

UNIVERSIDAD  
POLITÉCNICA  
SALESIANA  
ECUADOR



# ALTERIDAD

REVISTA DE EDUCACIÓN

ISSN print 1390-325x  
ISSN electronic 1390-8642

July-December 2025  
Vol. 20, No. II



## Artificial intelligence as a form of social expression in education

Inteligencia artificial como forma  
de expresión social en la educación

### Editors Board (Consejo de Editores)

#### Editors-in-Chief (Editores Jefe)

- Dr. Jaime Padilla-Verdugo, Universidad Politécnica Salesiana, Ecuador
- Dra. Verónica Marín Díaz, Universidad de Córdoba, España

#### Associate Editors (Editores Asociados)

- Dr. Peter McLaren, Chapman University, Estados Unidos
- Dr. Julio Cabero-Almenara, Universidad de Sevilla, España
- Dr. José Joaquín Brunner, Universidad Diego Portales, Chile
- Dr. Jorge Maldonado-Mahauad, Universidad de Cuenca, Ecuador

#### International Coeditors (Co-Editores internacionales)

- Dr. Geraldo Caliman, Universidade Católica de Brasília, Brasil
- Dra. Victoria Jara Cobos, Universidad Politécnica Salesiana, Ecuador
- Dr. Gunther Dietz, Universidad Veracruzana, México
- Dr. Miguel Ángel Zabalza, Universidad de Santiago de Compostela, España
- Dra. Armanda Matos, Universidad de Coímbra, Portugal
- Dr. Javier Suárez-Álvarez, University of Massachusetts Amherst, USA
- Dr. Jozef Hvorecký, University of Ostrava, República Checa
- Dr. Daniel Mato, Universidad Nacional Tres de Febrero, Argentina
- Dr. Rupert Wegerif, University of Cambridge, United Kingdom

#### Thematic Editors (Editores temáticos)

- Dra. Mari-Carmen Caldeiro-Pedreira, Universidad de Santiago de Compostela, España
- Dra. Paula Renés-Arellano, Universidad de Cantabria, España
- Dra. Lucie Rohlíková, University of West Bohemia, Pilsen, Czech Republic

### Advisory Board (Consejo Científico)

- Dr. Alejandro Rodríguez-Martín, Universidad de Oviedo, España
- Dr. Alfonso Torres Carrillo, Universidad Pedagógica Nacional, Colombia
- Dr. Alfredo Veiga-Neto, Universidad Federal do Rio Grande do Sul, Brasil
- Dra. Ana Castro Zubizarreta, Universidad de Cantabria, España
- Dra. Ana Rosa Arias Gago, Universidad de León, España
- Dr. Antonio Bautista García-Vera, Universidad Complutense de Madrid, España
- Dr. Carlos Paladines Escudero, Pontificia Universidad Católica del Ecuador, Ecuador
- Dra. Carmen Martínez Novo, Universidad de Kentucky, EEUU
- Dra. Cristina Allemann-Ghionda, Universidad de Colonia, Alemania
- Dra. Diana Rivera Rogel, Universidad Técnica Particular de Loja, Ecuador
- Dr. Emilio Álvarez-Arregui, Universidad de Oviedo, España
- Dr. Esteban Mauricio Inga Ortega, Universidad Politécnica Salesiana, Ecuador
- Dr. Felipe Trillo Alonso, Universidad de Santiago de Compostela, España
- Dra. Gabriela Borges, Universidade Federal de Juiz de Fora, Brasil
- Dr. Ignacio Aguaded, Universidad de Huelva, España
- Dr. Jairo Lugo-Ocando, University of Sharjah, Emiratos Árabes Unidos
- Dr. Jesus María Salinas Ibañez, Universitat Illes Balears, España
- Dr. José Antonio Caride Gomez, Universidad de Santiago de Compostela, España
- Dr. José Manuel Castellano, Universidad Nacional de Educación, Ecuador

- Dr. José Tejada Fernández, Universidad Autónoma de Barcelona, España
- Dr. Juan Silva Quiroz, Universidad de Chile, Chile
- Dra. Leonor Buendía Eisman, Universidad de Granada, España
- Dr. Lorenzo Cantoni, Università della Svizzera Italiana, Suiza
- Dr. Luis Miguel Pedrero Esteban, Universidad Pontificia de Salamanca, España
- Dr. Luis Miguel Romero Rodríguez, Universidad Rey Juan Carlos, España
- Dr. Manuel Area, Universidad de La Laguna, España
- Dra. María Caridad Valdés Rodríguez, Universidad de las Ciencias Informáticas, Cuba
- Dra. María Isabel Punín, Universidad Técnica Particular de Loja, Ecuador
- Dra. María Teresa Bejarano, Universidad de Castilla-La Mancha, España
- Dra. Maria-Soledad Ramírez-Montoya, Tecnológico de Monterrey, México
- Dr. Maurice Tardif, Université de Montréal, Canadá
- Dra. Mercedes González Sanmamed, Universidad de la Coruña, España
- Dra. Natalia González Fernández, Universidad de Cantabria, España
- Dra. Paloma Antón Ares, Universidad Complutense de Madrid, España
- Dra. Paula Renés Arellano, Universidad de Cantabria, España
- Dra. Pilar Arnáiz Sánchez, Universidad de Murcia, España
- Dr. Rafael Tejada Díaz, Universidad Técnica de Manabí, Ecuador
- Dr. Ronaldo Zacharias, Centro Universitario Salesiano de São Paulo, Brasil
- Dra. Rosa Bruno-Jofre, Queen's University, Canadá
- Dra. Rosa García-Ruiz, Universidad de Cantabria, España
- Dra. Soraya Ferreira Vieira, Universidade Federal de Juiz de Fora, Brasil
- Dra. Sylvia Irene Schmelkes del Valle, Universidad Iberoamericana, México
- Dr. Vicent Gozávez Pérez, Universidad de Valencia, España

### International Reviewers Board (Consejo Internacional de Revisores)

- Dra. Adelina de Oliveira Novaes, UNICID, Brasil
- Dra. Adir Casaro Nascimento, Universidade Católica Dom Bosco, Brasil
- Dr. Adrián Segura-Robles, Universidad de Granada, España
- Dra. Adriana Breda, Universitat de Barcelona, España
- Dra. Adriana Gewerc, Universidad de Santiago de Compostela, España
- Dra. Adriana Peña, Universidad de Guadalajara, México
- Dra. Águeda Delgado-Ponce, Universidad de Huelva, España
- Dra. Alba García Barrera, Universidad a Distancia de Madrid, España
- Dr. Alberto Ayaviri-Panozo, Universidad Mayor Real, Bolivia
- Dra. Alboni Marisa Dudeque Pianovski Vieira, PUC-PR, Brasil
- Dra. Alejandra Hurtado Mazeyra, UNSA, Perú
- Dra. Alejandra Rico Molano, Universidad de Cundinamarca, Colombia
- Dr. Alejandro Escudero-Santana, Universidad de Sevilla, España
- Dr. Alejandro Marquez Jiménez, IISUE, México
- Dra. Aleksandra Jablonska, Universidad Pedagógica Nacional, México
- Dra. Alessandra Diehl, Universidade de Ribeirão Preto, Brasil
- Dra. Alethia Fernández de la Reguera Ahedo, UNAM, México
- Dra. Alexandra Santamaría-Urbieta, UNIR, España
- Dr. Alexandre Godoy Dotta, UniBrasil, Brasil
- Dr. Alexandre Martins, Marquette University, USA
- Dra. Alicia Inés Villa, Universidad Nacional de La Plata, Argentina

- Dra. Alma Hernández, Universidad La Salle, México
- Álvaro Guaymás, Universidad Nacional de Salta (UNSa), Argentina
- Dr. Amauris Laurencio Leyva, Universidad de La Habana, Cuba
- Dra. Amelia Gort, UH, Cuba
- Dra. Amneris Chaparro Martínez, UDFJC, México
- Dra. Ana Atorresi, Universidad Nacional de Río Negro, Argentina
- Dra. Ana Barbancho, Universidad de Málaga, España
- Ana Canosa, UNISAL, Brasil
- Ana Castellanos, Universidad La Salle, México
- Dra. Ana Chaves, Universidad de Costa Rica, Costa Rica
- Dra. Ana González, UEx, España
- Dra. Ana León, Universidad de Salamanca, España
- Dra. Ana Lucía Braz, UNIABC, Brasil
- Dra. Ana Maldonado-Fuentes, Universidad del Bío-Bío, Chile
- Dra. Ana María Eyng, PUCPR, Brasil
- Dra. Ana Pérez-Escoda, UNIR, España
- Dra. Ana Santiago, ESEC, Portugal
- Dr. André Almeida, Pontificia Universidade Católica de São Paulo, Brasil
- Dra. Ángela Santamaría, Universidad del Rosario de Bogotá, Colombia
- Dra. Angélica Guzmán, UC, Chile
- Dra. Anita Gramigna, Università degli Studi di Ferrara, Italia
- Dra. Annachiara Del Prete, PUCV, Chile
- Dra. Anne Julia Klein, DIPF, Alemania
- Dra. Antonella Cagnolati, Università degli Studi di Foggia, Italia
- Dra. Antonia Ramírez García, Universidad de Córdoba, España
- Dr. Antonio Hilario Aguilera Urquiza, UFMS, Brasil
- Dr. Antônio Igo Barreto Pereira, Universidade Federal do Acre, Brasil
- Dr. Antonio Matas-Terrón, Universidad de Málaga, España
- Dr. Aristeo Santos, UAEM, México
- Dra. Azucena Ochoa, UAQ, México
- Dra. Beatriz Gualdieri, Universidad Nacional de Luján, Argentina
- Dra. Belén Giacomone, Universidad de San Marino, San Marino
- Dra. Bianca Thoilliez Ruano, Universidad Autónoma de Madrid, España
- Dr. Blas Garzón, UPS, Ecuador
- Dra. Brenda Boroel Cervantes, UABC, México
- Dr. Camilo Rodríguez-Nieto, UAGro, México
- Dra. Carina Fracchia, Universidad Nacional del Comahue, Argentina
- Dra. Carla Förster Marín, Pontificia Universidad Católica de Chile, Chile
- Dr. Carlos Crespo, Universidad Andina "Simón Bolívar", Ecuador
- Dr. Carlos Roberto Ruano, University of Toronto, Canadá
- Dra. Carmen Cantillo, UNED, España
- Dra. Carmen Llorente-Cejudo, Universidad de Sevilla, España
- Dra. Carmen Marta Lazo, Universidad de Zaragoza, España
- Dra. Carol Rivero Panaqué, PUCP, Perú
- Dra. Cecilia Correa de Molina, USB, Colombia
- Dra. Chantal-M Biencinto-López, UCM, España
- Dra. Claudia Araújo de Lima, UFMS, Brasil
- Dra. Claudia Moreno Standen, Universidad de Chile, Chile
- Dra. Claudia Vásquez, UC, Chile
- Dra. Claudia Vélez, USBCali, Colombia
- Dra. Constantina Xavier Filha, UFMS, Brasil
- Dr. Cristian Desbouts, Università Pontificia Salesiana, Italia
- Dra. Cristina Canabal García, UAH, España
- Dra. Damian Mendoza-Zambrano, ULEAM, Ecuador
- Dr. Daniel Leonidas Loncón, UNPSJB, Argentina
- Dr. Daniel Llanos Erazo, UPS, Ecuador
- Dra. Daniela Maturana, USACH, Chile
- Dr. Danilo Díaz-Levicoy, UCM, Chile
- Dr. David Ruiz Torres, Universidad de Granada, España
- Dra. Diana Ávila, UPS, Ecuador
- Dra. Donatila Ferrada, Universidad Católica del Maule, Chile
- Doris Macías Mendoza, Universitat Politècnica de València, España
- Dr. Édison Higuera Aguirre, PUCE, Ecuador
- Dr. Eduardo Amadeu Dutra Moresi, Universidade de Brasília, Brasil
- Dr. Eduardo Fabara, UASB, Ecuador
- Dr. Eduardo Mercado Cruz, ISCEEM, México
- Dr. Edwin Bersosa, UPS, Ecuador
- Elena Guadalupe Rodríguez-Roa, Universidad La Salle, México
- Dra. Elisabete Oliveira, ECOS - Comunicação em Sexualidade, Brasil
- Dra. Elsa Celina Gatti García, Universidad de la República, Uruguay
- Dra. Emiko Saldivar, University of California, Santa Barbara, USA
- Dra. Emília Carvalho Coutinho Referral, ESSV, Portugal
- Dr. Emiliano Gil Blanco, Universidad San Francisco de Quito, Ecuador
- Enrique Carmona, Universidad de Cádiz, España
- Dr. Enrique Sánchez Rivas, Universidad de Málaga, España
- Dr. Eric Passone, Universidade Cidade de São Paulo, Brasil
- Dr. Ernesto Colomo-Magaña, Universidad de Málaga, España
- Dr. Ernesto Guerra, UAIM, México
- Dra. Eska Elena Solano Meneses, UAEM, México
- Dr. Felipe de Jesús Perales, UPN-Unidad Torreón, México
- Dr. Fernando Lara, Pontificia Universidad Católica del Ecuador, Ecuador
- Dr. Fernando Lourenço Martins, ESEC, Portugal
- Fernando Paladines, UPS, Ecuador
- Dra. Flor Bermúdez-Urbina, UNICACH, México
- Dr. Floriano Viseu, Universidade do Minho, Portugal
- Dr. Francisco Fernández-Cruz, UCM, España
- Dr. Francisco Jiménez, ULL, España
- Dr. Francisco Merchán Iglesias, US, España
- Dr. Francisco Enrique Rodríguez-Alveal, UBB, Chile
- Dra. Gabriela de la Cruz Flores, IISUE-UNAM, México
- Galo Gonzalez, UPS, Ecuador
- Dra. Gema Sáez Rodríguez, Universidad Francisco de Vitoria, España
- Dr. Gersem dos Santos Luciano, UFAM, Brasil
- Gianella Carrión-Salinas, UTPL, Ecuador
- Dra. Gina Benavides, UASB, Ecuador
- Giovanna Barroca de Moura, UEPB, Brasil
- Dra. Gloria Gasca-Hurtado, Universidad de Medellín, Colombia
- Dr. Greby Rioja Montaña, Universidad Mayor de San Simón, Bolivia
- Guillermo Guato, UPS, Ecuador
- Dr. Gustavo Bravo, UPS, Ecuador
- Dr. Gustavo Cañadas, UGR, España
- Dr. Helio Aisenberg Ferenhof, UFSC, Brasil
- Dr. Henry Chero Valdiviezo, ULADECH, Perú
- Dra. Herminia Hernández, Universidad de La Habana, Cuba
- Dr. Hugues Ribeiro, Universidade Estadual Paulista, Brasil
- Dr. Igor Thiago Marques Mendonça, IFSC, Brasil
- Dra. Irene García Lázaro, Universidad de Sevilla, España
- Dra. Irene Melgarejo Moreno, Universidad Católica de Murcia, España
- Dra. Irina Salcines Talledo, Universidad de Cantabria, España
- Dra. Isabel Gallardo Fernandez, Universidad de Valencia, España
- Dra. Isabel María Gómez Trigueros, Universidad de Alicante, España

