a significant impact on improving students' mathematical skills.

Keywords: Propaedeutic course; Mathematical skills; Academic effectiveness.

IoT Platforms in Perspective: Evaluating Azure IoT, IBM Watson IoT Platform, and Google IoT.

José Jesús Alejandro Montejo¹

¹ Universidad Juárez Autónoma de Tabasco, Cunduacán, Tabasco, México

232H19003@alumno.ujat.mx

ORCID ID: <https://orcid.org/0009-0002-6982-1862>

The IoT (Internet of Things) has revolutionized the way we interact with the digital world, connecting devices and systems to collect and share data. However, the quality of IoT software is crucial, as it handles data that is important and confidential to the companies that use it. It is significant to make an analysis of the platforms that exist in the market to identify the one that best suits the customer's needs. Quality models, such as FURPS (Functionality, Usability, Reliability, Performance, Supportability), provide a framework for evaluating the quality of software or platforms, which helps to choose the feasible element for a company. In the present work, a comparison of three platforms that are outstanding in the market is made through the FURPS quality model and with the Likert scale a weighting is assigned to identify the feasible platform in terms of data processing and compatibility with other tools.

Keywords: Internet of Things; IoT Platforms; FURPS Model; Software Quality.

Educational robotics: a survey.

Rebeca Solís-Ortega¹, Cindy Calderón-Arce¹, Juan Carlos Brenes-Torres², Cristhian Chavez-Montoya³, Kenneth Mejía-Luna³, José Pablo Calderón Gairaud³

¹ Instituto Tecnológico de Costa Rica, Escuela de Matemática, Cartago, Costa Rica.

² Instituto Tecnológico de Costa Rica, Escuela de Ingeniería en Mecatrónica, Cartago, Costa Rica.

³ Instituto Tecnológico de Costa Rica, Estudiante Enseñanza de la Matemática con Entornos Tecnológicos, Cartago, Costa Rica.

rsolis@itcr.ac.cr, ccalderon@itcr.ac.cr, juanbrenes@itcr.ac.cr, acrismontoya@gmail.com, kennethluna16k@gmail.com, jose03pcg@gmail.com

ORCID ID: <https://orcid.org/0000-0002-0077-225X> <https://orcid.org/0000-0002-3065-8386>
<https://orcid.org/0000-0001-6323-2173> <https://orcid.org/0009-0009-2090-8247>
<https://orcid.org/0009-0001-8485-995X> <https://orcid.org/0009-0001-7381-5134>

This paper provides a thorough survey of robots used in STEM (Science, Technology, Engineering y Mathematics) focused educational activities, covering both basic and advanced options. This research delves into various platforms, capabilities, and sizes of educational robots through an analysis of the current state of the art. It emphasizes the role of robotics in addressing educational needs in STEM, showcasing the ability to customize robots for specific learning environments. Examples of how robots have been and can be tailored for learning settings are highlighted, emphasizing their capacity to foster student interaction and collaborative learning. Additionally, the article details educational tools and resources available for effectively integrating robots into the classroom. Lastly, it offers a comparison of the presented robots, spotlighting their strengths and areas for improvement.

Keywords: Educational robotics; Educational resources; Collaborative learning; STEM.

Exploring new frontiers: Training experiences through immersive videos.

Carlos Busón¹, Lucilene Machado García Arf¹,
Katherin Pérez Mendoza²

¹ Universidade Federal de Mato Grosso do Sul, Campo Grande, Brasil

² Universidad de La Guajira, Riohacha, Colombia

carlos.buson@ufms.br, lucilene.arf@ufms.br, kperez@uniguajira.edu.co

ORCID ID: <http://orcid.org/0000-0002-1446-2252> <https://orcid.org/0000-0001-7870-3636>
<https://orcid.org/0000-0001-6574-1959>

This work is the result of a preliminary exploratory pilot study that explored the possibility of using immersive videos as a didactic tool to incorporate them into educational environments. This proposal aimed to develop a series of open online resources using immersive videos, allowing students to analyze a concept through a specific learning object. The methodology involved students viewing the materials and collecting data through a survey with open and closed questions for subsequent quantitative and qualitative analysis. The results revealed a favorable perception of the participants towards this technology, highlighting its ability to enhance the learning experience and facilitate the understanding of complex concepts that require a more visual explanation. Similarly, difficulties and recommendations for improving the development of future materials were also identified. However, despite the technological advantages, many students lack the means and resources to access it, making it necessary to study its use in different contexts. The contribution of this pilot study lies primarily in its innovative approach to integrating immersive videos into academic environments.

Keywords: Immersive videos; Educative technology; Educational innovation; Immersive learning; Digital divide.

Influence of role models on the choices of systems engineering students: A multigroup approach by gender and type of university.

William Peña¹

¹ Universidad Científica del Sur, Lima, Perú

wpena.billisys@gmail.com

ORCID ID: <https://orcid.org/0000-0002-4295-0907>

We tested the Akbulut Choice Goals Model on data by gender and university type to understand the influence of role models on the choice of a major in Information Systems. Using SEM, 257 students from private and public systems engineering universities in Lima were evaluated. Role models indirectly influence the choice objectives. However, it is evident that role models do influence women when choosing a major. In addition, role models directly influence self-efficacy, interests, and outcome expectations. Multigroup analysis by university type shows that role models influence the expectations of students at private universities, while the opposite is true for their counterparts at public universities. The self-efficacy of public university students is influenced to a greater extent by their role models compared to their private university counterparts. Akbulut's model was validated, however, multigroup analysis by gender showed the influence of role models on female students. The influence of role models on self-efficacy, expectations and interests was corroborated.

Keywords: Role Models; Career Choice; College Students; Multigroup analysis; Information Systems

English language teaching mediated by WhatsApp as a pedagogical strategy in a public school in Brasília, Brazil, post COVID-19.

Carla Moreira de Sousa Freire¹, Enaldo da Silva Freire²

¹ Secretaria de Estado de Educação do Distrito Federal, Brasília, Brasil

² Juris Peritus, Brasília, Brasil

carlamoreirafreire@gmail.com, doutorfreireadv@gmail.com

ORCID ID: <https://orcid.org/0009-0000-2206-9701>

The pedagogical strategies mediated by WhatsApp emerge as a didactic proposal for teaching English in Brazil, especially, as outlined in the research, in the post-pandemic context of COVID-19, which transformed remote education, turning WhatsApp into an excellent tool for supporting teachers and students. This research analyzes the relationship between the use of the messaging app and English teaching, focusing on 36 high school seniors from Centro de Ensino Médio 414 in Samambaia. The objective is to verify the impact of WhatsApp on the development of communicative competence in English. The specific objectives include identifying the relationship between WhatsApp and oral communicative competence; establishing the impact of WhatsApp on texts and oral dialogues; and evaluating the use of WhatsApp as a pedagogical strategy post-pandemic. The mixed-method research, that is, both quantitative and qualitative, revealed that easy access to mobile phones and the internet facilitates the development of communicative skills in English, although the use of WhatsApp presents challenges. The results showed that the strategy is compatible with the teaching of the four English language skills (listening, speaking, reading, and writing), highlighting its flexible, collaborative, and group-oriented nature.

Keywords: English, Foreign language, Pedagogy, Mobile learning, WhatsApp, Communicative competences, Brazil.

Financial Applications and their Implementation in Mexican higher Education Institutions.

Isael Martínez Silva¹, Luis Miguel González García¹

¹ Universidad de Celaya, Celaya, Guanajuato, México

isaelmtz860@gmail.com, drlmgonzalez@gmail.com

ORCID ID: <https://orcid.org/0009-0000-1948-3573> <https://orcid.org/0000-0001-5938-3497>

This paper analyzed whether the implementation of financial applications in higher education institutions in Mexico improves the financial education of university students. The research was quantitative-descriptive, a survey was implemented as a data collection instrument in 4 states of the Mexican Republic. As conclusions, , it was identified that more than 65% of respondents consider it possible to increase their level of education if they received classes through financial applications, likewise, a 72% increase in positive attitude regarding financial education was determined through the use of said applications, which allows us to infer that there is a great opportunity to implement improvements in the way in which financial education is currently taught to university students in Mexico

Keywords: University students; Financial education; Investment applications (Apps); Movil applications; Financial system.