- Dra. Isabel Sonsoles De Soto García, UPNA, España
- Dr. Ivan Sanchez Soto, Universidad del Bio Bio, Chile
- Dr. Ivar César Oliveira de Vasconcelos, UCB, Brasil
- Ivonne López-Cepeda, UPS, Ecuador
- Dr. Jaime A. Huincahue, UCM, Chile
- Dr. Jaime García-García, Universidad de Los Lagos, Chile
- Dr. Jaime Rivas Castillo, Universidad Don Bosco, El Salvador
- Dr. Javier García-García, UAGro, México
- Dr. Javier Gil-Quintana, UNED, España
- Dr. Jean García, PUCE, Ecuador
- Dra. Jennie Brand Barajas, Universidad La Salle, México
- Dra. Jessica Paños Castro, Universidad de Deusto, España
- Jessica Revelo, UPS, Ecuador
- Dr. Jesús Cabrerizo Diago, UNED, España
- Dr. Jesus Fernández Gavira, Universidad de Sevilla, España
- Jorge Cárdenas, UPS, Ecuador
- Dr. Jorge Rivera Muñoz, UNMSM, Perú
- Dr. Jorge Zapatero, UCM, España
- Dr. José Alvarado, Universidad Iberoamericana, México
- Dr. José Álvarez, Universidad de Almería, España
- Dr. José Fernández, Universidad Camilo José Cela, España
- Dr. José García, ENAH, México
- Dr. José Gonzalez, Universidad de Playa Ancha, Chile
- Dr. José Guilherme dos Santos Fernandes, UFPA, Brasil
- Dr. José Guzón Nestar, CES Don Bosco, UCM y San Pío X, UPSA, España
- Dr. José Jiménez Moreno, UABC, México
- Dr. José Jiménez Ibáñez, Universidad de La Salle, Colombia
- Dr. José Luis Galván, UPS, Ecuador
- Dr. José Lupiáñez, UGR, España
- Dr. José Marbán, Universidad de Valladolid, España
- Dr. José Marín Marín, UGR, España
- Dr. José Meza Cano, UDFJC, México
- Dr. José Moral, Università Pontificia Salesiana, Italia
- Dr. Jose Muñoz-Escolano, Unizar, España
- Dr. José Sánchez-Santamaría, UCLM, España
- Dr. José Trasferetti, PUC-Campinas, Brasil
- Dra. Josiane Peres Gonçalves, UFMS, Brasil
- Dr. Josu Ahedo, Universidad Internacional de La Rioja, España
- Juan Jara, UPS, Ecuador
- Dr. Juan Leiva Olivencia, Universidad de Málaga, España
- Dr. Juan López Núñez, UGR, España
- Dr. Juan Ortiz, Fundación Universitaria Los Libertadores, Colombia
- Dra. Juana Martín Perico, USTA, España
- Julia Sevy Biloan, UNAE, Ecuador
- Dra. Kajiana Nuernberg Sartor Vidotto, UFSC, Brasil
- Dra. Kathie Njaine, Fundação Oswaldo Cruz, Brasil
- Dr. Keith Harman, Oklahoma Baptist University, Estados Unidos
- Dra. Kimiz Dalkir, McGill University, Canadá
- Dra. Laura Mateos Cortés, Universidad Veracruzana, México
- Dra. Laura Muñoz-Rodríguez, Universidad de Oviedo, España
- Laura Rosso, Universidad Nacional de Nordeste, Argentina
- Dra. Laura Sánchez Blanco, Universidad Pontificia de Salamanca, España
- Dr. Leonardo J. Ramirez, UMNG, Colombia
- Dra. Leonor Buendía Eisman, Universidad de Granada, España
- Dra. Liliana Ávila, UPTC, Colombia
- Dra. Liliana Mayer, UMET, Argentina
- Dra. Lisset Coba Mejía, FLACSO, Ecuador
- Dra. Lorena Pastor Gil, Universidad Complutense de Madrid, España
- Dr. Luis Contreras-González, UHU, España
- Dr. Luis Cuji Llugna, Universidad Nacional de Tres de Febrero, Argentina
- Dr. Luis García Álvarez, INAH, México
- Dr. Luis Huerta-Charles, New Mexico State University, USA
- Dr. Luis Reyes Ochoa, Universidad Católica Silva Henríquez, Chile
- Dr. Luis Sime Poma, PUCP, Perú
- Dra. Ma.Dolores Díaz Noguera, US, España
- Dra. Magdalena Madany-Saa, Penn State University, USA
- Dra. Mara Castilho, Instituto Federal de Brasilia, Brasil
- Dra. Marcela Salazar Ibáñez, Universidad La Salle, México
- Dr. Márcio Roberto de Lima, UFSJ, Brasil
- Dr. Marcos Iglesias Martínez, UA, España
- Dr. Marcos Zapata, Universidad de Piura, Perú
- Dra. Maria Alfredo Lopes Moreira, Universidade do Minho, Portugal
- María Belén Huilca, UPS, Ecuador
- Dra. María Blanco, UCM, España
- Dra. Maria-Carmen Caldeiro-Pedreira, UPNA, España
- Dra. Maria de Fátima Pereira, Universidade do Porto, Portugal
- Dra. María Fortoul Ollivier, Universidad La Salle, México
- Dra. María Copello Danzi, Universidad de la República, Uruguay
- Dra. María del Mar Molero Jurado, Universidad de Almería, España
- Dra. María del Mar Rodríguez, Universidad Católica de Murcia, España
- Dra. María del Valle De Moya, UCLM, España
- Dra. María Domingo Coscollola, UIC, España
- Dra. Maria Inês Millen, Centro de Ensino Superior de Juiz de Fora, Brasil
- Dra. María José Batista Pinto, UFMG, Brasil
- Dra. María Labrador-Piquer, Universitat Politècnica de València, España
- Dra. María Latorre-Medina, Universidad de Granada, España
- Dra. María López, USAL, España
- María Marhx Bracho, Universidad La Salle, México
- Dra. María Martínez Usaralde, Universidad de Valencia, España
- Dra. María Ortiz, UPS, Ecuador
- Dra. María Prieto Quezada, Universidad de Guadalajara, México
- Dr. M.I. Punín Larrea, UTPL, Ecuador
- Dra. María Serván, Universidad de Málaga, España
- Dra. María Sol Villagómez, UPS, Ecuador
- Dra. Mariana Coralina Carmo, Kroton Educacional, Brasil
- Dra. Maribel Alegre Jara, Universidad Nacional del Santa, Perú
- Dra. Maribel Pinto, Instituto Politécnico de Viseu, Portugal
- Dra. Marina Pagani, Universidad de Concepción del Uruguay, Argentina
- Dra. Marisa Fariña Sánchez, Universidad de Sevilla, España
- Dr. Mário Marcelo Coelho, PUC-SP, Brasil
- Dr. Mario Rueda, UNAM, México
- Dr. Marlécio Maknamara, Universidade Federal da Bahia, Brasil
- Dra. Marta Beranuy Fargues, UPNA, España
- Dr. Matías Arce, Universidad de Valladolid, España
- Dra. Meireluci Costa Ribeiro, UNIFESP, Brasil
- Dr. Miguel Zabalza Beraza, Universidad de Santiago de Compostela, España
- Dra. Milagros Rodríguez, Universidad de Oriente, Venezuela
- Dra. Miriam Gallego, UPS, Ecuador
- Dra. Mirtes Lira, Universidade de Pernambuco, Brasil
- Dra. Mistli López-Pérez, Instituto Mexicano del Seguro Social, México
- Dra. Mónica Montenegro, Universidad de Buenos Aires, Argentina
- Dra. Mónica Sáenz Amaguaya, UPS, Ecuador

- Dr. Napoleón Esquivel, UPS, Ecuador
- Dr. Nelson Martínez Reyes, Universidad Don Bosco, El Salvador
- Dra. Noelia Alcaraz Salariche, Universidad de Málaga, España
- Dra. Noelia Ceballos López, Universidad de Cantabria, España
- Dra. Olga Alegre de la Rosa, Universidad de La Laguna, España
- Dra. Olga Espinoza Aros, Pontificia Universidad Católica de Chile, Chile
- Dr. Oscar Boude Figueredo, Universidad de la Sabana, Colombia
- Dr. Óscar Navarro Martínez, UCLM, España
- Dr. Oscar Vivas Albán, Universidad del Cauca, Colombia
- Dr. Pablo Gómez Jiménez, UJAT, México
- Dr. Pablo Muñoz Carril, Universidad de Santiago de Compostela, España
- Dr. Pablo Ortiz, UPS, Ecuador
- Dra. Paola Perochena González, UNED, España
- Paola Ramirez, UPS, Ecuador
- Dra. Patricia Carla da Hora Correia, UNEB, Brasil
- Dra. Patricia Muñoz Borja, Universidad Santiago de Cali, Colombia
- Dra. Patricia Torrijos, Universidad de Salamanca, España
- Dr. Paulo César Nodari, Universidade de Caxias do Sul, Brasil
- Dra. Paz Guarderas Albuja, UPS, Ecuador
- Dr. Pierre André Garcia Pires, Universidade Federal do Acre, Brasil
- Dr. Raimundo França, Universidade Federal de Alagoas, Brasil
- Dr. Ramon Luis de Santana Alcântara, UFMA, Brasil
- Dr. Raúl Baños, Universidad de Almería, España
- Dra. Regina Elaine Cabette, UNISAL, Brasil
- Dra. Regina Ferreira Barra, UFJF, Brasil
- Dr. Renann Gama, UNISAL, Brasil
- Dra. Renata Nunes Vasconcelos, Universidade Federal de Alfenas, Brasil
- Dra. Rita Gomes do Nascimento, Ministério da Educação, Brasil
- Dr. Robério Pereira Barreto, Universidade do Estado da Bahia, Brasil
- Dr. Robert Bolaños, UPS, Ecuador
- Roberto López Chila, UPS, Ecuador
- Dra. Romilda Teodora Ens, PUCPR, Brasil
- Dra. Rosa Delgado, Universidad de Concepción, Chile
- Dra. Rosabel Roig, Universidad de Alicante, España
- Dra. Rosalba Pesantez, UPS, Ecuador
- Dra. Rubicelia Valencia, Macmillan Education, México
- Dra. Ruth Aguilar Feijoo, Universidad Técnica Particular de Loja, Ecuador
- Dra. Ruth Cortés Salcedo, IDEP, Colombia
- Dra. Salomé Sola-Morales, Universidad de Santiago de Chile, Chile
- Dra. Sandra Alves da Silva Santiago, UFPB, Brasil
- Dra. Sandra Londoño Calero, Pontificia Universidad Javeriana, Colombia
- Dr. Sayim Aktay, Muğla Sıtkı Koçman Üniversitesi, Turquía
- Dr. Sebastián Granda Merchán, UPS, Ecuador
- Dr. Sergio Hernández Loeza, UNAM, México
- Dra. Shirlei Rezende Sales, Universidade Federal de Minas Gerais, Brasil
- Dra. Shirley Silva, Universidade de São Paulo, Brasil
- Dra. Sibel Celik, Dicle University, Turquía
- Silvia Barco, Universidad Nacional del Comahue, Argentina
- Dra. Sílvia Ester Orrú, Universidade de Brasília, Brasil
- Dra. Sonia Ivanoff, UNPSJB, Argentina
- Dra. Sonia Koehler, Centro Universitário Salesiano de São Paulo, Brasil
- Dra. Sonia Sampaio, Universidad Federal de Bahía, Brasil
- Dra. Soraya Ferreira Vieira, Universidade Federal de Juiz de Fora, Brasil
- Susana Barco, UNComa, Argentina
- Dra. Suyai Malen García Gualda, UNComa, Argentina
- Dra. Suzana dos Santos Gomes, UFMG, Brasil
- Dra. Tânia Regina Dantas, Universidade do Estado da Bahia, Brasil
- Dra. Tania Suely Azevedo Brasileiro, UFOPA, Brasil
- Dra. Teresa Artieda, UNNE, Argentina
- Dra. Teresa Linde, Universidad de Málaga, España
- Dr. Thiago Bimestre, UNESP, Brasil
- Dr. Tiago Duque, Universidade Federal de Mato Grosso do Sul, Brasil
- Dr. Tomás Izquierdo, Universidad de Murcia, España
- Dra. Urtza Garay, Universidad del País Vasco, España
- Dra. Váldina Gonçalves da Costa, UFTM, Brasil
- Dra. Vanessa Figueiredo, UFMS, Brasil
- Dra. Vania Tanira Biavatti, FURB, Brasil
- Dr. Vicente do Nascimento Nunes, RPCTE, Brasil
- Dr. Victor Larios, UAQ, México
- Dra. Victoria Vázquez, Universidad de Valencia, España
- Dr. Walter Castro, Universidad de Antioquia, Colombia
- Dra. Wanessa Gazzoni, UNISAL, Brasil
- Dra. Wedja Maria Oliveira Leal, PUC-SP, Brasil
- Dr. Wellington de Oliveira, UFVJM, Brasil
- Dr. Welson Barbosa Santos, Universidade Federal de Goiás, Brasil
- Willy Chambi Zabaleta, Universidad Pedagógica de Heidelberg, Alemania
- Dr. Wilson Pavon, UPS, Ecuador
- Dr. Wilson Pinzon, UDFJC, Colombia
- Dra. Ximena Vélez-Calvo, Universidad del Azuay, Ecuador
- Dra. Yadira Navarro Rangel, BUAP, México
- Dra. Yamila Irupé Núñez, Universidad Nacional de Misiones, Argentina
- Dra. Yamirlis Gallar Pérez, Universidad Internacional SEK, Ecuador
- Dra. Yolanda Castro, PUJ, Colombia
- Dr. Wilson Pavon, UPS, Ecuador
- Dr. Wilson Pinzon, UDFJC, Colombia
- Dra. Ximena Vélez-Calvo, Universidad del Azuay, Ecuador
- Dra. Yadira Navarro Rangel, BUAP, México
- Dra. Yamila Irupé Núñez, Universidad Nacional de Misiones, Argentina
- Dra. Yamirlis Gallar Pérez, Universidad Internacional SEK, Ecuador
- Dra. Yolanda Castro, PUJ, Colombia

### Board of Management (Consejo Técnico)

- María José Cabrera (Marcalyc Support)
- Christian Arpi (Coordination of Community Managers)
- Wilson Verdugo (OJS Support)
- Marco Gutiérrez (OJS Support)
- Paulina Torres (Wording and Style Editing)
- Raysa Andrade (Layout)
- Adriana Curiel (Translation)
- Jessica Rivadeneira-Peñafiel (Editorial Assistance)

## Published by (Edita)

**Universidad Politécnica Salesiana**

[www.ups.edu.ec](http://www.ups.edu.ec)

**Board of Publications** (Consejo de Publicaciones)

- Dr. Juan Cárdenas Tapia, Rector–President
- Dr. Esteban Inga, Vice chancellor research
- Dr. Ángel Torres-Toukoumidis, General Editor
- Dr. Jaime Padilla Verdugo, Alteridad Editor
- Dra. Sheila Serrano Vincenti, Granja Editor
- Jorge Cueva Estrada, Retos Editor
- Dr. John Calle Sigüencia, Ingenius Editor
- Dra. Floralba Aguilar Gordón, Sophia Editor

- Dra. Betty Rodas Soto, Utopía Editor
- Jorge Altamirano Sánchez, Magazine Editor Unesco Chair
- Mónica Ruiz Vásquez, Noti-Ups Editor
- David Armendáriz González, Web Editor
- Dr. José Juncosa Blasco, Editorial Universitaria Abya-Yala

**Editorial Universitaria Abya-Yala**

(Quito, Ecuador)

Hernán Hermosa (General Coordination)

Av. 12 de Octubre N23-116 y Wilson, Bloque A, UPS

Telephone: (593-2)3962-800 ext. 2638

E-mail: [editorial@ayayala.org.ec](mailto:editorial@ayayala.org.ec)

Electronic portal [www.abyayala.org](http://www.abyayala.org)



Source: <https://www.shutterstock.com/es/image-photo/womans-hand-selects-wooden-block-ai-2205679295>

### Artificial intelligence in education

Artificial Intelligence (AI) has been progressively integrated into multiple areas of human life. Education has become one of the areas with more discussion, as the way we teach and learn is taking a different path. This so-called educational “transformation” generates possibilities both inside and outside the classroom; the use of AI in educational settings can support educators in planning, resource generation, assessment, and administrative tasks, allowing teachers to focus their time on mentoring and human learning. However, these technological advances also represent a challenge and concern for the educational community, as they require digital and ethical skills on the part of teachers and students so that their use is pedagogically mediated with a view to educational quality and innovation. In this sense, education takes on the central role of training people to use AI critically and responsibly, without these “new” tools replacing human work and knowledge, but rather enhancing them.

# Contents



## Artificial intelligence as a form of social expression in education

*Inteligencia artificial como forma de expresión social en la educación*

### THEMATIC EDITORS

- **Dra. Mari-Carmen Caldeiro-Pedreira**, Universidad de Santiago de Compostela (España)
- **Dra. Paula Renés-Arellano** Universidad de Cantabria (España)
- **Dra. Lucie Rohlíková**, University of West Bohemia, Pilsen (Czech Republic)

### MONOGRAPHIC SECTION (SECCIÓN MONOGRÁFICA)

DR(C). FLAVIO EDUARDO LÓPEZ-VASCO, MISHELL ROMINA ANGULO-ÁLVAREZ AND DAVID ISMAEL SOSA-ZÚÑIGA.....	162
Teacher training in Generative AI: ethical impact and challenges in Higher Education <i>Formación docente en IA Generativa: impacto ético y retos en educación superior</i>	
DR. IGOR RADTKE BEDERODE AND DR. LUIS OTONI MEIRELES RIBEIRO .....	173
Educational platformization with Generative AI: impacts on teacher autonomy <i>Plataformización educativa con IA Generativa: impactos en la autonomía docente</i>	
DRA. LUZ MARINA PEREIRA-GONZÁLEZ, DRA. ANDREA BASANTES-ANDRADE, MILTON MORA-GRIJALVA AND ANABELA GALÁRRAGA-ANDRADE.....	184
Latent dimensions in the adoption of ChatGPT at the University: CHASSIS model <i>Dimensiones latentes en la adopción de ChatGPT en la universidad: modelo CHASSIS</i>	
ISAAC J. PÉREZ-LÓPEZ AND DRA(C). CARMEN NAVARRO-MATEOS.....	196
What does ChatGPT know about gamification in education? From AI to the human touch <i>¿Qué sabe ChatGPT de gamificación en educación?: De la IA a la artesanía</i>	
DRA. ANDRÉA INÊS GOLDSCHMIDT AND DR. FERNANDO JOSÉ FRAGA AZEVEDO .....	211
Science and children's literature: an analysis of the narratives created by GenIA <i>Ciencia y literatura infantil: un análisis de las narrativas creadas por GenIA</i>	

### MISCELLANEOUS SECTION (SECCIÓN MISCELÁNEA)

DR(C). ANA CRISTINA GÓMEZ-VALLARTA, DR. SERGIO RIVERA MAGOS, DR. ANTONIO DANIEL GARCÍA-ROJAS (ESPAÑA) AND DR. ÁNGEL HERNANDO-GÓMEZ .....	226
Digital emotional intelligence: construction of a model and validation of a measurement instrument <i>Inteligencia emocional digital: construcción de un modelo y validación de un instrumento para su medición</i>	
DR. GUSTAVO TOLEDO-LARA.....	238
Feedback and ICT tools used by university professors <i>Retoolimentación y herramientas TIC utilizadas por profesores universitarios</i>	
MAITE ZUBILLAGA-OLAGUE, DRA. LAURA CAÑADAS AND DR. JESÚS MANSO.....	250
Formative assessment strategies. Basic education teachers' perception <i>Estrategias de evaluación formativa. Percepción del profesorado de educación básica</i>	
DR. SAMUEL PÉREZ-NORAMBUENA, DRA. MARCELA MORA-DONOSO, DR. SEBASTIÁN PEÑA-TRONCOSO AND DR. FRANCISCO GALLARDO-FUENTES .....	263
Emancipatory perspective in the evaluative orientations in the Physical Education Curriculum of Chile <i>Perspectiva emancipadora en las orientaciones evaluativas en el currículum de Educación Física en Chile</i>	
EMILYN VERDE-AVALOS, DR. JOSÉ LIVIA-SEGOVIA, SEGUNDO MALCA-PERALTA AND DR. JOSUÉ TURPO-CHAPARRO .....	277
Relationship between technostress and academic goals in Peruvian university students <i>Relación entre el tecnoestrés y objetivos académicos en universitarios peruanos</i>	
Publication Guidelines of «Alteridad» .....	290
Normas de Publicación en «Alteridad» .....	296



# Monographic section (Sección Monográfica)

## Artificial intelligence as a form of social expression in education

*Inteligencia artificial como forma de expresión  
social en la educación*






Source: <https://www.shutterstock.com/es/image-photo/chat-ai-artificial-intelligence-technology-man-2426994193>



# Teacher training in Generative AI: ethical impact and challenges in Higher Education

## *Formación docente en IA Generativa: impacto ético y retos en educación superior*

-  **Dr(c) Flavio Eduardo López-Vasco** is a doctoral candidate at Universidad Católica Andrés Bello (Venezuela) (felopez.24@est.ucab.edu.ve) (<https://orcid.org/0000-0002-7853-8439>)
-  **Mishell Romina Angulo-Álvarez** is a professor at Universidad de las Fuerzas Armadas (Ecuador) (mrangulo@espe.edu.ec) (<https://orcid.org/0000-0002-6434-6137>)
-  **David Ismael Sosa-Zúñiga** is a lecturer at Universidad de las Fuerzas Armadas (Ecuador) (disosa1@espe.edu.ec) (<https://orcid.org/0000-0002-2692-2746>)

**Received:** 2025-03-03 / **Revised:** 2025-05-31 / **Accepted:** 2025-06-11 / **Published:** 2025-07-01

### Abstract

Generative Artificial Intelligence (GAI) is reshaping on higher education, and transforming instructional and assessment practices, therefore, educators must develop technical expertise and pedagogical awareness to ensure ethical and responsible use. This study evaluates the impact of an 80-hour GAI training program conducted with 299 lecturers from eight Ecuadorian universities, aiming to enhance their digital skills and openness to AI-based teaching strategies. Through a quasi-experimental design with pretest and posttest assessments, findings reveal an increase in technical proficiency ( $M = 2.62$  to  $4.22$ ,  $t = -30.77$ ,  $p < 0.0001$ ,  $d = 0.85$ ) and lecturers' willingness to apply GAI in their teaching ( $M = 3.63$  to  $4.02$ ,  $t = -6.38$ ,  $p < 0.0001$ ,  $d = 0.52$ ). However, perceptions of AI-generated content originality remained unchanged ( $M = 3.02$  to  $2.94$ ,  $t = -0.82$ ,  $p = 0.41$ ), indicating ongoing concerns regarding authenticity in academic settings. These results emphasize the necessity of training programs that merge technical instruction with active learning methodologies, such as project-based learning and formative assessment. Additionally, higher education institutions should establish clear policies regulating AI implementation, ensuring ethical standards and academic integrity. Moreover, developing institutional guidelines for assessing AI-generated content is essential for maintaining transparency, fairness, and responsible adoption in teaching and assessment to identify the best practices to support lecturers' development, and promote its effective use in academic fields.

**Keywords:** artificial intelligence, teacher education, higher education, educational evaluation, ethics of technology.