Computational Thinking Challenges: A Workshop to Diagnose and Enhance Skills in Incoming University Students.

Hugo Viano¹, Mariela Zuñiga¹, María V. Rosas¹

¹ Universidad Nacional de San Luis, San Luis, Argentina

hviano@email.unsl.edu.ar, mezuniga@email.unsl.edu.ar, mvrozas@email.unsl.edu.ar

ORCID ID: <https://orcid.org/0000-0003-1093-0319> <https://orcid.org/0000-0001-8622-4889>
<https://orcid.org/0000-0003-1663-9610>

Computational Thinking (CT) has established itself as a key strategy for problem-solving, particularly in fields related to Computer Science. In this context, a disciplinary workshop was developed for incoming students of the Department of Computer Science at the National University of San Luis, aimed at diagnosing the initial state of CT skills and assessing their evolution, anticipating their performance in the first semester courses.

The development of Computational Thinking (CT) skills is crucial in introductory Computer Science courses. In 2023, as part of line 3 of the PROICO 03/2720 research project, a disciplinary workshop was proposed to the Department of Computer Science for incoming students to evaluate CT skills. The workshop was conducted virtually and organized into three stages: an initial challenge to assess baseline skills, a synchronous meeting to share results and analyze strategies, and a final challenge to measure progress made. The results indicated that 44% of the students answered between 4 and 5 questions correctly in the initial challenge, while this percentage increased to 54.29% in the final challenge, showing significant improvement. Evaluation and analysis skills were the most developed by the students, while the skill of Generalization presented greater challenges in both assessments. The results showed that 44% of the students obtained between 4 and 5 correct answers in the initial challenge, while in the final challenge, this percentage rose to 54.29%, indicating significant improvements in the assessed skills. The evaluation skill was the most dominant, while the Generalization skill faced greater difficulties in stages 1 and 3.

Keywords: Disciplinary workshops; Educational diagnosis; Skills development; Problem-solving skills; Higher education.

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 41.

doi: <http://doi.org/10.24215/18509959.41.e1>

Automated rubrics for evaluating good practices in HTML.

Ana Gabriela Zúñiga Zárte¹

¹Euncet Business School, Terrassa, España

gzuniga@euncet.com

ORCID ID: <https://orcid.org/0000-0003-4069-9488>

This paper presents an automated tool to assess the structural quality of web pages, based on the implementation of standard rubrics using the Flask framework. The tool analyzes essential tags such as <title>, <meta>, <h1>, and <p>, assigning scores based on their presence and correct implementation. This solution was applied to 120 pages developed by university students, allowing to identify common patterns in the implementation of web standards, as well as areas for improvement, especially in accessibility and SEO. The results demonstrate the effectiveness of the system to provide fast and objective feedback, optimizing teaching and assessment processes in educational contexts. Finally, possible improvements are discussed, such as the integration of artificial intelligence for more detailed analysis and personalized recommendations.

Keywords: Automated rubrics; Web assessment; SEO; Accessibility; HTML; Technology education; Flask framework.

Implementation of the Flipped Classroom Approach for Developing Projects with First-Year Engineering Students.

Adriana Lescano¹, María del Carmen Maurel², Andrés Puy¹

¹Universidad Tecnológica Nacional, Facultad Regional Rafaela, Rafaela, Argentina

²Universidad Tecnológica Nacional, Facultad Regional Resistencia, Resistencia, Argentina

lescanoadri@gmail.com, mmaurel@gfe.frre.utn.edu.ar, andi.puy@gmail.com

ORCID ID: <https://orcid.org/0000-0001-6597-9879> <https://orcid.org/0000-0001-9565-6253>

<https://orcid.org/0000-0001-5638-3344>

The present article describes an innovative educational experience implemented in the field of engineering education, where a combination of the flipped classroom approach and project-based learning was applied to teach the topic of fluid statics to first-year students. This methodology brought about a significant shift in how students engage with the curricular content, fostering an active and participatory learning environment. The experience was positively evaluated by both instructors and students, as the use of this pedagogical strategy enhanced the development of critical and creative skills in students, effectively preparing them to tackle real-world challenges in the field of engineering.

Keywords: Flipped classroom, Project, Active learning, Skills.

Digital Technologies and Reading Comprehension: Challenges for Educational Intervention.

Victoria Arnés^{1, 2}, Verónica Zabaleta^{2, 3}

¹ Centro Interdisciplinario de Investigaciones en Psicología Experimental y Matemática (CONICET), Ciudad Autónoma de Buenos Aires, Argentina

² Universidad Nacional de La Plata, Facultad de Psicología, Laboratorio de Evaluación Psicológica y Educativa, La Plata, Argentina

³ Comisión de Investigaciones Científicas de la Provincia de Buenos Aires, La Plata, Argentina

varnes@psico.unlp.edu.ar, vzabaleta@psico.unlp.edu.ar

ORCID ID: <https://orcid.org/0000-0002-5378-9522> <https://orcid.org/0000-0002-5302-196X>

In the current context, the incorporation of technologies in education poses challenges and controversies regarding their effectiveness and impact on learning. A fundamental learning that takes place at school is linked to the comprehensive reading of texts. Digital technologies transform reading and writing practices, enabling the emergence of new formats and the reconfiguration of existing ones. This paper aims to review some studies that analyze the effectiveness of interventions that use technologies to improve reading comprehension. For this purpose, the main results of six systematic reviews and meta-analyses on this subject are synthesized. While some studies show positive results, others show limited or non-significant effects. In view of the available evidence, the importance of developing reading practices that incorporate technology in an appropriate manner is emphasized. Finally, some limitations and possible lines of research are pointed out.

Keywords: Reading; Reading comprehension; Educational technology; Intervention; Education.

Artificial Intelligence and Basic Education: A Systematic Review of Applications.

Thiago da Silva Fialho¹, Christian de Vargas Silva¹,
Fabrício Herpich¹, Marina Sérgio Carradore¹, Eliane Pozzebon¹

¹ Universidade Federal de Santa Catarina, Programa de Pós-Graduação em Tecnologias da Informação e Comunicação, Araranguá, Brasil

fialho.t@posgrad.ufsc.br, christianvargas442@gmail.com, fabricao.herpich@ufsc.br, marina.carradore@ufsc.br, eliane.pozzebon@ufsc.br

ORCID ID: <https://orcid.org/0009-0002-2297-9582> <https://orcid.org/0000-0001-9407-7532>
<https://orcid.org/0000-0002-1575-0512> <https://orcid.org/0000-0002-3942-2249>
<https://orcid.org/0000-0002-4237-6589>

The use of artificial intelligence (AI) in education is revolutionizing teaching methodologies, making them more adaptable and innovative. AI enables the creation of almost individualized learning experiences, promoting equal access to knowledge among different socioeconomic levels. AI tools integrated into the educational environment, offer powerful support for both teachers and students. For educators, AI automates repetitive and bureaucratic tasks, allowing greater focus on strategic pedagogical activities. For students, it provides ideal support in learning and practicing content. Thus, this systematic review, conducted with the aim of analyzing different types of teaching personalization using AI, was carried out using the PRISMA 2020 protocol and carefully defined inclusion and exclusion criteria for the analysis of selected articles. The main results allowed the identification of different teaching methodologies that go beyond traditional teaching, demonstrating the practical and effective use of AI.

Keywords: STEAM, Artificial Intelligence, STEM, Education.

Recommending Audio and Video Learning Objects: A Systematic Review.

Rodrigo Miranda Feitosa¹, Luiz Aurélio Batista Neto¹,
André Macedo Santana², Vinicius Ponte Machado²,
André Luís Silva Santos¹

¹ Instituto Federal de Educação, Ciência e Tecnologia do Maranhão, São Luís-MA, Brasil

² Universidade Federal do Piauí, Teresina-PI, Brasil

rodrigo.feitosa@ifma.edu.br, luiz.neto@ifma.edu.br, andremacedo@ufpi.edu.br, vinicius@ufpi.edu.br,
andresantos@ifma.edu.br

ORCID ID: <https://orcid.org/0009-0000-9120-1841> <https://orcid.org/0009-0002-4403-2517>
<https://orcid.org/0000-0002-0062-1806> <https://orcid.org/0000-0003-3391-8443>
<https://orcid.org/0000-0002-9590-6686>

Recommending learning objects is an important strategy for teaching the technology area. Personalized recommendation for students is not a trivial task and requires analysis of the themes explored and the types of objects suggested. This research investigated the work on recommending learning objects in terms of audio, video typing and other related types that contribute to supporting the teaching of Computing courses in Brazil. The research analyzes the teaching-learning processes developed, the information filtering techniques used, the tools in the area, other research topics covered, the content made available and the existing repositories of learning objects within the scope of Computing teaching in the Brazilian scenario. This work describes initiatives and approaches aimed at teaching and how recommendations for these types of learning objects can impact the national scenario.