### Resumen

La inteligencia artificial generativa (IA-G) está redefiniendo la educación a nivel superior, cambiando los enfoques en la enseñanza y evaluación, y para su integración, los docentes deben desarrollar habilidades técnicas y criterios pedagógicos que les permitan utilizar estas herramientas con conciencia ética. Este estudio analiza el impacto del programa de formación en IA-G de 80 horas impartido a 299 docentes de ocho universidades ecuatorianas, con el propósito de fortalecer sus competencias digitales y su disposición hacia estas tecnologías. Mediante un diseño cuasi-experimental con mediciones pretest y posttest, los resultados mostraron mejoría en el conocimiento técnico sobre IA-G ( $M = 2.62$  a  $4.22$ ,  $t = -30.77$ ,  $p < 0.0001$ ,  $d = 0.85$ ) y en la predisposición docente para su aplicación en el aula ( $M = 3.63$  a  $4.02$ ,  $t = -6.38$ ,  $p < 0.0001$ ,  $d = 0.52$ ). Sin embargo, la percepción sobre la originalidad de los contenidos generados por IA no mostró cambios relevantes ( $M = 3.02$  a  $2.94$ ,  $t = -0.82$ ,  $p = 0.41$ ), lo que sugiere incertidumbre sobre su autenticidad académica. Estos resultados destacan la importancia de una capacitación que combine instrucción con metodologías activas, como el aprendizaje basado en proyectos y la evaluación formativa. Asimismo, se recomienda establecer políticas institucionales claras sobre el uso de IA en la educación superior, priorizando ética y transparencia acorde con los principios de la UNESCO.

**Palabras clave:** inteligencia artificial, formación de docentes, enseñanza superior, evaluación de la educación, ética de la tecnología.

**Suggested citation (APA):** López-Vasco, F. E., Angulo-Álvarez, M. R. & Sosa-Zúñiga, D. I. (2025). Teacher training in Generative AI: ethical impact and challenges in Higher Education. *Alteridad*, 20(2), 162-172. <https://doi.org/10.17163/alt.v20n2.2025.01>

## 1. Introduction

Generative artificial intelligence (G-AI) has transformed areas including higher education, where its application in teaching, assessment and academic development continues to advance (Kohnke et al., 2023; Michel-Villarreal et al., 2023; Sanusi et al., 2023) due to the ability to automate teaching tasks, personalize learning experiences and generate educational content, which has generated debate. While authors such as Chan (2023), Usher and Barak (2024) highlight the potential of AI-G to improve accessibility and personalized learning; Nam and Bai (2023), Vallis et al. (2024) warn about the risks to equity and privacy.

One of the main challenges in the adoption of artificial intelligence (AI) in education is the role of the teacher, since, according to the existing literature, the lack of training in AI represents a significant obstacle for its correct implementation (Bendeche et al., 2021; Michel-Villarreal et al., 2023; Sanusi et al., 2023). Thus, some studies argue that resistance is mainly due to technical ignorance (Baron, 2024; Diao, 2020), others emphasize ethical concerns and the idea that AI could reduce autonomy in pedagogical design (Rudolph et al., 2024; Slimi and Carballido, 2023; Vallis et al., 2024); thus, this differences in findings suggests further analysis of how specific AI training influences teacher perception and willingness (Archambault et al., 2024; Celik, 2023). Weglarz et al. (2025) identify that performance expectancy, perceived effort, and institutional trust are factors that influence the adoption of AI tools, even out of the educational setting.

The use of AI-G in education has changed teaching processes and academic assessment; thus, Crawford et al. (2023) and Eager and Brunton (2023) have pointed out that although tools such as Turnitin AI and GPTZero were designed to detect AI-generated content, their accuracy is still questioned due to limitations in identifying manually rephrased texts. Likewise, Nikolic et al. (2023) argue that these systems do not always manage to accurately differentiate between original productions and AI-generated texts with subsequent modifications. On the other hand, Sanusi et al. (2023) warn that the reliability of these detectors is still evolving, since their performance may be affected by linguistic diversity and different academic writing styles.

Similarly, Yin Albert et al. (2022) highlight that the increasing sophistication of AI models poses additional challenges, as texts generated by these technologies can mimic human writing patterns with a high degree of accuracy, making it difficult to identify them effectively in evaluative contexts.

Moreover, automated assessment using AI has been questioned due to potential algorithmic biases that could compromise fairness in grading (Chiu, 2024; Javed et al., 2022; Silva-Rodriguez et al., 2021), so teacher monitoring and auditing of AI systems have been proposed as key strategies to mitigate these risks (Almassaad et al., 2024; Eager and Brunton, 2023).

From an inclusive perspective, AI can expand access to education through personalized learning, but it can also reinforce pre-existing inequalities (Chiu, 2024), since recent research has revealed that the digital divide remains a key determinant of AI adoption in the classroom as access to technology infrastructure and specialized training is not equitable across institutions (Archambault et al., 2024; Diao, 2020); i.e., universities with greater resources have more opportunities to incorporate AI into their educational programs, while others face technological limitations in its implementation (Crawford et al., 2023; Sanusi et al., 2023).

Despite the interest in AI-G within the educational environment, most studies have prioritized the analysis of student perception, leaving aside the role of the teacher in its adoption and pedagogical application (Almassaad et al., 2024; Archambault et al., 2024; Celik, 2023). Although there is consensus on the importance of AI teacher training, current approaches have been fragmented and there is a lack of a comprehensive analysis of how training programs can influence their acceptance and effective use in the classroom (Nam & Bai, 2023; Slimi & Carballido, 2023). Thus, this study seeks to address this gap through a detailed analysis of the impact of AI-G training on university faculty's perception, attitude, and application of these technologies (Javed et al., 2022; Nikolic et al., 2023). Unlike previous research with general approaches, this comparative research allows us to assess changes in faculty's technical knowledge and willingness before and after receiving specific training (Chun & Elkins, 2023; Tubella et al., 2024).

Given the advance of AI-G in higher education, its effective adoption requires access to technology and to teacher training to ensure its pedagogical integration with clear ethical and methodological criteria; therefore, this study examines how an AI-G training program influences the perception and development of teaching competencies, in addition to identifying the main challenges for its application in university teaching (Slimi & Carballido, 2023).

Based on the findings obtained, strategies will be proposed to strengthen digital literacy and thus facilitate its effective incorporation in the classroom. To this end, the use of IA-G in education is analyzed, addressing its benefits and challenges. Then, the methodology used to evaluate teacher training is described, followed by an analysis of results that allows understanding how this training transforms the perception and its use in educational practice. Finally, key implications and recommendations are presented to design AI training policies, aligned with the realities and needs of the university context.

## 2. Methodology

Authors such as Gómez-Diago (2022) and Yue et al. (2024) have highlighted that quasi-experimental designs are an effective methodological strategy to evaluate changes in educational contexts without altering the institutional dynamics. This study used a quasi-experimental design without random assignment of participants to control and experimental groups, responding to ethical and operational restrictions within the university environment, allowing to analyze the impact of training in generative artificial intelligence (G-AI) on the perception and development of teaching skills within real teaching conditions.

On the other hand, Nikolic et al. (2023) emphasize the importance of forming heterogeneous samples in studies on technological adoption, since diversity in teaching experience and academic environments influences the results. Based on this criterion, teachers from different disciplines and levels of experience were selected, allowing a more representative evaluation of the phenomenon studied. In addition, Zhao et al. (2023) and Michel-Villarreal et al. (2023) mention that the triangulation of measurement instruments is essential to reduce biases in educational studies; therefore, this research imple-

mented multiple data collection techniques and a covariate analysis was performed to mitigate external factors that could influence the results.

Finally, Chiu (2024) and van den Berg and du Plessis (2023) argue that in educational research where accessibility and willingness of participants are determining factors, non-probability convenience sampling presents as a valid methodological alternative. Hence, the selection of teachers was based on their interest and willingness to integrate AI-G into their pedagogical practices, which allowed for a more in-depth examination of its impact on university teaching; Therefore, the sample of 299 university teachers was based on both methodological criteria and operational considerations associated with the feasibility of implementing the IA-G training program in different institutional contexts and the need to ensure adequate representativeness to allow statistical analysis (such as t-test for related samples, multiple regression and effect size estimation).

Because of the latter, measures were adopted to minimize selection bias, such as the inclusion of participants from public and private institutions, with equal representation in terms of gender, age and teaching experience (Nikolic et al., 2023; Sullivan et al., 2023). An age range of 25 to 60 years was established, with a mean of 45 years, and teachers were checked for similar levels of prior AI knowledge before training (Diao, 2020; Zhao et al., 2022).

Data were collected through structured surveys with five-point Likert scales, applied as: pretest and posttest (Celik, 2023; Gómez-Diago, 2022) where the variables assessed included the level of knowledge about AI-G, the perceived originality of AI-generated content, and concerns about data privacy and ethics in teaching (Saltos et al., 2023; Vallis et al., 2024). To verify the validity of the instrument, it was sent for validation by experts in educational technology and digital ethics using Aiken's V coefficient (0.82), which confirmed the relevance of the selected items (Almassaad et al., 2024; van den Berg & du Plessis, 2023). Likewise, reliability was assessed by Cronbach's alpha coefficient ( $\alpha = 0.87$ ), reflecting consistency in the responses obtained (Sanusi et al., 2023; Zhao et al., 2022).

In the quantitative approach, the t-test for related samples allowed evaluating differences between pretest and posttest results, where the normality of the data distribution was verified by the Shapiro-

Wilk test, obtaining values of  $W = 0.978$ ,  $p = 0.12$  in the pretest and  $W = 0.982$ ,  $p = 0.08$  in the posttest. Given that both p-values are greater than 0.05, it was confirmed that the data followed a normal distribution, allowing the use of parametric tests (Rudolph et al., 2024; Sullivan et al., 2023).

Multiple regression was performed to control possible confounding variables, considering factors such as academic discipline, teaching experience and previous level of familiarity with AI-G, where the coefficient of determination  $R^2 = 0.65$  ( $p < 0.01$ ) indicated that the model explains 65 % of the variability in the posttest results, suggesting a considerable impact of training on the knowledge and perception of AI-G in the classroom (Michel-Villarreal et al., 2023; Zhao et al., 2022). Additionally, the effect size was calculated using Cohen's d, obtaining a value of 0.85, which confirms improvement in the understanding and perception of AI-G after training (Archambault et al., 2024; Gómez-Diago, 2022).

From a qualitative approach, inductive thematic coding was used, which allowed to identify five emerging categories in the teachers' perception of AI-G in higher education: 1. Confidence in the use of AI-G: Greater confidence in the application of AI tools in teaching. 2. Perception of originality: Concerns about the generation of content and its impact on student creativity. 3. Ethics and privacy: Considerations about data security and responsible use of AI in education. 4. Adoption in teaching practice: Differences in implementation by academic discipline. 5. Continuing education: Interest in expanding knowledge about AI and its educational applications.

According to the above, an intersubjective validation was performed among researchers to ensure the reliability of the qualitative analysis, obtaining a Cohen's Kappa index ( $\kappa = 0.79$ ), indica-

ting substantial agreement in the interpretation of the data (Chiu, 2024; Sullivan et al., 2023) using the software NVivo for the segmentation and classification of responses, and optimizing the processing and organization of the findings (Leoste et al., 2021; Zhao et al., 2022). Thus, the results of this study will provide empirical evidence on the effectiveness of AI-G training, contributing to the design of strategies for its responsible adoption in higher education (Gómez-Diago, 2022).

### 3. Results

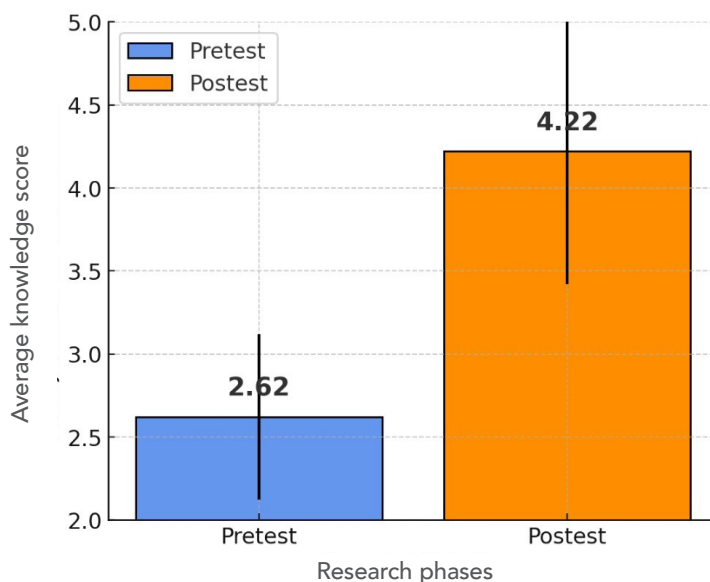
#### 3.1 Evolution of the technical knowledge on Generative IA

The quantitative analysis evidences a significant improvement in the technical knowledge about AI-G after the training, where the comparison of pretest and posttest measurements applied to the same participants allowed evaluating the evolution of their understanding about this technology; so the normality of the data was done by means of the Shapiro-Wilk test, confirming the suitability of the use of parametric tests; and the t-test for related samples, which presented a statistically significant difference between both measurements, with a t-value of -30.77 and a p-value lower than 0.0001 (Lozano and Blanco Fontao, 2023; Moorhouse et al., 2023).

The effect size, measured with Cohen's d (0.85), indicates a considerable impact on the acquisition of technical knowledge presented on Table 1, and Figure 1 shows that the mean score in AI-G knowledge increased from 2.62 in the pretest to 4.22 in the posttest, supporting the effectiveness of the training program (Dai et al., 2023).

**Table 1.** Pretest-Posttest Comparison of IA-G Technical Knowledge

Variable	Mean of Pretest ( $\pm$ SD)	Mean of Posttest ( $\pm$ SD)	T Value	P Value	Cohen's d	95 % CI
Knowledge of AI-G	2.62 $\pm$ 0.71	4.22 $\pm$ 0.68	-30.77	<0.0001	0.85	[2.41, 4.03]

**Figure 1.** Evolution of technical knowledge about IA-G

### 3.2 Change in teaching attitude towards IA-G

The evolution in teaching attitude towards the use of IA-G in teaching also showed a positive change; the mean went from 3.63 in the pretest to 4.02 in the posttest, with a statistically significant

improvement (t-value of -6.38,  $p < 0.0001$ ) (Puerto and Gutiérrez-Esteban, 2022).

The effect size (Cohen's  $d = 0.52$ ) indicates a moderate impact. As detailed in Table 2, these findings evidence an advance in teachers' willingness to use AI-G in their pedagogical strategies (Flores-Vivar and García-Peñalvo, 2023).

**Table 2.** Pretest-Posttest Comparison on Teaching Attitude towards IA-G

Variable	Mean of Pretest ( $\pm$ SD)	Mean of Posttest ( $\pm$ SD)	T Value	P Value	Cohen's d	95 % CI
Teaching attitude towards IA-G	3.63 $\pm$ 0.88	4.02 $\pm$ 0.75	-6.38	<0.0001	0.52	[3.49, 4.15]

### 3.3 Perception on the originality of AI-generated content

The results suggest that the training failed to significantly change teachers' perception on the originality of AI-G-generated content. The mean went from 3.02 in the pretest to 2.94 in the posttest, with a non-significant difference (t-value = -0.82,  $p$

= 0.41), and a low effect (Cohen's  $d = 0.12$ ) (Sperling et al., 2024). This pattern was also identified by Firat and Kuleli (2024), who observed that even after an intensive AI training, the teacher's perception on the originality of the generated content did not show substantial improvements, revealing the resistance linked to ethical and cognitive factors.

**Table 3.** Pretest-Posttest Comparison on Perception of Originality in IA-G

Variable	Mean of Pretest ( $\pm$ SD)	Mean of Posttest ( $\pm$ SD)	T Value	P Value	Cohen's d	95 % CI
Perception of originality in AI-G	3.02 $\pm$ 0.91	2.94 $\pm$ 0.87	-0.82	0.41	0.12	[2.81, 3.15]

### 3.4 Qualitative analysis of teacher perception

The qualitative analysis complemented the findings through a process of inductive thematic coding, allowing the identification of changes in teacher perception, whose data were processed with NVivo, facilitating the categorization of open-ended responses in the pretest and posttest surveys (Ma, 2021). Thus, in the initial phase, expressions of uncertainty and lack of knowledge about IA-G predominated, while in the post-test, more specific mentions of concrete tools and pedagogical strategies emerged (Yin Albert et al., 2022). The following are some textual responses from teachers:

I am interested in learning about AI tools, but I don't know how they can be applied in education.

I think they can be useful, but I have doubts about the originality of the content generated.

I am now more clear on how to use AI in my classes, especially ChatGPT and Copilot.

I still have concerns about plagiarism, but I have a better understanding of the detection mechanisms available.

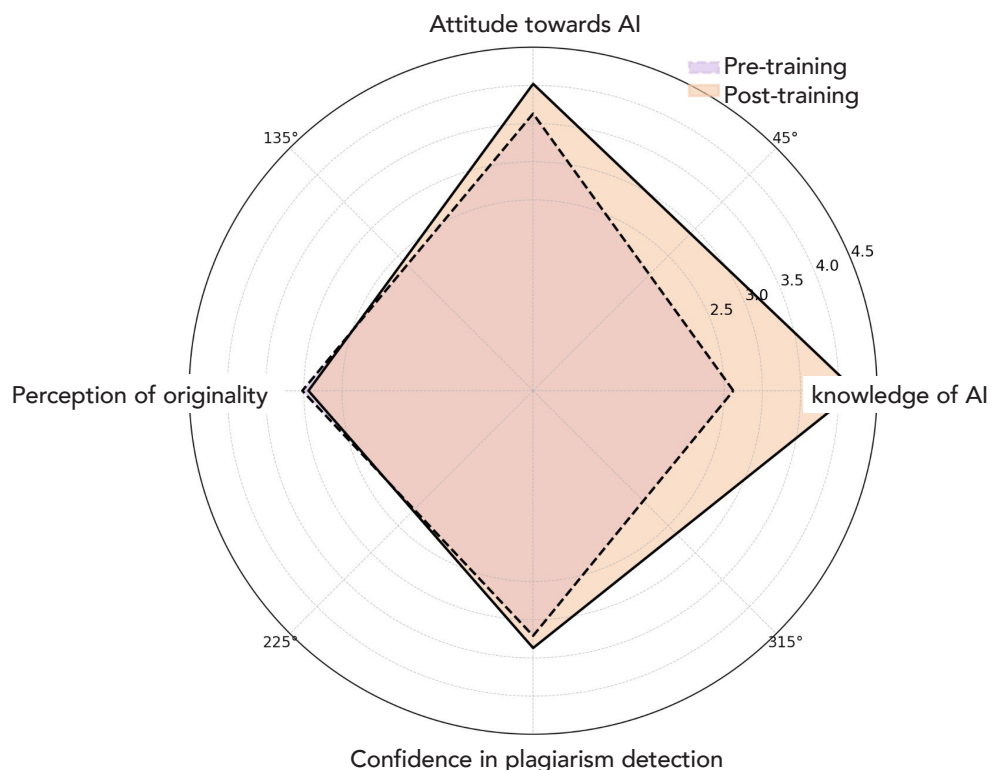
## 4. Discussion and conclusions

### 4.1 Discussion

This section discusses the findings of the study in relation to its objectives and to the existing literature, evaluating the impact of generative AI training in higher education. It examines the evolution of technical knowledge, teaching attitude, the perceived originality of AI-generated content, and the effectiveness of plagiarism detection tools.

To facilitate the visualization of these results and their comparisons, Figure 2 shows the evolution of the four dimensions analyzed before and after the training, making it possible to clearly identify the changes experienced in technical knowledge and attitude towards AI, as well as the stability in the perception of originality and confidence in plagiarism detection systems (Cordero et al., 2024).

**Figure 2.** Impact of AI-G training on technical knowledge, teaching attitude, perception of originality and confidence in plagiarism detection.



The first objective of this research was to determine the impact of training on teachers' technical knowledge, and the results show an increase in mean knowledge from 2.62 in the pretest to 4.22 in the posttest ( $t = -30.77$ ,  $p < 0.0001$ , Cohen's  $d = 0.85$ ) (Table 1), indicating an improvement. Thus, previous research has documented the effectiveness of digital skills training programs in university teachers (Sanusi et al., 2023), reinforcing the idea that structured AI literacy can reduce gaps in access and use of these technologies in higher education (Crompton and Burke, 2023; Ng et al., 2025).

Regarding teachers' attitude towards generative AI, a positive change was obtained with an increase in the mean from 3.63 in the pretest to 4.02 in the posttest ( $t = -6.38$ ,  $p < 0.0001$ , Cohen's  $d = 0.52$ ) (Table 2); thus, this finding shows the relationship between the acquisition of technological competencies and the willingness to adopt new tools in teaching (Leoste et al., 2021). However, the insignificant change in this dimension suggests that although teachers have more information about AI, they may still have doubts about its effective implementation in the classroom. Recent research highlights the importance of providing training programs that integrate both technical and ethical skills and pedagogical considerations in the use of AI in education (Feigerlova et al., 2025; Keith et al., 2025).

Likewise, the results indicate that training did not produce significant changes in the perceived originality of AI-generated content, as the mean went from 3.02 in the pretest to 2.94 in the posttest ( $t = -0.82$ ,  $p = 0.41$ , Cohen's  $d = 0.12$ ) (Table 3), coinciding with studies that have pointed to a persistent distrust of the authenticity of AI-generated texts in academic settings (Baron, 2024). Thus, one possible explanation is the absence of clear regulations on the use of AI as a tool for academic support, generating uncertainty about its application in scientific evaluation and publication (Hagendorff, 2024; Sperling et al., 2024).

In contrast, the perception of the effectiveness of plagiarism detection tools in identifying AI-generated texts showed a slight increase in the mean from 3.21 to 3.37 ( $t = -2.01$ ,  $p = 0.045$ , Cohen's  $d = 0.18$ ) (Table 4); although the difference is statistically significant, its impact is limited. Given this, previous research has pointed out that current AI detection systems still present difficulties in accu-

rately identifying algorithmically generated content, especially when texts have been manually edited (Cordero et al., 2024); therefore, it is important that training programs include practical exercises on the use and limitations of these tools in real academic contexts (Corfmat et al., 2025).

From the qualitative analysis, it was observed that after the training the teachers demonstrated greater familiarity with the available artificial intelligence tools, although they continued to express concerns about their regulation and their application in academic assessment. While in the pretest the responses were general, in the posttest they began to mention platforms such as ChatGPT or Turnitin AI, suggesting progress in their technical understanding.

These results indicate that the training process allowed teachers to develop a clearer vision about the potential and limitations of artificial intelligence in education (Feigerlova et al., 2025). However, doubts persist about the originality of the content generated by these tools, as well as the possible risks of plagiarism. Consequently, there is a need to establish clear institutional regulations to guide their ethical and pedagogical use (Leoste et al., 2021; Ng et al., 2025).

A case that illustrates these shortcomings is the study by Ramírez Vergara, López-Chau and Rojas Hernández (2024), in which an AI-based inclusive storytelling system was implemented, but without incorporating pedagogical guidelines or teaching mediation to support its integration in the classroom. Although the findings of this study show advances in technical knowledge and teacher attitudes towards generative AI, there are still areas of uncertainty regarding its real impact on authorship and originality, as well as on the effectiveness of automated detectors. In this regard, several studies agree that addressing these challenges requires technological competencies, critical thinking and informed decision making about the ethical use of these technologies in educational contexts (Crompton and Burke, 2023; Hagendorff, 2024).

## 4.2 Conclusions

This study shows a significant contribution on AI-G teacher training in Latin America by empirically evaluating the impact of a structured 80-hour program taught to 299 teachers from eight Ecuadorian universities. Through a mixed approach

(quasi-experimental and qualitative), it indicates how the training improves knowledge ( $d = 0.85$ ), and favors the teaching attitude towards AI ( $d = 0.52$ ). In addition, tensions in the perception of originality of the contents generated are still present. These findings allow us not only to validate the proposed training model, but also to identify institutional gaps between public and private universities, which provides input to design evidence-based ethical educational policies. These inequalities were also evidenced by Aguirre-Aguilar et al. (2024), who, based on an advanced quantitative approach, highlighted significant differences in the access and pedagogical use of AI between institutions with different levels of infrastructure and institutional support.

Thus, research such as Sanusi et al. (2023) and Crompton and Burke (2023) have documented how structured AI training not only reduces gaps in technology adoption, but also encourages more thoughtful use aligned with innovative pedagogical strategies. However, one of the main challenges identified is the perceived originality of AI-generated content. Despite the training received, teachers have not changed their minds about the authenticity of these texts, suggesting the need for clearer criteria to assess creativity and relevance in academia. Previous studies, such as those by Baron (2024) and Hagedorff (2024), have pointed out that uncertainty about the originality of automatically generated texts continues to be a determining factor, limiting their acceptance in higher education; therefore, it is important to develop regulations that allow the establishment of clear standards to evaluate the transparency and reliability of these materials.

From an applied approach, the increase in knowledge and greater openness on the part of teachers towards G-CI can be understood as a favorable willingness to its use in daily teaching practice. However, there are still ethical and methodological concerns that need to be addressed by both authorities and planners for future training, as suggested by authors such as Feigerlova et al. (2025) and Keith et al. (2025). Given the above, it is necessary to design training that goes beyond technical issues, incorporating interactive scenarios and case studies where teachers can evaluate the implementation of AI in their teaching practice and critical thinking.

Regarding the perception of the effectiveness of plagiarism detection tools, the results reflect a

slight increase in teachers' confidence in this technology, although concerns persist about its accuracy; authors such as Cordero et al. (2024) and Corfmat et al. (2025) have pointed out that these detectors still present difficulties in identifying AI-generated texts, especially when they have been manually reformulated. Therefore, it is even more necessary for teacher training to include a critical analysis of the scope and limitations of these tools, allowing educators to make more informed and grounded decisions in their academic work.

## 5. Recommendations

### 5.1 Lines of future research

Regarding the perception of originality, it is recommended to explore what specific factors influence teachers' confidence in the authenticity of IA-G-generated content. Co-creation of content with IA, comparison with student-produced texts, and adoption of specific academic standards could significantly impact such perception. Furthermore, in the evaluation of the impact of AI on teaching, both this and previous research have focused on the short term. Therefore, it is necessary to move towards a progressive and sustainable adoption of AI in higher education, accompanied by longitudinal studies to examine its effects on teaching practice over time.