Keywords: Recommender Systems; Learning Object; Educational Recommendation.

Methods and techniques for validating educational products: integrative literature review.

Sarah Lais Rocha¹, Robson José de Souza Domingues¹,
Elizabeth Teixeira¹, Lucas Henrique de Amorim Lima¹

¹ Universidade do Estado do Pará, Belém, Brasil

sarahlaisrocha@gmail.com, omingues@uepa.br, etfelipe@hotmail.com, lucasheerique2000@gmail.com

ORCID ID: <https://orcid.org/0000-0002-3753-9507> <https://orcid.org/0000-0001-5419-2878>
<https://orcid.org/0000-0002-5401-8105> <https://orcid.org/0000-0001-6757-6360>

The methods and techniques for validating educational products are diverse. Therefore, the objective is to investigate in the scientific literature which validation methods and techniques have been applied in validation studies of educational products in health education. To this end, an integrative literature review was carried out. 28 full articles were selected after searching PubMed, Scopus, Web of Science, Educational Resources Information Center (ERIC) and Virtual Health Library (VHL), being published in 13 countries. The results elucidated that the validation stage can occur through validation of face, construct, content, semantics, appearance, skill transfer. For this process, most studies validated different aspects and dimensions of the product considering the type and target audience. It is concluded that the validation methods used in validation research on educational products in health education are diverse.

Keywords: Validation studies; Educational technology; Health teaching.

Maker Culture and Augmented Reality: A Bibliographic Review.

Jonathan Felipe da Silva¹, Sandro César Silveira Jucá¹,
Solonildo Almeida da Silva¹

¹ Instituto Federal de Educação, Ciência e Tecnologia do Ceará, Fortaleza, Brasil.

jonathan.silva@ifce.edu.br, sandrojuca@ifce.edu.br, solonildo@ifce.edu.br

ORCID ID: <https://orcid.org/0000-0003-2677-2984> <https://orcid.org/0000-0002-8085-7543>
<https://orcid.org/0000-0001-5932-1106>

Maker Culture (CM) promotes the idea that a person can create or modify objects, using accessible technologies and sharing knowledge in collaborative communities. This movement values creativity, practical learning and open innovation, encouraging individuals to become active producers rather than mere consumers. Augmented Reality (AR) inserts digital elements into the physical world, creating interactive experiences, being widely adopted in sectors such as games, entertainment and education, where it provides new ways of learning. Combining CM with AR offers significant potential to innovate educational and professional practices. This article highlights how the integration of these technologies can make the teaching and learning process more dynamic and personalized, facilitating the understanding of complex concepts through interactive visualizations. In teaching environments, for example, AR can be used to provide detailed, real-time instructions, while CM empowers students to apply this knowledge in practical and creative ways. Therefore, a bibliographical review was carried out with publications related to the topic, pointing out innovative methodologies, concluding that the convergence of these approaches represents an important tool to stimulate the development of essential skills in the 21st century.

Keywords: Maker culture; Teaching; Active methodology; Augmented reality.

Quality evaluation of tools used in teaching initial programming based on ISO 25000.

María Cecilia Espíndola¹, Cristina Liliam Greiner¹,
Gladys Noemí Dapozo¹

¹ Universidad Nacional del Nordeste, Corrientes, Argentina

mcespindola@exa.unne.edu.ar, cgreiner@exa.unne.edu.ar, gndapozo@exa.unne.edu.ar

ORCID ID: <https://orcid.org/0009-0009-2960-432X> <https://orcid.org/0009-0003-3048-7470>
<https://orcid.org/0009-0006-4297-4075>

The teaching of programming at pre-university educational levels has acquired particular relevance. In this context, various strategies are implemented so that students acquire programming skills from an early age, and teachers must decide which programming environments to use. This work presents a framework to evaluate the quality of the tools used in teaching planning, in order to provide teachers with a guide to select the most appropriate tools for their teaching objectives. A quality model was defined, selecting characteristics and subcharacteristics of the ISO 25010 standard. Metrics were established based on the ISO 25023 standard and the evaluation was carried out following the stages established by the ISO 25040 standard. The results show that the evaluated tools comply with the quality criteria defined in the model, although its degree of compliance varies in the evaluation of the different characteristics. As a contribution to this proposal, a quality model and its respective measurement have been formalized, based on international standards, which will allow its application in the evaluation of the quality of this type of educational software, which is relatively recent in pre-university education.

Keywords: Software product quality; Product quality evaluation; Software tools for teaching programming.

Learning the Fourier Transform through the analysis of local bird songs: a case study.

Willian Ricardo Bispo Murbak Nunes^{1,2}, Matheus Bonfim da Rocha¹, Murilo Garrido Volpato¹, Samuel Felipe Córdova Victório¹

¹ Universidade Tecnológica Federal do Paraná (UTFPR), Apucarana, PR, Brasil

² Universidade Estadual de Londrina (UEL), Londrina, PR, Brasil

willianr@utfpr.edu.br, matheusbonfimrocha@alunos.utfpr.edu.br, murilogarrido@alunos.utfpr.edu.br, samuelfelipe@alunos.utfpr.edu.br

ORCID ID: <https://orcid.org/0000-0002-3574-7441> <https://orcid.org/0009-0009-3712-8802>
<https://orcid.org/0009-0006-9251-2178> <https://orcid.org/0009-0004-8392-0482>

The Fourier transform is essential for technology and engineering professionals due to its signal processing, image processing, telecommunications, and machine learning applications. However, its teaching is typically covered in signals and systems courses and faces challenges due to the abstract and complex nature of the content, leading to high dropout rates and student demotivation. In this context, this paper analyzes the opinions of Computer Engineering students regarding an innovative approach to teaching the Fourier transform, based on the analysis of birdsong signals from the students' local environment. The methodology involved developing scripts for signal analysis in the MATLAB® environment. The evaluation of this strategy was conducted through a Likert-scale questionnaire, and the results, statistically validated, indicated increased student motivation, as well as significant improvements in practical programming skills, teamwork, and learning outcomes. Students reported that the approach facilitated the understanding of complex concepts and contributed to the development of programming skills focused on solving applied problems, making the learning process more engaging.

Keywords: Active methodology; Technology education; Problem-based learning; Engineering education; Computational skills; Computer science education; Signals and systems; Critical thinking.

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 41.

doi: <http://doi.org/10.24215/18509959.41.e10>

Search and selection of information on the Internet of adults pursuing higher education at a distance.

Eduardo Reuss¹, Karen Jiménez²

¹Universidad de las Américas, Facultad de Educación, Magíster en Docencia Universitaria, Santiago, Chile

²Universidad de las Américas, Facultad de Educación, Dirección de Desarrollo Docente, Santiago, Chile

edoanreuss@gmail.com, kjimenez@udla.cl

ORCID ID: <https://orcid.org/0009-0006-8849-6419> <https://orcid.org/0009-0003-7567-7200>

The research addressed the human side of the relationship between andragogy and information and communication technologies (ICTs) in the field of higher education in the virtual or distance modality. This, in a scenario of development, consolidation and expansion of ICTs and the Internet, together with the growing offer of higher education courses in virtual or distance mode. The objectives were to investigate how adult students search for and select information on the Internet, and the criteria for evaluating information sources from the Web. It was possible to demonstrate that the search and selection of information on the network and the evaluation of information sources have an empirical basis, which is not the result of systematic and academic learning in the field of ICTs. This is a challenge for higher education institutions, academics and students, in the sense of including, on a mandatory basis, continuing education workshops, training and improvement in the use of the web, search engines, information search processes on the Internet, and the evaluation of information sources from which data are extracted from cyberspace.