The effectiveness of AI detectors in academic assessment varies according to the generative model and the strategy used to reformulate texts, so a comparative analysis between different platforms is necessary to determine which ones offer greater reliability in specific educational contexts.

### Practical applications

The lack of regulations in higher education generates uncertainty among teachers and limits the adoption of G-GI in the classroom. Therefore, the definition of clear institutional policies on its use will allow universities and regulatory bodies to establish guidelines on transparency in its application, originality criteria in academic production and its impact on learning assessment.

In addition, providing training with a practical and contextualized approach by incorporating active

methodologies such as case studies, project-based learning and simulations in real environments will allow teachers to develop effective strategies for their pedagogical application.

Finally, AI-based pedagogical innovations will allow taking advantage of its benefits in the automatic generation of didactic materials, personalized learning and the automation of feedback processes. However, their implementation must be accompanied by periodic evaluations that measure their impact on teaching and student performance.

### Author contributions

**Flavio Eduardo López-Vasco:** conceptualization, data curation, research, formal analysis, methodology, project management, supervision, original draft writing, writing-revision and editing.

**Mishell Romina Angulo-Álvarez:** conceptualization, research, writing original draft, writing-revising and editing.

**David Ismael Sosa-Zúñiga:** data curation, writing of the original draft.

### References

- Aguirre-Aguilar, G., Esquivel-Gómez, I., Navarro, R. E. & Veytia-Buchelli, M. G. (2024). La IA en el desarrollo de competencias investigativas en el posgrado. *Alteridad*, 19(2), 162-172. <https://doi.org/10.17163/alt.v19n2.2024.01>
- Almassaad, A., Alajlan, H. & Alebaikan, R. (2024). Student perceptions of Generative Artificial Intelligence: investigating utilization, benefits, and challenges in Higher Education. *Systems*, 12(10). <https://doi.org/10.3390/systems12100385>
- Archambault, S. G., Ramachandran, S., Acosta, E. & Fu, S. (2024). Ethical dimensions of algorithmic literacy for college students: Case studies and cross-disciplinary connections. *Journal of Academic Librarianship*, 50(3). <https://doi.org/10.1016/j.acalib.2024.102865>
- Baron, P. (2024). Are AI detection and plagiarism similarity scores worthwhile in the age of ChatGPT and other Generative AI? *Scholarship of Teaching and Learning in the South*, 8(2), 151-179. <https://doi.org/10.36615/sotls.v8i2.411>
- Bendechache, M., Tal, I., Wall, P., Grehan, L., Clarke, E., Odriscoll, A., Der Haegen, L. V., Leong, B., Kearns, A. & Brennan, R. (2021). *AI in My Life: AI, Ethics & Privacy Workshops for 15-16-Year-Olds*. 34-39. <https://doi.org/10.1145/3462741.3466664>
- Celik, I. (2023). Towards Intelligent-TPACK: An empirical study on teachers' professional knowledge to ethically integrate artificial intelligence (AI)-based tools into education. *Computers in Human Behavior*, 138. <https://doi.org/10.1016/j.chb.2022.107468>
- Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education*, 20(1). <https://doi.org/10.1186/s41239-023-00408-3>
- Chiu, T. K. F. (2024). Future research recommendations for transforming higher education with generative AI. *Computers and Education: Artificial Intelligence*, 6. <https://doi.org/10.1016/j.caeai.2023.100197>
- Chun, J. & Elkins, K. (2023). The crisis of artificial intelligence: a new digital humanities curriculum for human-centred AI. *International Journal of Humanities and Arts Computing*, 17(2), 147-167. <https://doi.org/10.3366/ijhac.2023.0310>
- Cordero, J., Torres-Zambrano, J. & Cordero-Castillo, A. (2024). Integration of Generative Artificial Intelligence in Higher Education: Best Practices. *Education Sciences*, 15(1), 32. <https://doi.org/10.3390/educsci15010032>
- Corformat, M., Martineau, J. T. & Régis, C. (2025, enero). High-reward, high-risk technologies? An ethical and legal account of AI development in healthcare. En *BMC medical ethics* (Vol. 26, Número 1, p. 4). <https://doi.org/10.1186/s12910-024-01158-1>
- Crawford, J., Cowling, M., Ashton-Hay, S., Kelder, J.-A., Middleton, R. & Wilson, G. S. (2023). Artificial Intelligence and Authorship Editor Policy: ChatGPT, Bard Bing AI, and beyond. *Journal of University Teaching and Learning Practice*, 20(5). <https://doi.org/10.53761/1.20.5.01>
- Crompton, H. & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, 20(1). <https://doi.org/10.1186/s41239-023-00392-8>
- Dai, Y., Liu, A. & Lim, C. P. (2023). Reconceptualizing ChatGPT and generative AI as a student-driven innovation in higher education. 119, 84-90. <https://doi.org/10.1016/j.procir.2023.05.002>
- Diao, S. (2020). *The Reform of Teaching Management Mode Based on Artificial Intelligence in the Era of Big Data*. 1533(4). <https://doi.org/10.1088/1742-6596/1533/4/042050>

- Eager, B. & Brunton, R. (2023). Prompting Higher Education towards AI-augmented teaching and learning practice. *Journal of University Teaching and Learning Practice*, 20(5).  
<https://doi.org/10.53761/1.20.5.02>
- Feigerlova, E., Hani, H. & Hothersall-Davies, E. (2025). A systematic review of the impact of artificial intelligence on educational outcomes in health professions education. *BMC Medical Education*, 25(1), 129.  
<https://doi.org/10.1186/s12909-025-06719-5>
- Firat, M. & Kuleli, S. (2024). Educational frontiers with ChatGPT: a social network analysis of influential tweets. *Alteridad*, 19(2), 224-235.  
<https://doi.org/10.17163/alt.v19n2.2024.06>
- Flores-Vivar, J.-M. & García-Peñalvo, F.-J. (2023). Reflections on the ethics, potential, and challenges of artificial intelligence in the framework of quality education (SDG4). *Comunicar*, 30(74), 35-44.  
<https://doi.org/10.3916/C74-2023-03>
- Gómez-Diago, G. (2022). Perspectives to address artificial intelligence in journalism teaching. A review of research and teaching experiences. *Revista Latina de Comunicación Social*, 80, 29-46.  
<https://doi.org/10.4185/RLCS-2022-1542>
- Hagendorff, T. (2024). Mapping the ethics of Generative AI: a comprehensive scoping review. *Minds and Machines*, 34(4), 39.  
<https://doi.org/10.1007/s11023-024-09694-w>
- Javed, R. T., Nasir, O., Zea, E., Gupta, S., Vinuesa, R. & Qadir, J. (2022). Get out of the BAG! Silos in AI ethics education: unsupervised topic modeling analysis of Global AI Curricula Loïs Vanhée. En *KTH Royal Institute of Technology FLOW, Engineering Mechanics Osquars* (Vol. 73, p. 44).  
<https://wasp-hs.org/projects/>
- Keith, M., Keiller, E., Windows-Yule, C., Kings, I. & Robbins, P. (2025). Implementation and evaluation of generative artificial intelligence (GAI) in chemical engineering education. *Education for Chemical Engineers*.  
<https://doi.org/10.1016/j.ece.2025.01.002>
- Kohnke, L., Moorhouse, B. L. & Zou, D. (2023). Exploring generative artificial intelligence preparedness among university language instructors: A case study. *Computers and Education: Artificial Intelligence*, 5.  
<https://doi.org/10.1016/j.caeai.2023.100156>
- Leoste, J., Jögi, L., Ōun, T., Pastor, L., San Martín López, J. & Grauberg, I. (2021). Perceptions about the future of integrating emerging technologies into higher education—The case of robotics with artificial intelligence. *Computers*, 10(9).  
<https://doi.org/10.3390/computers10090110>
- Lozano, A. & Blanco Fontao, C. (2023). Is the education system prepared for the irruption of Artificial Intelligence? A study on the perceptions of students of Primary Education Degree from a dual perspective: current pupils and future teachers. *Education Sciences*, 13(7).  
<https://doi.org/10.3390/educsci13070733>
- Ma, J. (2021). Intelligent decision system of higher educational resource data under Artificial Intelligence Technology. *International Journal of Emerging Technologies in Learning*, 16(5), 130-146.  
<https://doi.org/10.3991/ijet.v16i05.20305>
- Michel-Villarreal, R., Vilalta-Perdomo, E., Salinas-Navarro, D. E., Thierry-Aguilera, R. & Gerardou, F. S. (2023). Challenges and opportunities of generative AI for Higher Education as explained by ChatGPT. *Education Sciences*, 13(9).  
<https://doi.org/10.3390/educsci13090856>
- Moorhouse, B. L., Yeo, M. A. & Wan, Y. (2023). Generative AI tools and assessment: Guidelines of the world's top-ranking universities. *Computers and Education Open*, 5.  
<https://doi.org/10.1016/j.caeo.2023.100151>
- Nam, B. H. & Bai, Q. (2023). ChatGPT and its ethical implications for STEM research and higher education: A media discourse analysis. *International Journal of STEM Education*, 10(1).  
<https://doi.org/10.1186/s40594-023-00452-5>
- Ng, D. T. K., Chan, E. K. C. & Lo, C. K. (2025). Opportunities, challenges and school strategies for integrating generative AI in education. *Computers and Education: Artificial Intelligence*, 8, 100373.  
<https://doi.org/10.1016/j.caeai.2025.100373>
- Nikolic, S., Daniel, S., Haque, R., Belkina, M., Hassan, G. M., Grundy, S., Lyden, S., Neal, P. & Sandison, C. (2023). ChatGPT versus engineering education assessment: A multidisciplinary and multi-institutional benchmarking and analysis of this generative artificial intelligence tool to investigate assessment integrity. *European Journal of Engineering Education*, 48(4), 559-614.  
<https://doi.org/10.1080/03043797.2023.2213169>
- Ramírez Vergara, K. M., López-Chau, A. & Rojas Hernández, R. (2024). Storytelling utilizing Generative AI to foster inclusion of individuals with disabilities. *Ingenius*, (32), 101-113. <https://doi.org/10.17163/ings.n32.2024.10>
- Puerto, D. A. & Gutiérrez-Esteban, P. (2022). Artificial Intelligence as an Educational Resource during

- preservice teacher training. *RIED-Revista Iberoamericana de Educacion a Distancia*, 25(2), 347-362. <https://doi.org/10.5944/ried.25.2.32332>
- Rudolph, J., Ismail, M. F. B. M. & Popenici, S. (2024). Higher Education's Generative Artificial Intelligence paradox: the meaning of Chatbot Mania. *Journal of University Teaching and Learning Practice*, 21(6). <https://doi.org/10.53761/54fs5e77>
- Saltos, G. D. C., Oyarvide, W. V., Sánchez, E. A. & Reyes, Y. M. (2023). Bibliometric analysis on neuroscience, artificial intelligence and robotics studies: Emphasis on disruptive technologies in education. *Salud, Ciencia y Tecnología*, 3. <https://doi.org/10.56294/saludcyt2023362>
- Sanusi, I. T., Oyelere, S. S., Vartiainen, H., Suhonen, J. & Tukiainen, M. (2023). A systematic review of teaching and learning machine learning in K-12 education. *Education and Information Technologies*, 28(5), 5967-5997. <https://doi.org/10.1007/s10639-022-11416-7>
- Silva-Rodriguez, J., Colomer, A., Dolz, J. & Naranjo, V. (2021). Self-Learning for Weakly Supervised Gleason Grading of Local Patterns. *IEEE Journal of Biomedical and Health Informatics*, 25(8), 3094-3104. <https://doi.org/10.1109/JBHI.2021.3061457>
- Slimi, Z. & Carballido, B. V. (2023). Navigating the Ethical Challenges of Artificial Intelligence in Higher Education: An Analysis of Seven Global AI Ethics Policies. *TEM Journal*, 12(2), 590-602. <https://doi.org/10.18421/TEM122-02>
- Sperling, K., Stenberg, C.-J., McGrath, C., Åkerfeldt, A., Heintz, F. & Stenliden, L. (2024). In search of artificial intelligence (AI) literacy in teacher education: A scoping review. *Computers and Education Open*, 6. <https://doi.org/10.1016/j.caeo.2024.100169>
- Sullivan, M., Kelly, A. & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning and Teaching*, 6(1), 31-40. <https://doi.org/10.37074/jalt.2023.6.1.17>
- Tubella, A. A., Mora-Cantalops, M. & Nieves, J. C. (2024). How to teach responsible AI in Higher Education: Challenges and opportunities. *Ethics and Information Technology*, 26(1). <https://doi.org/10.1007/s10676-023-09733-7>
- Usher, M. & Barak, M. (2024). Unpacking the role of AI ethics online education for science and engineering students. *International Journal of STEM Education*, 11(1). <https://doi.org/10.1186/s40594-024-00493-4>
- Vallis, C., Wilson, S., Gozman, D. & Buchanan, J. (2024). Student perceptions of AI-Generated avatars in teaching business ethics: we might not be impressed. *Postdigital Science and Education*, 6(2), 537-555. <https://doi.org/10.1007/s42438-023-00407-7>
- van den Berg, G. & du Plessis, E. (2023). ChatGPT and Generative AI: possibilities for its contribution to lesson planning, critical thinking and openness in teacher education. *Education Sciences*, 13(10). <https://doi.org/10.3390/educsci13100998>
- Weglarz, D., Pla-Garcia, C. & Jiménez-Zarco, A. I. (2025). Acceptance of Generative AI in the creative industry: The role of UTAUT, brand recognition and trust in adoption. *Retos (Ecuador)*, 15(29), 90-27. <https://doi.org/10.17163/ret.n29.2025.01>
- Williams, R. T. (2023). The ethical implications of using generative chatbots in higher education. *Frontiers in Education*, 8. <https://doi.org/10.3389/educ.2023.1331607>
- Yin Albert, C. C., Sun, Y., Li, G., Peng, J., Ran, F., Wang, Z. & Zhou, J. (2022). Identifying and monitoring students' classroom learning behavior based on multisource information. *Mobile Information Systems*, 2022. <https://doi.org/10.1155/2022/9903342>
- Yue, M., Jong, M. S.-Y. & Ng, D. T. K. (2024). Understanding K-12 teachers' technological pedagogical content knowledge readiness and attitudes toward artificial intelligence education. *Education and Information Technologies*, 29(15), 19505-19536. <https://doi.org/10.1007/s10639-024-12621-2>
- Zhao, L., Wu, X. & Luo, H. (2022). Developing AI literacy for primary and middle school teachers in China: based on a structural equation modeling analysis. *Sustainability (Switzerland)*, 14(21). <https://doi.org/10.3390/su142114549>