Keywords: Searching for information on the Internet; Evaluation of sources; Andragogy; Information and communication technologies; Higher education; Virtual higher education; Distance higher education.

Use of Waldorf pedagogía as a post-covid learning método.

María Esther Quispe Mamani ¹, Daniel Bernal Torres¹

¹ Universidad Cesar Vallejo, Lima, Perú

mquispema78@ucvvirtual.edu.pe, dbernalt@ucvvirtual.edu.pe

ORCID ID: <https://orcid.org/0000-0003-0896-144X> <https://orcid.org/0000-0002-5432-8592>

During 2020, there was a significant increase in the SARS-CoV-2 virus that caused the COVID-19 disease.. This forced the education sector to adopt measures to prevent the spread of the virus through virtual classes, converting teaching into virtual classes. However, the closure of institutes, universities, and schools, coupled with the implementing of this teaching modality, led to delayed student learning. In this sense, the use of Waldorf pedagogy has served as a learning method upon returning to school; it has been adapted and adjusted to students' abilities, allowing them to relate their environment with what they have learned. This study aimed to determine the effect of using Waldorf pedagogy as a post-pandemic learning method at various levels of the education system on a global scale. Through the consultation of academic literature, it was concluded that Waldorf pedagogy is a creative educational method that benefits several disciplines and adapts to any generation. It requires trained and updated teachers and promotes social justice. It has advantages and opportunities, but also challenges and contradictions with technology and the post-pandemic educational transformation.

Keywords: Waldorf pedagogy; Learning; Method; COVID.

Virtual Teaching-Learning Environment for the Caribbean Biological Corridor.

Yarinet Tomacen Mustelier¹, Soe del Carmen Márquez Montoya¹, Reinier Fidel Correoso Calzado¹, Blanca Laura Uranga Pozo¹

¹ Centro de Información y Gestión Tecnológica de Santiago de Cuba, Santiago de Cuba, Cuba

yarinet9107@gmail.com, soemarquez@gmail.com, reinierfidel@gmail.com, blancalaura.uranga@gmail.com

ORCID ID: <https://orcid.org/0000-0003-2745-5235> <https://orcid.org/0000-0002-8325-0878>
<https://orcid.org/0000-0002-4056-7074> <https://orcid.org/0000-0001-8704-7650>

The Biological Corridor initiative in the Caribbean is developing tools and services for knowledge management that respond to cooperation indicators on a trinational platform to extend the impact of biodiversity conservation. This has led to the need to train participants and create a space for exchanging their experiences. The objective of the research was to develop a virtual teaching-learning environment for the Biological Corridor in the Caribbean, with a constructivist learning model and a linear classroom visual scheme, to contribute to distance professional training using new technologies in the institutional and social community of interest to the initiative, adapted to current times. The authors conducted a descriptive research with a quantitative-qualitative approach in 2021. As a result, a virtual environment was implemented using the Moodle platform version 3.11.5 to facilitate knowledge management and comprehensive training processes through the use of information and communication technologies. This study will also help reduce cognitive gaps in scientific research for future actions of the Biological Corridor in the Caribbean.

Keywords: Virtual teaching-learning environment; Biological corridor in the Caribbean; Virtual classroom; ICTs

Computer technologies applied to the study of the visiting public at the Interactive Science and Technology Center abremate (National University of Lanús, Argentina).

Fabián Bognanni¹, Analía Dávila¹, Ezequiel Scordamaglia², Germán Infiesta³

¹ Universidad Nacional de Lanús, Centro Interactivo de Ciencia y Tecnología abremate, Lanús, Argentina

² Universidad Nacional de Lanús, Departamento de Desarrollo Productivo y Tecnológico, Lanús, Argentina

³ Universidad Nacional de Lanús, Departamento en Humanidades y Arte, Licenciatura en Audiovisión, Lanús, Argentina.

fabianbogn@hotmail.com; davilanalina@yahoo.com.ar; scordamagliaezequiel@gmail.com; germaninfiesta@gmail.com

ORCID ID: <https://orcid.org/0000-0002-8455-4195> <https://orcid.org/0000-0002-7514-9972>
<https://orcid.org/0009-0004-5494-2068> <https://orcid.org/0009-0002-2668-7173>

The Interactive Science and Technology Center (CICyT) abremate, dependent on the National University of Lanús (UNLa), is a non-formal education space that aims at scientific-technological literacy. Like other centers and museums, abremate carries out studies on the experiences and characteristics of its audiences. The analysis of the use of space by visitors is a novelty in the institution and makes it possible to reformulate aspects of the museum proposal. The first expeditious methodological attempts are presented and the subsequent inclusion of audiovisual analysis technologies and the AI MapaGen software, based on artificial intelligence, which was developed specifically between the CICyT and teachers and students of the Bachelor's Degree in Systems at UNLa. The first results allowed the construction of heat maps with the areas of greatest concentration of the public in the room.

Keywords: Interactive Science and Technology Center (CICyT) abremate; Visiting public; Information and communication technology; Artificial intelligence; Heat map

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 41.

doi: <http://doi.org/10.24215/18509959.41e14>

Usability test of a technological resource focused on oral language.

Thiago Mathias de Oliveira¹, Amauri Amorin Assef¹,
Joaquim Miguel Maia¹, Juliana De Conto², Daniele Santana
Carmo Cardoso da Silva Serra³, Ana Cristina Guarinello⁴,
Adriana Bender Moreira de Lacerda³

¹ Universidade Tecnológica Federal do Paraná, Curitiba, Paraná, Brasil

² Universidade Estadual do Centro-Oeste, Irati, Paraná, Brasil

³ Universidade Tuiuti do Paraná, Curitiba, Paraná, Brasil

⁴ Espaço Linguagem em Ação, Curitiba, Paraná, Brasil

thiagomathias@alunos.utfpr.edu.br, amauriassef@utfpr.edu.br, joaquim@utfpr.edu.br, jconto@unicentro.br,
serradaniele912@gmail.com, acguarinello@gmail.com, adriana.lacerda@utp.br

ORCID ID: <https://orcid.org/0000-0003-4297-0382> <https://orcid.org/0000-0002-2001-5387>
<https://orcid.org/0000-0001-6309-8664> <https://orcid.org/0000-0002-3190-6003>
<https://orcid.org/0009-0008-6831-9276> <https://orcid.org/0000-0002-6954-8811>
<https://orcid.org/0000-0002-6660-4902>

The use of technologies in educational and health sciences is an essential element to propose new ways of thinking about language acquisition and treatment processes. It is understood that the need for such tools comes from the modernization of social systems, and this process is encouraged by global organizations, public education and health policies. It is indicated in the literature that there are challenges in relation to the development of technologies in health sciences, and the greatest of them is the satisfactory guarantee of such resources in relation to the subjectivity of oral language. Based on this, the objective of this study was to perform usability tests of an application focused on oral language alterations, using a Likert scale based on the statistical technique of agreement (Delphi) and exposure time. The study included 64 professionals working around oral language. The results indicate a satisfaction score of 85.33% in favour of using the application. Additionally, 75% of the professionals consider the resource an innovative, accessible and motivating ally for the speech therapy clinic. It is concluded from the study that urgent and emerging advances in breaking challenges to produce technologies for speech-language pathology and audiology are needed to train professionals to integrate new technological tools into their actions effectively.

Keywords: Usability; Health Technologies; Oral Language; Inclusion; Apraxia; Assistive Technologies.

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 41.

doi: <http://doi.org/10.24215/18509959.41.e15>

Artificial intelligence in science learning.

Ema E. Aveleyra¹, Diego Racero¹, Laura Chiabrando¹

¹ Universidad de Buenos Aires, Facultad de Ingeniería, Ciudad Autónoma Buenos Aires, Argentina.

eaveley@fi.uba.ar, dracero@fi.uba.ar, lchiabra@fi.uba.ar

ORCID ID: <https://orcid.org/0000-0002-0322-8778> <https://orcid.org/0009-0003-8129-7837>
<https://orcid.org/0009-0001-7457-1645>

Research and development on generative artificial intelligence, applied in academia, show that chatbots can be valuable aid in promoting personalized learning. In this case, the evolution of a bot's design and application is presented, built in the context of a physics course at the Faculty of Engineering at the University of Buenos Aires. Within a methodological framework of design-based research and action research, it is analyzed the implementation of artificial intelligence in a student's activity to solve a mechanics problem. The impact of technological advancement on the use of artificial intelligence tools is shown. It is emphasized that the development of "Física.bot" with Agentic-RAG bot provides students and teachers with a reliable tool built with their own sources. The results of its implementation also indicate that students positively value the inclusion of this technology in classes as a learning supplement. Finally, future lines of action are proposed for its use in the Faculty and its relationship with the environment.