# Educational platformization with Generative AI: impacts on teacher autonomy

## *Plataformización educativa con IA Generativa: impactos en la autonomía docente*

**ID** **Dr. Igor Radtke-Bederode** is a professor at Instituto Federal Sul-rio-grandense (Brazil).  
(igor.bederode@gmail.com) (<https://orcid.org/0000-0002-3579-4387>)

**ID** **Dr. Luis Otoni Meireles-Ribeiro** is a professor at Instituto Federal Sul-rio-grandense (Brazil).  
(luis.otoni@gmail.com) (<https://orcid.org/0000-0002-5526-8632>)

**Received:** 2025-02-12 / **Revised:** 2025-05-24 / **Accepted:** 2025-06-12 / **Published:** 2025-07-01

### Abstract

The accelerated growth of generative artificial intelligence (GAI) platforms in the educational field demands a critical analysis of their impact on teacher autonomy. This study aims to investigate how these technologies influence teachers' pedagogical freedom and to propose strategies for their ethical, conscious, and strategically aligned use in contemporary educational practices. The research adopted a qualitative, exploratory approach, supported by an analytical framework developed and validated through a focus group with experts in digital technology-mediated education. The results show that although the platforms analyzed — Teachy, MagicSchool and PlanIt Teachers — offer innovative features for lesson planning, activities, and assessments, their uncritical use may compromise teachers' creativity and professional independence. The findings reveal that relying on automatically generated responses from GAI tends to restrict pedagogical decision-making, subordinating teachers to algorithmic logic that is often biased, technical, and non-transparent. The discussion highlights the risk of diminishing teacher agency and emphasizes the need to develop Prompt Engineering as a key competency to maintain professional autonomy. The study concludes that mastering this skill allows teachers to consciously configure their interactions with platforms, enhancing their control over pedagogical processes. Thus, GAI can shift from being perceived as a threat to becoming an ally of critical, creative, innovative, and contextualized educational practices.

**Keywords:** artificial intelligence, educational technology, educational autonomy, educational innovations, teacher qualifications, digital platforms.

### Resumen

El crecimiento acelerado de las plataformas de inteligencia artificial generativa (IAG) en el ámbito educativo exige un análisis crítico de sus impactos en la autonomía docente. Este estudio tiene como objetivo investigar cómo estas tecnologías influyen en la libertad pedagógica de los docentes, proponiendo caminos para su uso ético, consciente y estratégicamente alineado con las prácticas educativas contemporáneas.

La investigación se llevó a cabo utilizando un enfoque cualitativo, exploratorio, anclado en un *marco* analítico desarrollado y validado a través de un grupo focal con expertos en tecnologías digitales aplicadas a la educación. Los resultados indican que, si bien las plataformas analizadas — *Teachy*, *MagicSchool* y *PlanIt Teachers*— presentan funcionalidades innovadoras para planificar lecciones, actividades y evaluaciones, su uso acrítico puede comprometer la creatividad y la independencia docente. Se observó que la adopción automatizada de las respuestas generadas por IAG tiende a restringir la toma de decisiones pedagógicas, subordinando a los docentes a una lógica algorítmica, muchas veces sesgada y poco transparente. La discusión destaca el riesgo de reducir el protagonismo docente y la necesidad de desarrollar habilidades en ingeniería de *prompt* como estrategia para mantener la autonomía profesional. Se concluye que el dominio de esta habilidad permite la configuración consciente de las interacciones con las plataformas, aumentando el control sobre los procesos pedagógicos. De esta forma, la IAG puede dejar de representar una amenaza y convertirse en un aliado de la práctica docente crítica, creativa, innovadora y contextualizada.

**Palabras clave:** inteligencia artificial, tecnología educativa, autonomía docente, innovación educativa, habilidades docentes, plataformas digitales.

**Suggested citation (APA):** Radtke-Bederode, I. & Meireles-Ribeiro, L. O. (2025). Educational platformization with Generative AI: impacts on teacher autonomy. *Alteridad*, 20(2), 173-183. <https://doi.org/10.17163/alt.v20n2.2025.02>

## 1. Introduction

The use of Generative Artificial Intelligence (GAI) in education can profoundly transform the educational landscape. GAI platforms used by teachers, such as *Teachy*, *MagicSchool*, and *PlanIt Teachers*, aim to optimize teaching work and offer comprehensive solutions for everyday challenges, such as lesson planning, assessment creation, and student performance analysis (Xin, 2024; Celik et al., 2022; Niu et al., 2022).

This technological revolution has been driven by the promise of increased efficiency, personalization, and democratized access to advanced resources (Duan and Zhao, 2024; Zawacki-Richter et al., 2019). However, the use of these tools raises important questions: to what extent does the intensive use of AI platforms compromise teacher autonomy? Does entrusting pedagogical planning to algorithms reduce the teacher's role to that of a mere technology operator? These are crucial questions, as they point to the risk of the educational process becoming a platformized, overly automated and standardized system, neglecting cultural and pedagogical diversity and the specific needs of students (Silva and Carolei, 2024; Gruzdeva, 2022; Haleem et al., 2022).

The relevance of this study lies in a context with fast technological expansion, in which teachers face challenges arising from the increasing integration of GAI tools in education. While these technologies promise greater efficiency and personalization in teaching, it is critical to ensure that their adoption does not result in superficial pedagogical practices or over-reliance on GAI tools (Sağın et al., 2023).

Therefore, this study investigates the impacts of GAI platforms targeting the educational domain on teacher autonomy. Unlike approaches that merely criticize the risks, the ide aims to present a constructive perspective, arguing that engineering prompts - the ability to create precise and strategic commands to interact with AI tools - can be a practical solution to empower teachers. This approach positions the teacher as a co-creator and agent of AI-generated outcomes, rather than a mere passive consumer of automated solutions. To critically analyze the functions and limitations of the *Teachy*, *MagicSchool* and *PlanIt Teachers* platforms; 2. To understand how these tools can impact teacher autonomy; and 3. To propose ways for prompts engineering to be

incorporated as an essential teaching practice, strengthening teacher autonomy and creative capacity. With the fulfillment of these objectives, the paper aims to contribute to the construction of more solid pedagogical practices adapted to contemporary technological demands, placing the teacher at the center of the educational process. The article is divided into five sections : introduction, methodology, presentation and discussion of the results, and the final considerations.

### 1.1 Artificial Intelligence in education

The use of Generative Artificial Intelligence in education has attracted increasing academic interest, given its potential to transform traditional pedagogical practices (Szabó and Szoke, 2024; Xia et al., 2024; Vallis et al., 2024, Bahroun et al., 2023). Researchers claim that GAI tools can help teachers create innovative lesson plans and creative content, promoting an environment conducive to exploration (Butler-Ulrich et al., 2024; Pont-Niclòs et al., 2024). In addition, they can contribute to the development of personalized learning experiences geared to meet the diverse needs of learners (Sipahioğlu, 2024; Barroso et al., 2024). However, some studies warn of the risk of over-reliance on GAI tools by teachers, which may reduce teachers' intrinsic motivation and critical thinking, compromising their autonomy and creativity (Firat and Kuleli, 2024; Williamson and Eynon, 2020).

### 1.2 Educational platformization

Researchers in the field of education have already warned about the risks of educational institutions adopting digital platforms such as *Google Workspace for Education* and *Microsoft 365*, which, although supposedly «free», actually hide a business model based on the massive collection of personal data for profit (Silva and Carolei, 2024). The concept of «platformization» refers to the reorganization of various sectors of society around digital platforms, which act as intermediaries between users and providers of products and services, including education. These platforms have a complex architecture involving connectivity, data collection and the use of artificial intelligence algorithms, allowing them to influence behaviors and shape users' decisions

(Martorell and Tirado, 2024). The risks associated with the platformization of education may be significantly amplified with the introduction of AI-based platforms and their computational algorithms. These algorithms can create informational filters that limit access to different perspectives, reinforcing biases and contributing to a more homogeneous and standardized education. Ultimately, this reduces the autonomy of educators and compromises the quality of the educational process (Kerssens and van Dijck, 2022, 2023; Putri et al., 2024).

### 1.3 Potentials and risks of GAI

While GAI offers promising tools for improving educational practices, its integration requires caution so as not to undermine teacher autonomy (Broadfoot and Rockey, 2025; Li, 2024). Łodzikowski et al. (2024) note benefits such as personalization of learning, automated assessment, interactive participation, and task automation, but warn of risks such as reproduction of bias, misinformation, loss of pedagogical control, ethical challenges, and technical difficulties. Therefore, ethical and effective implementation of GAI requires active human supervision and continuous teacher training, with the teacher at the center of the educational process.

### 1.4 Prompt engineering as a teaching competence

In the contemporary context of constant technological evolution, the continuous development of digital skills by educators becomes increasingly necessary (Kurtz et al, 2024). In the case of GAI, the key is to find a balance between leveraging the capabilities of GAI and preserving the essential human approach in the educational process (Humble, 2024; Bobula, 2024). In this context, *prompt* engineering emerges as an essential skill for teachers to strategically interact with these platforms, configuring responses aligned to pedagogical needs and preserving their autonomy.

*Prompt* engineering is the process of creating, adjusting and refining commands to optimize the interaction between users and GAI models. This practice is essential to ensure accurate and relevant results by structuring prompts in a clear and contextualized way (Lee and Palmer, 2025). Among its main elements

are the PARTS (Persona, Aim, Recipients, Theme, Structure) structure and the CLEAR (Concise, Logical, Explicit, Adaptive, Restrictive) linguistic approach, which help to formulate more effective prompts (Park and Choo, 2024).

In this sense, *prompt* engineering emerges as a practical and strategic approach to mitigate the ethical and technical challenges of using GAI (Rathod, 2024). This practice, which involves the creation of detailed textual commands to guide the AI, allows teachers to control the outcomes generated, ensuring alignment with pedagogical and contextual goals. By mastering this skill, the teacher ceases to be a passive user of AI platforms and becomes a co-creator, able to shape interactions and outcomes. This competence not only increases teaching autonomy, but also favors the personalization of teaching, allowing content to reflect the specific needs of each group of students (Park and Choo, 2024). Therefore, it is an essential competence to preserve pedagogical integrity and avoid reliance on predefined platform solutions.

## 2. Methodology

### 2.1 Methodological approach and nature of the research

The research is qualitative according to the principles described by Bogdan and Biklen (1999), respecting the five fundamental characteristics indicated by the authors: (i) the direct source of data is the natural environment, with the researcher being the main instrument of collection; (ii) it is a descriptive research; (iii) the focus is on processes rather than on results or products; (iv) data analysis is carried out inductively; and (v) meaning is attributed to the participants. The study is exploratory in nature (Gil, 2008) and is anchored in an analytical framework constructed and validated through a focus group (Gatti, 2005; Nyumba et al., 2024).

### 2.2 Characterization of the expert group

The focus group was conducted with the TEDCOM-Educational Technologies in Connectivity and Mobility Research Group, composed of 30 members, including the authors of this article. The group gathers teachers, instructional designers and Master's

and PhD students in the area of Education mediated by Digital Technologies. This group characterizes a group of experts, since it is composed of participants with advanced academic training, consolidated professional experience and direct work in the area of Education mediated by Digital Technologies, which gives them technical and theoretical mastery over the object of research.