Keywords: Artificial intelligence; Academic chatbot; Retrieval augmented generation; Agents; University physics.

Content validity of CHAEA through expert judgment supported by Generative Artificial Intelligence.

Gustavo Javier Astudillo¹, Paula Dieser¹, Silvia Bast¹

¹ Universidad Nacional de La Pampa, Facultad de Ciencias Exactas y Naturales, Santa Rosa, La Pampa, Argentina
astudillo@exactas.unlpam.edu.ar, pauladieser@exactas.unlpam.edu.ar, silviabast@exactas.unlpam.edu.ar

ORCID ID: <https://orcid.org/0000-0003-0645-6335> <https://orcid.org/0000-0002-2066-0183>
<https://orcid.org/0009-0007-2535-1017>

Learning styles describe how individuals process and assimilate information, influencing teaching strategies and methodologies. The Honey-Alonso Learning Styles Questionnaire (CHAEA) is a widely used tool at the university level in Spanish-speaking contexts to assess these styles. However, its validity has been questioned when applied across different cultural contexts. This research explores the use of Generative Artificial Intelligences (GenAI) as expert judges in the content validation of CHAEA. The article synthesizes previous findings as well as the expert judgment conducted. The results show an excellent level of agreement between judges and with the original CHAEA structure. In addition, they demonstrate the feasibility of using GenAI as expert judges, highlighting their potential to complement human judgment. This work contributes to the analysis of learning styles and proposes new perspectives for the validation of educational measurement instruments.

Keywords: Learning styles; CHAEA; Content validity; Expert judgment; Generative artificial intelligence.

Assessment of the responsibility trait through a serious game on chemistry and mathematics.

Paula A. Ferreyra^{1,2,3}, Paula Dieser², Cecilia V. Sanz⁴,
Teresa Coma-Roselló⁵

¹ Universidad Nacional de La Pampa, Facultad de Agronomía, Santa Rosa, Argentina

² Universidad Nacional de La Pampa, Facultad de Ciencias Exactas y Naturales, Santa Rosa, Argentina

³ Universidad Nacional de La Plata, Facultad de Informática, Maestría en Tecnología Informática Aplicada en Educación, La Plata, Argentina

⁴ Universidad Nacional de La Plata, Facultad de Informática, III LIDI – CIC, La Plata, Argentina

⁵ Universidad de Zaragoza, Facultad de Educación, Zaragoza, España

paulaferreyra@agro.unlpam.edu.ar, pauladieser@gmail.com, csanz@lidi.info.unlp.edu.ar, tcoma@unizar.es

ORCID ID: <https://orcid.org/0000-0002-2066-0183> <https://orcid.org/0000-0002-9471-0008>
<https://orcid.org/0000-0002-7439-8459>

This paper presents an exploratory study on the use of the serious video game, Escapados, as a stealth assessment of the responsibility trait, associated with academic performance. A case study involving 36 students from the Agricultural Engineering course of studies at the School of Agriculture, UNLPam, was carried out. The game involves chemistry and mathematics content, and allows recording several performance indicators, such as score, number of errors, time, and use of aids. For the analysis of results, a Principal Components Analysis (PCA) was applied. It showed a correlation among one of the components found, which reflects the performance in the game and the score obtained for the responsibility trait calculated with the Big Five personality questionnaire (BFI). The PCA also allowed establishing four profiles of performance and autonomy in the game. The “efficient and autonomous” student profile represents the highest number with high responsibility, which coincides with what is theoretically expected. The results suggest that the video game Escapados has the potential to be used as a stealth assessment of the responsibility trait.

Keywords: Serious video game; Stealth assessment; Trait Responsibility; Academic performance; University students.

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 42.

doi: <http://doi.org/10.24215/18509959.42.e3>

Design and Psychometric Validation of the Teachers' Perception of the Use of AI in Education Questionnaire (TPU-AIED-Q).

Thomaz Edson Veloso da Silva^{1,2}

¹ Educometrika LTDA, Ceará, Brasil

² Universidade Federal de Alagoas, Núcleo de Excelência em Tecnologias Sociais, Alagoas, Brasil

thomaz@educometrika.com.br, thomaz.veloso@nees.ufal.br

ORCID ID: <https://orcid.org/0000-0003-0889-7564>

The study aimed to psychometrically validate the Teachers' Perception of the Use of AI in Education Questionnaire (TPU-AIED-Q), an instrument designed to assess teachers' perceptions of AI application in the educational context. The research involved 143 teachers who responded to an electronic form. The KMO and Bartlett's Sphericity tests were applied to verify sample adequacy, and confirmatory factor analysis (CFA) was used to validate the questionnaire's structure. The results indicated four main components with high Cronbach's Alpha values, ensuring the internal consistency of the measures. The study concludes that the TPU-AIED-Q is a valid and reliable instrument for assessing teachers' perceptions of AI use in education.

Keywords: AI in education; Psychometric validation; Teacher perception; Factor analysis; Cronbach's Alpha.

Teaching strategies for concurrent programming: a case study on the use of semaphores in an operating systems course.

Alejandro Miños¹

¹ Instituto Normal de Enseñanza Técnica, Montevideo, Uruguay

alejandromifa@gmail.com

ORCID ID: <https://orcid.org/0000-0002-9988-1682>

Learning the concurrent paradigm is complex, and several factors influence it: programming language, prior knowledge, teaching sequence, and strategies. To achieve learning, it is necessary to identify appropriate teaching sequences for learning the paradigm, as well as common errors in building concurrent programs. A teaching sequence focused on working with binary semaphores was used, emphasizing inductive strategies and demonstrations, with special attention paid to the progression of content and practical activities. Based on the assumption that building a concurrent program demonstrates an understanding of the paradigm, the construction of 21 programs that worked with binary semaphores was evaluated. Among those not familiar with the paradigm, poor identification of critical sections was identified as a common error, particularly the inclusion of statements that should not be included. Most students demonstrated mastery of the concurrent paradigm, leading to the conclusion that the applied sequence was adequate.

Keywords: Computer science teaching; Concurrency; Teaching sequence; Programming; Binary semaphores.

Impact of Teaching about Artificial Intelligence and Computational Thinking in Basic Education – Literature Review

Douglas Martins Erdmann¹, Gustavo Gehrke Graffunder¹,
Christian Brackmann¹

¹ Instituto Federal Farroupilha Campus Panambi, Rio Grande do Sul, Brasil

hmora.ndouglas.2023015760@aluno.iffar.edu.br, gustavo.2023009557@aluno.iffar.edu.br,
brackmann@iffar.edu.br

ORCID ID: <https://orcid.org/0009-0001-7990-3119> <https://orcid.org/0009-0007-3860-5071>
<https://orcid.org/0000-0002-3761-2268>

In recent years, Artificial Intelligence (AI) has made significant advancements, creating an interest in the application of AI in basic education, particularly in the development of Computational Thinking, which includes skills such as critical thinking, analysis, problem decomposition, and abstraction. The presented research explores the bibliography related to this impact, especially following the inclusion of the Brazilian Computing standard in the National Common Curricula. In spite of this interest, there is a need for more quantitative and qualitative research in the area, and further research is proposed, based on a specific didactic sequence to be applied in two classes in the first year of high school. It is expected that the methodology detailed may contribute to ways through which AI can be integrated into the school curriculum to develop Computational Thinking.

Keywords: Artificial intelligence; Computational thinking; Basic education.

What integrates the Integrating Project? Analysis of difficulties with the module within the Virtual University of State of São Paulo.

Jéssica dos Anjos Januário¹, Romário Melquíades Resende²,
Bruno Boroto Neves³, Thomaz Carvalho Lima⁴

¹ Universidade Estadual de Campinas (UNICAMP), Campinas, Brasil

² Universidade Federal de Ouro Preto (UFOP), Ouro Preto, Brasil

³ Pontifícia Universidade Católica de Campinas (PUC), Campinas, Brasil

⁴ Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, Brasil

jessica.anjos.januario@gmail.com, romariome70@gmail.com, brunoboroto@gmail.com,
thomazcax@gmail.com

ORCID ID: <https://orcid.org/0000-0002-6789-2520> <https://orcid.org/0000-0002-6151-9928>
<https://orcid.org/0009-0000-7566-2963> <https://orcid.org/0009-0000-2989-0172>

The study aims to analyze how the practice experienced in the Integrative Projects affects the academic and professional development of students in the Engineering, Literature, Mathematics and Pedagogy courses in the context of Distance Education at the Virtual University of the State of São Paulo. The methodology consisted of: a) the application of online forms for the purpose of producing data; b) statistical, percentile and qualitative treatment in terms of this corpus; c) the use of Thematic Analysis as a contribution that allows the qualitative examination of the information. The analysis of the data generated five distinct axes, with Axis 4 – Possible difficulties in relation to the Integrative Project – being listed for this article. It is concluded that the Integrative Project module, under its interdisciplinary nuances and offering in the Distance Education format, impacts the construction of a university that seeks democratization processes by resolving cultural, economic and social difficulties of a student body composed of a plural, heterogeneous and diverse sociocultural universe. Furthermore, it brings academic training closer to practical reality, offering transversal means for a more conscious and transformative action in the context based on theory and practice that can be established, in everyday life, through praxis.

Keywords: Integrating project; Distance education; Virtual University of the State of São Paulo

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 42.

doi: <http://doi.org/10.24215/18509959.42.e7>

Embeddings of Tutoring Guides via Inference in E-Learning.

Aluisio José Pereira¹, Alex Sandro Gomes¹,
Tiago Thompsen Primo²

¹ Universidade Federal de Pernambuco, Recife - PE, Brasil

² Universidade Federal de Pelotas, Pelotas - RS, Brasil

ajp3@cin.ufpe.br, asg@cin.ufpe.br, tiago.primo@inf.ufpel.edu.br

ORCID ID: <http://orcid.org/0000-0003-2960-3481> <https://orcid.org/0000-0003-1499-8011>
<https://orcid.org/0000-0003-3870-097X>

In this article, we propose a strategy for incorporating help guides through inference to tutor students in online learning. We developed an Intelligent Tutoring System (ITS) module that integrates the work of human tutors in creating these guides. Based on tutorials conducted on an Educational Social Network (ESN) platform, these guides were embedded using Natural Language Processing (NLP) models. We employed a hybrid model, feedback-driven by human tutors, combining human and artificial interventions. This model creates a hypothesis space to capture the semantic and contextual meaning of difficult questions, providing answers based on the prior knowledge shared by the tutors. Preliminary tests indicate that the help guides, developed by tutors during offline moments, guide the model during training, using knowledge distillation techniques for answers in online learning. The results showed that the proposed strategy provides effective tutoring, with a lower perception of complexity and high satisfaction, by personalizing the experience based on the identified tutoring needs.

Keywords: Embedding; Tutoring guide; Help requests; E-learning.

Virtual Simulators for Professional Practice in Psychological Interviews

Georgina Cárdenas-López¹, Raúl Durón-Figueroa¹,
Mario Derian Mandujano Torres¹

¹ Universidad Nacional Autónoma de México, Facultad de Psicología, Laboratorio de Enseñanza Virtual y Ciberpsicología, Ciudad de México, México

cardenas.georgina@gmail.com, raulduron7@gmail.com

ORCID ID: <https://orcid.org/0000-0003-4569-1944> <https://orcid.org/0000-0002-5520-6706>
<https://orcid.org/0000-0002-7197-5820>

Virtual simulation for training allows the recreation of real-life situations in a controlled environment, in which users can interact, acquire new skills, and receive real-time feedback for professional practice. In the field of healthcare education, these programs have enabled clinical training in a safe and controlled environment, providing the opportunity to practice as many times as needed, with the freedom to make mistakes, learn from them, and thus acquire the professional skills required to achieve mastery of the clinical competence demanded by their profession. This paper describes the preliminary results of a study aimed at evaluating the acquisition of professional competencies for clinical interviews in psychology students through the use of virtual simulators, as well as their usability. The results obtained showed positive outcomes in terms of theoretical knowledge acquisition and practical skills in psychological interviewing after completing the simulators. Additionally, they demonstrate a high level of functionality and acceptability among students, proving to be of great utility for competency acquisition and clinical skill practice. In conclusion, this work represents a significant advancement in the implementation of virtual simulation-based programs in clinical psychology education. However, some limitations are described that should be considered to optimize their evaluation in future studies.

Keywords: Simulation; Virtual teaching; Professional Competencies; Clinical Psychology.

Kano model of satisfaction with the educational process and the implementation of information and communication technologies (ICT) in Microbiology courses, 2018-2024

Alonso Zuñiga-Agüero¹, Jose Arturo Molina Mora¹

¹ Universidad de Costa Rica, Facultad de Microbiología, San José, Costa Rica

alonso.zunigaaguero@ucr.ac.cr, jose.molinamora@ucr.ac.cr

ORCID ID: <https://orcid.org/0000-0001-9764-4192>

High-quality teaching in higher education is a critical element in shaping future professionals in society. For this reason, optimizing teaching practices and achieving student satisfaction are essential. In the context of the COVID-19 pandemic, where Information and Communication Technologies (ICT) played a vital role, education experienced an abrupt change that prompted a re-evaluation of educational needs. Through the MicroTICs projects (2018-2024), the Faculty of Microbiology at the University of Costa Rica (Costa Rica) has seen an opportunity to enhance the educational experience with the use of ICT. In this context, this study aimed to evaluate satisfaction with the educational process according to the Kano model and the implementation of ICT in courses within this unit, comparing information pre- and post-pandemic. With regard to the Kano model, it was possible to identify basic, desired, and attractive characteristics influencing student satisfaction, highlighting the use of technology, experienced faculty, and stronger connections to future professions in the post-pandemic era. Regarding ICT, a wide variety of resources were successfully implemented across eight courses. High levels of student satisfaction were documented in methodological aspects, the tools themselves, and overall. Together, these results are not only vital for improving educational quality but also serve as a model that can be adopted in other contexts and fields of education.

Keywords: Kano Model; Information and Communication Technologies (ICT); Student satisfaction; COVID-19 Pandemic; University education.

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 42.

doi: <http://doi.org/10.24215/18509959.42.e10>

Analysis of the impact of emotional intelligence on academic performance in different educational areas in elementary school students. A case study.

Luis Arturo Espín Pazmiño^{1,2}, Armando De Giusti¹

¹ Universidad de La Plata, Facultad de Informática, III-LIDI, La Plata, Argentina

² Universidad de Guayaquil, Facultad de Ciencias Matemáticas y Físicas, Guayaquil, Ecuador

luis.espinp@ug.edu.ec, degiusti@lidi.info.unlp.edu.ar

ORCID ID: <https://orcid.org/0000-0002-1663-2489> <https://orcid.org/0000-0002-6459-3592>

This study used assessment techniques and methods to explore the impact of emotional intelligence on the academic performance of fourth-grade elementary school students at U.E. Ariel in the Durán canton of Ecuador, specifically in the educational areas of Physical Education and Mathematics. 28 students (13 boys and 15 girls) were included during an evaluation week. The students attended four tutoring sessions before their final assessment. In physical education, the topic was the correct starting technique for a race, while in mathematics, natural number operations were covered. Emotional intelligence was assessed using the MESQUITE Emotional Intelligence Test, which classifies students into four levels. Data collection was conducted daily during the experimentation phase, prior to classes and the final test, through questionnaires to ensure efficient and accurate data collection utilizing technological analysis tools. The results showed that students with higher levels of emotional intelligence tended to achieve better results in both subjects. The study concluded that emotional intelligence is a key component of academic performance, both positively and negatively, based on the analyzed data. Students with better emotional skills performed better in class. The Pearson correlation method revealed that higher emotional intelligence was associated with better exam grades. The technique known as ANOVA compared groups of subjects, identifying differences in their scores and revealing substantial discrepancies in effectiveness, emphasizing the relation between emotional intelligence and academic results. Future research line focuses on the importance of integrating Emotional Intelligence (EI) into the school curriculum.

Keywords: Emotional intelligence; Academic achievement; Physical education; Mathematics; Academic assessment; Elementary school students; Quantitative analysis.

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 42.

doi: <http://doi.org/10.24215/18509959.42.e11>

Evaluation of VARK Learning Styles in the Context of a MOOC Applied in a Hybrid Way in Technical Education.

Thainara Marques da Costa¹, Cynthia Pinheiro Santiago¹

¹ Instituto Federal de Educação, Ciência e Tecnologia do Ceará (IFCE), Ceará , Brasil

thainara.marques.profissional@gmail.com , cynthia.pinheiro@ifce.edu.br

ORCID ID: <https://orcid.org/0009-0007-6468-2679> <https://orcid.org/0000-0003-4013-4751>

Learning styles represent individuals' preferences in assimilating knowledge, encompassing sensory modalities and cognitive strategies. A widely used model is VARK, which classifies styles into Visual, Auditory, Reading/Writing, and Kinesthetic. Therefore, this study aimed to evaluate the association between VARK styles and students' academic performance, gender and age, in the context of a MOOC course applied in a hybrid format in a technical course in Informatics. This applied, exploratory and quantitative research had the participation of 59 students over three different periods, whose data were collected through an electronic form with the VARK questionnaire and from the academic records of the MOOC virtual learning environment. For the statistical analysis of the data, the Kruskal-Wallis test and Fisher's exact test were used. As a result, the Kinesthetic style was observed to be predominant among the students. However, no statistically significant associations were identified between the VARK styles and the variables of interest previously mentioned.

Keywords: Learning styles; VARK; Hybrid MOOC; Technical education.

The inclusion of the NAP of Digital Education, Programming and Robotics in the curriculum designs of the primary level in Argentina

Nerina Menchón¹, María Carmen Leonardi²,
María Virginia Mauco²

¹ Universidad Nacional del Centro de la Provincia de Buenos Aires, Facultad de Cs. Humanas, Tandil, Argentina

² Universidad Nacional del Centro de la Provincia de Buenos Aires, Facultad de Cs. Exactas, Tandil, Argentina

nmenchon@fch.unicen.edu.ar, cleonard@exa.unicen.edu.ar, vmauco@exa.unicen.edu.ar

ORCID ID: <https://orcid.org/0000-0001-6787-4050> <https://orcid.org/0009-0008-9970-5268>
<https://orcid.org/0009-0004-6428-7511>

This article is the result of a survey and analysis of the curriculum designs of the primary level of Argentina's jurisdictions. It presents a research about what kind of presence, selection, organization and sequencing was given to the contents of Digital Education, Programming and Robotics as from the approval of the Priority Learning Cores -NAP EDPR-. An attempt will be made to recognize the relevance of the advance of this federally agreed political-educational definition that proposes a set of knowledge considered unavoidable, while recognizing the diversity of socio-educational realities in each jurisdiction. The purpose of this article arises from the guidelines of this regulation where it is established that the curricular designs must be adapted based on it.

Keywords: Curricular design; Primary education; Digital education; Programming; Educational robotics.

Gamification for the Strengthening of Basic Competencies in Health Students

Alejandra Muñoz-Moya¹, Cristian Carreño-León¹

¹ Universidad de Valparaíso, Escuela de Obstetricia y Puericultura, Valparaíso, Chile

alejandra.munoz@uv.cl, cristian.carreno@uv.cl

ORCID ID: <https://orcid.org/0009-0006-5548-602X> <https://orcid.org/0000-0003-2144-7146>

This study examines the effectiveness of gamification using Virtual Learning Objects (VLO) to strengthen basic competencies in Obstetrics and Gynecology students, given the reduction in clinical practice hours caused by the COVID-19 pandemic. Three VLOs with varying complexity levels were designed using the ADDIE method and validated by experts. 69 students participated, divided into control and experimental groups. Competency development was assessed with a standardized test, and student perception was evaluated using the LORI instrument and qualitative feedback. The results showed no statistically significant differences in the development of basic low-complexity competencies between the groups. However, the VLO addressing higher-complexity competencies (vital sign interpretation) showed a statistically significant difference, albeit with a small to moderate effect size, in favor of the experimental group that used the VLO before the face-to-face workshop. Student perception was largely positive, highlighting motivation and usefulness for learning, although areas for improvement in usability and feedback were identified. It is concluded that gamified VLO are a promising pedagogical tool to complement training, especially for complex competencies, but improving their interactive design and feedback mechanisms is crucial.

Keywords: Basic health competencies; Gamification; Virtual Learning Objects; Health students; Virtual education.

Project based learning integrating data science into programming education in higher education.

César Manuel Hernández Mendoza¹,
Juan Pablo Serrano Rubio¹, Luz María Rodríguez Vidal¹

¹ Tecnológico Nacional de México / Instituto Tecnológico Superior de Irapuato, Irapuato, México

cesar.hm@irapuato.tecnm.mx, juan.sr@irapuato.tecnm.mx, luz.rv@irapuato.tecnm.mx

ORCID ID: <https://orcid.org/0000-0003-4667-9816> <https://orcid.org/0000-0003-3705-5112>
<https://orcid.org/0000-0002-6287-8906>

This study analyzes the application of Project-Based Learning (PBL) in programming education. The fundamentals and principles of data science were implemented with engineering students. A methodological strategy was applied that enabled students to acquire knowledge contributing to the development of analytical skills and competencies useful for informed decision-making in their professional and industrial fields.

The study considered identifying the main deficiencies of the study group at the beginning of the semester and introduced related topics that allowed them to work with real data from the automotive industry. Specialized software for programming with descriptive statistics was used, which is accessible to any student.

The results show a significant improvement in the way students acquire and understand knowledge of descriptive statistics and data analysis, an increase in motivation to carry out activities, and improved academic performance. On the qualitative side, students recognized the importance of this knowledge as added value to their professional training. The study successfully promoted an effective connection between theory and practice.

Keywords: Data science; Project-based learning; Educational technology; Engineering education; Applied statistics.

Proposal for a didactic sequence for teaching Temperature and Heat with Python

Jonas Guimarães Paul Neto¹, Jonathan Ferreira Gomes²,
João Cláudio Nunes Carvalho³

¹ Instituto Federal do Ceará, Crateús, Brasil

² Instituto Federal do Ceará, Sobral, Brasil

³ Instituto Federal do Ceará, Maracanaú, Brasil

jonas.guimaraes@ifce.edu.br, jonathan_gomes06@hotmail.com, joao.carvalho@ifce.edu.br

ORCID ID: <https://orcid.org/0000-0002-4589-5413> <https://orcid.org/0000-0003-2544-1358>
<https://orcid.org/0000-0001-8619-0869>

Several researches seek to promote improvements in Physics teaching through the insertion of new methodologies, mainly those linked to Digital Information and Communication Technologies. In this work, based on Ausubel's theory of Meaningful Learning, a proposal for two classes on thermometric scales and sensible heat is presented using the Python programming language, which can be applied even if the teacher does not know it. It is proposed that classes take place in a laboratory with computers and a whiteboard and that the teacher addresses the conceptual content in his/her own way, although approaches and strategies for socialization, discussion and feedback are suggested, and that, when solving exercises, students use Python as a tool to check their answers. In this way, it is understood, based on related research, that difficulties regarding the use of the computer and a computational language are mitigated and that the use of Python collaborates with the learning of Physics, also contributing to the scientific and technological literacy of students.

Keywords: Programming in Physics Teaching; Python; Active learning; Thermometric scales; Calorimetry.

The integration of ICT in the improvement processes with new teachers for engineering careers in the area of agricultural sciences.

Misleidy Arzuaga Ramírez¹, Carlos Rafael Fernández Medina¹

¹ Universidad Agraria de la Habana "Fructuoso Rodríguez Pérez", Centro de estudios de la Educación Agropecuaria (CEESA), Mayabaeque, Cuba

misleidysa@unah.edu.cu, cmolina@unah.edu.cu

ORCID ID: <https://orcid.org/0000-0003-1115-1261> <https://orcid.org/0000-0002-9599-2625>

The novice professors at the Agrarian University of Havana play an important role in ensuring the continuity of university students' education. However, several challenges arise, including issues related to pedagogy and didactics, technology, demographics, population aging, migration, and socioeconomic factors. These obstacles hinder the integration of new technologies into the teaching-learning process, causing traditional teaching methods to persist. The article proposes a postgraduate approach to contributing to the integration of Information and Communication Technologies (ICT) for novice professors entering university teaching. Methods such as modeling, document review, activity analysis, and observation were employed to achieve the proposed objective: integrating ICT into the teaching-learning process for novice professors at the Agrarian University of Havana. The primary achievement was the integration of ICT into the specific didactics of each subject taught by professors in their respective fields. The diploma course "Basic Training for University Professors" was used as the essential pathway for professional development.

Keywords: Integration; overcoming; novel teacher

Personalized language learning with gamified microinteractions and location sensitivity.

Ana Carolina de Sousa Ferreira¹, Bruno de Sousa Monteiro¹,
Vitor Duarte Bezerra de Oliveira¹

¹Universidade Federal Rural do Semi Árido, Mossoró, Brasil

ana.ferreira23402@alunos.ufersa.edu.br, brunomonteiro@ufersa.edu.br, vitor.oliveira@alunos.ufersa.edu.br

ORCID ID: <https://orcid.org/0009-0001-1858-8506> <https://orcid.org/0000-0001-9073-2042>
<https://orcid.org/0009-0009-0732-4300>

The popularization of mobile devices encouraged the development of various applications to help language learning. Although these apps employ different techniques to support autonomous learning, many still do not incorporate context sensitivity as a pedagogical differentiator. This resource is fundamental, because it encourages learner autonomy and promotes a more meaningful learning experience. In this scenario, the present paper aims to explore this approach and propose an application for Android and iOS that integrates user's location context with gamification strategies and microinteractions, seeking to enrich the language learning process. To achieve this goal, a literature review and an analysis of existing market products and relevant academic work were conducted. As a result, it was possible to develop the conceptual model, software artifacts, and the database structure. Finally, the solution was validated through the Think Aloud technique. The results indicate that the product received positive feedback from participants, highlighting the importance of using location context for better content assimilation and the ease of use of the application.

Keywords: Language; Game; Context; English. Teacher training courses.

Development of an augmented reality application that integrates voice and sound in learning and training colors in the English language.

Edgar Serrano-Pérez¹

¹ Universidad Autónoma del Estado de México, Centro Universitario Valle de Chalco, Valle de Chalco Solidaridad, México

eserranop_s@uaemex.mx

ORCID ID: <https://orcid.org/0000-0003-4012-9709>

The development of an augmented reality application that integrates the main sound components in a web portal is presented. On one side, voice recognition uses the microphone integrated into a smartphone, and on the other side the component that allows robotic voice interpretation, taking a text entry as a reference; both functionalities were implemented focusing on the English language with an American accent. Using primitive shapes, a three-dimensional ice cream cone-shaped object was generated, which can change the color of its surface dynamically and interactively with the user. In the event that the user needs to consult the correct pronunciation of a color, the text-to-speech functionality can be used at any time. During the development of the application, a generative artificial intelligence tool was used to develop the programming code in the A-frame language, so relevant aspects found during the interaction in the Chatbot are discussed. The final application promotes the learning of ice-cream flavors in the English language through mobile devices, using a multimodal learning approach that combines sight, voice and speech.

Keywords: Augmented Reality, Learning, English language, Multimodal, Interactivity, Mobile device.

Acceptance and Integration of ChatGPT in Higher Education: Analysis of Faculty Perceptions in the Agronomic Engineering Program and Student Perceptions in the Agricultural Microbiology and Bioinputs Course at UNNOBA

Juan Pablo de Benedetto^{1,2}, Claudia Fabiana Pons^{2,3,4}

¹ Universidad Nacional del Noroeste de la Provincia de Buenos Aires, Escuela de Ciencias Agrarias y Naturales, Junín, Argentina

² Universidad Nacional de la Plata, Facultad de Informática, La Plata, Argentina

³ Comisión de Investigaciones Científicas (CIC), Buenos Aires, Argentina

⁴ Universidad Abierta Interamericana

juanpy_junin@hotmail.com, claudia.pons.33@gmail.com

ORCID ID: <https://orcid.org/0000-0003-1149-0976>

This study explores the acceptance and integration of ChatGPT as an educational tool in higher education, based on a case study conducted at the National University of Northwestern Buenos Aires (UNNOBA). A practical activity was implemented with students in the Agricultural Microbiology and Bioinputs course, along with a survey for faculty in the Agronomic Engineering program. Results show that students had a positive perception of ChatGPT in terms of usefulness, accuracy, and ease of use, emphasizing its role in concept comprehension, critical thinking, and teamwork. Faculty members, however, were more cautious, with lower usage frequency and concerns related to plagiarism and technological dependence. Despite this, they acknowledged the tool's potential and expressed interest in training. The study reveals a gap between students' enthusiasm and faculty's limited adoption, highlighting the need for institutional support and critical training to promote the effective integration of artificial intelligence in academic settings.

Keywords: Artificial intelligence in education; ChatGPT; Higher education; Perception; Digital tools in the classroom.

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 42.

doi: <http://doi.org/10.24215/18509959.42.e20>

Fractal antenna: a case study on the full course of mathematical modeling cycle in linear algebra.

Victoria Artigue¹, María de los Ángeles Fanaro², Joel Gak¹

¹Universidad Católica del Uruguay, Montevideo, Uruguay

² Universidad Nacional del Centro de la Provincia de Buenos Aires, Tandil, Argentina

maria.artigue@ucu.edu.uy, mfanaro@fch.unicen.edu.ar, jgak@ucu.edu.uy

ORCID ID: <https://orcid.org/0000-0001-6753-0952> <https://orcid.org/0000-0002-9290-5450>
<https://orcid.org/0000-0001-6440-6630>

This paper presents a case study conducted at a university in Uruguay, where a Computer Engineering student explored Fractal Geometry through the design and performance analysis of fractal antennas based on the Sierpinski triangle iterations 2 and 3. The research began in a linear algebra course that is part of the curriculum for several Engineering programs (Agronomy, Food Engineering, Electronics, Computer Science, Artificial Intelligence, Telecommunications) and extended into an introductory research project. The study focused on characteristic properties of fractals, such as self-similarity, non-integer fractal dimension, and having an infinite perimeter within a finite area, which facilitated the design of small multiband antennas.

From the student's work, it was observed that interpreting and validating the studied concepts through the analysis of fractal antenna performance completed a modeling cycle, as the findings demonstrated advantages of these antennas over traditional ones. This allowed for the experimental validation of theoretical models, strengthening the connection between Mathematics and its applications, and highlighting the educational value of integrating theory and experimentation in the learning of Fractal Geometry.

Keywords: Modeling cycle; Linear algebra; Fractal antennas; Initiation research activities; Engineering students.

Artículo completo en idioma español disponible en: Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología, no. 42.

doi: <http://doi.org/10.24215/18509959.42.e21>

Methods for Estimating Academic Workload in Virtual Environments: A Systematic Comparative Review Across Online, Blended, and Hyflex Modalities.

Francisco Sereño¹

¹ Universidad de Chile, Vicerrectoría de Tecnologías de la Información – Oficina de Educación Online, Santiago, Chile.

francisco.sereno@uchile.cl

ORCID ID: <https://orcid.org/0000-0002-0269-4910>

This systematic review analyzes the methods and criteria used to calculate student academic workload across various educational modalities: online, blended learning, and hyflex. Following the PRISMA methodology, 2,179 initial references were evaluated, of which 28 were analyzed in depth. The results identify three main approaches for calculating academic workload: (1) computational models and standardized calculators such as i-SLT, (2) analysis of interaction data on educational platforms, and (3) self-report surveys on time spent. The evidence demonstrates that the choice of method can explain up to 15% of the variance in results and that the estimated academic workload in blended environments was 62% lower than ECTS-based parameters. The findings reveal that the most effective methods for quantifying academic workload specifically depend on the educational context, requiring a differentiated approach according to the modality. The review also identifies significant research gaps, particularly in emerging modalities such as hyflex and in the application of advanced technologies for personalizing academic workload estimation.

Keywords: Academic workload; virtual education; blended learning; hyflex; systematic review.

ISBN 978-950-34-2767-5