### 2.3 Research procedures and data collection instruments

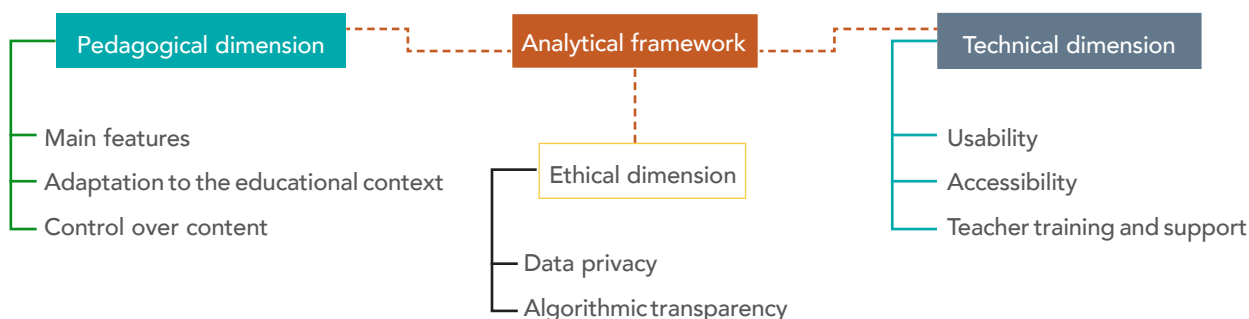
The group of experts initially created an Analytical Framework for Generative Artificial Intelligence Platforms in Education, with the objective of operationalizing the critical analysis of the impacts of these technologies on teacher autonomy. This process was designed collaboratively, anchored on the theoretical review and the experience of the focus group participants, who acted as co-constructors and validators of the instrument.

To this end, we initially conducted an exploratory review of the national and international scientific literature on the platformization of education, the use of generative AI in teaching and emerging skills such as *prompt* engineering. This review allowed us to identify the main challenges and recurring categories in the analysis of AI-based tools in the educational context. Based on this mapping, a preliminary structure of analytical categories was defined to guide the evaluation of the platforms.

This initial model was subjected to two rounds of validation with a focus group. The sessions lasted two hours each and were held in different weeks. During the meetings, participants critically analyzed the proposed categories, suggested reformulations and added criteria considered relevant based on their practical and theoretical experiences.

As a result of this interactive and dialogic process, three main dimensions were consolidated, the visual representation of which is shown in Figure 1.

**Figure 1.** Analytical framework of generative artificial intelligence platforms in education



The analytical framework allows an evaluation process of GAI platforms in education, based on three essential dimensions: pedagogical, technical and ethical.

**Pedagogical dimension:** its main objective is to evaluate how the platforms address teaching needs in pedagogical planning and practice. Tools for developing lesson plans, creating evaluations and personalizing teaching are analyzed, considering the automatic generation of materials, the support of multimodal content and integration with official curricula. Compatibility with different educational levels and pedagogical guidelines, such as Brazil's National Common Curriculum Base (BNCC), is also observed. In addition, the possibility of custo-

mization to meet the diversity of student profiles and teaching methodologies is evaluated, investigating whether teachers can modify, adjust or reject the automatically generated content, as well as the flexibility of the tool to integrate different methodological approaches.

**Technical dimension:** evaluates the usability and accessibility of the platforms, considering aspects such as interface, technical support and digital accessibility. It verifies that the interface is intuitive and accessible for teachers with different levels of technological familiarity, and the availability of guides, tutorials and technical support, in addition to providing training for the autonomous and critical use of the tools. Compatibility with

different devices (computers, smartphones, tablets) and support for users with disabilities are also considered, ensuring compliance with international accessibility standards.

**Ethical dimension:** analyzes data privacy and the transparency of algorithms on the platforms. It verifies whether the platform clearly informs about its policies on the collection, storage and use of user data, and its compliance with data protection legislation, such as the Brazilian General Personal Data Protection Law (LGPD). It also assesses whether the platform enables teachers to understand the logic of recommendations and content generation, and whether it provides options to customize automated decisions.

Based on this analytical framework, the group of experts constructed a Checklist for the Evaluation of Generative Artificial Intelligence Platforms in Education, composed of 23 items with three response options for each: Yes, fully met; Partially answered; and Not answered.

The categories, items and questions are organized as follows:

### **Pedagogical dimension:**

*Main features.* Does the platform offer tools for lesson planning? Does it have resources for creating assessments? Does it allow for personalized teaching? Does it offer automatic generation of material? Does it include multimodal capabilities? Does it integrate with official curricula?

*Adequacy to the educational context.* Does the platform support different educational levels? Is it aligned with pedagogical guidelines (e.g. BNCC)? Does it allow customization for classes with different profiles?

*Control over content.* Can the teacher modify, adjust or reject automatically generated content? Does the tool allow the integration of teacher's own methodologies?

### **Technical dimension:**

*Usability:* Is the interface intuitive and easy to navigate? Can it be used by teachers with different levels of digital competence? Does the platform offer tutorials and guides? Is technical support available?

*Accessibility:* Is it compatible with computers, smartphones and tablets? Does it include digital accessibility features (screen readers, subtitles, contrast adjustment)?

*Training and teaching support.* Does the platform offer training or technical support for stand-alone use? Does it provide resources for teachers to use the tools critically?

### **Ethical dimension:**

*Data privacy.* Does the platform inform how data is collected, stored and used? Does it comply with legislation such as the LGPD?

*Algorithmic transparency.* Does the platform allow teachers to understand how automated decisions work? Is it possible to adjust recommendations and automatically generated content?

The expert panel conducted three two-hour sessions in different weeks to analyze the *Teachy*, *MagicSchool* and *PlanIt Teachers* platforms, based on the analytical framework and checklist. These platforms were chosen for their representativeness in the current scenario of tools based on GAI platforms oriented to education, which can be seen through references to them, especially in educators' social networks, teaching forums and educational repositories.

Each session addressed one dimension: pedagogical, technical and ethical. The choice to focus on one dimension per week, instead of evaluating them all on one platform at a time, was a strategic methodological decision. This approach favored consistent cross-sectional comparisons, concentration on criteria, reflective maturation between meetings and greater equity in the analysis. It also prevented familiarity with one platform from influencing the assessment of the others, ensuring greater criticality, methodological rigor and consistency in the assignment of scores. It is important to note that the scores attributed to each item/dimension resulted from the consensus among the focus group participants, based on the collective discussion of criteria and perceptions.

Based on the scoring criteria, it was defined whether the platform favors or compromises teacher autonomy. Each item on the checklist was scored as follows: Yes, fully met = 2 points; Partially met = 1 point; Not answered = 0 points. Based on the results, the following evaluation scale was established to measure the impact of the platforms on teaching autonomy: 36 to 46 points - the platform significantly strengthens teaching autonomy, allowing full control over content and methodologies; 24 to 35 points: the platform offers reasonable support for autonomy

but imposes some restrictions on personalization and decision making; 12 to 23 points: the platform presents substantial limitations, compromising pedagogical flexibility; and 0 to 11 points: the platform excessively centralizes pedagogical decisions, compromising teacher autonomy and promoting technological dependence.

Finally, the results of the analyses were compared and discussed, supporting the conclusions of the study.

### 3. Results

The analysis of the *Teachy*, *MagicSchool* and *PlanIt Teachers* platforms was performed according to the criteria defined in the analytical framework, completing the checklist. The main observations are highlighted below.

#### 3.1 Analysis of the Teachy Platform - <https://www.teachy.com.br/>

The *Teachy* artificial intelligence platform is Brazilian, developed to help teachers prepare lesson plans, create questions and activities for different educational levels (Brito and Brito, 2024).

##### **Pedagogical dimension** (19 points in total):

*Main features:* the platform allows the creation of interactive lessons (2 points) and offers support for quizzes and assessments (2 points). Teachers can adapt content to students' needs (2 points). AI automatically generates lesson plans and teaching materials (2 points). It includes multimodal resources, focusing on texts and assessments (2 points). No clear mention of BNCC or other official curricula (0 points). Subtotal: 10 points.

*Appropriateness to the educational context:* *Teachy* can be used at different educational levels, focusing on Primary and Secondary Education (2 points). There is no explicit information on compliance with pedagogical guidelines (0 points). Teachers can customize materials for different classes (2 points). Subtotal: 4 points.

*Control over the content:* the user can modify, adjust or reject the generated content (2 points). It is possible to integrate own methodologies, inserting personalized strategies (2 points). Subtotal: 4 points.

##### **Technical dimension** (13 points in total):

*Usability:* intuitive and well-structured interface (2 points), easy to use by teachers with different levels of technological familiarity (2 points). It offers guides, tutorials (2 points) and support by chat and e-mail (2 points). Subtotal: 8 points.

*Accessibility:* compatible with computers, smartphones and tablets (2 points). No explicit mention of digital accessibility features such as screen readers, subtitles or contrast (0 points). Subtotal: 2 points.

*Teacher training and support:* provides tutorials and support materials for independent use (2 points). Despite support, there is no explicit encouragement for pedagogical reflection on the use of AI (1 point). Subtotal: 3 points.

##### **Ethical dimension** (3 points total):

*Data privacy:* the platform provides information on data collection, storage and use, but in a superficial manner (1 point). It states compliance with the LGPD, but without going into details (1 point). Subtotal: 2 points.

*Algorithmic transparency:* no clear explanations of how algorithms work (0 points). Some options allow adjusting recommendations and automatic content generation (1 point). Subtotal: 1 point.

With 35 points in the final sum, *Teachy* falls into the category of adequate support for teaching autonomy, although it has limitations in customization and decision making. It stands out for its resources oriented to the planning and creation of personalized assessments, but lacks improvements in accessibility, integration with official curricula and algorithmic transparency, which may limit its application in more diverse educational contexts.

#### 3.2 MagicSchool platform review - <https://www.magic-school.ai/>

*MagicSchool* is an international artificial intelligence platform developed to support educators in various pedagogical tasks (Chacón Molina et al., 2024). It offers tools to create lesson plans, develop assessments, create rubrics, and provide guidance on specific courses (Montenegro et al., 2024).

**Pedagogical dimension** (18 points total):

*Key features:* *MagicSchool* offers tools for lesson planning, allowing the generation of plans aligned to educational standards (2 points). It supports the creation of customized tests and quizzes (2 points). Teachers can adapt the generated content to the specific needs of students, promoting personalized teaching (2 points). Using AI, the tool automatically generates teaching materials such as lesson plans and assessments (2 points). It includes multimodal resources, such as generation of slides and images to enrich the teaching-learning process (2 points). Although it allows the creation of plans aligned to educational standards, there is no specific mention of integration with official curricula such as BNCC (1 point). Subtotal: 11 points.

*Appropriateness to the educational context:* the platform was developed to serve educators at all levels of education, from elementary to higher education (2 points). While it facilitates the creation of materials aligned with educational standards, there is no specific information on compliance with guidelines such as BNCC (1 point). Teachers can adapt materials for different classes, addressing the specific needs of each group (2 points). Subtotal: 5 points.

*Control over content:* educators have partial freedom to edit, adjust or discard the content generated by the platform (1 point). The tool offers limited flexibility for teachers to incorporate their own teaching methodologies into the materials (1 point). Subtotal: 2 points.

**Technical dimension** (14 points total):

*Usability:* the interface is intuitive and well structured, making it easy for teachers to navigate and use (2 points). It is accessible to educators with different levels of technological ability, offering support and easy-to-understand materials (2 points). Provides support materials, including tutorials and guides to use the functions (2 points). Provides technical support to clarify doubts and resolve difficulties (2 points). Subtotal: 8 points. *Accessibility:* compatible with different devices (computers, smartphones and tablets), allowing access in different contexts (2 points). While designed to be inclusive, there is no specific information on features such

as screen readers or adjustable contrast options (1 point). Subtotal: 3 points.

*Teacher training and support:* provides support materials and technical assistance to help teachers use the tool independently (2 points). However, there is no explicit focus on encouraging critical use of the functions (1 point). Subtotal: 3 points.

**Ethical dimension** (5 points total):

*Data privacy:* *MagicSchool's* privacy policy details how user data is collected, stored and used (2 points). The platform claims to comply with data protection legislation, ensuring user privacy (2 points). Subtotal: 4 points.

*Algorithmic transparency:* no information is available on how algorithms make decisions or generate recommendations (0 points). Some customizations are allowed, but without full transparency on how the settings affect algorithm performance (1 point). Subtotal: 1 point.

With a total of 37 points, *MagicSchool* is classified as a platform that significantly strengthens teacher autonomy, offering control over content and methodologies. It stands out for its wide range of functions oriented to lesson planning, assessment creation and teaching customization, providing effective support to teachers. Its intuitive interface, compatibility with multiple devices and provision of guides and tutorials make the user experience accessible and efficient. However, there are still areas for improvement, especially in terms of algorithmic transparency, as the platform does not clarify how automated decisions are made. In addition, integration with official curricula and the presence of specific digital accessibility resources remain points of attention. Despite these limitations, *MagicSchool* represents a robust and innovative solution for teachers seeking to optimize their pedagogical practices with the support of artificial intelligence.

### 3.3 Analysis of the PlanIt Teachers platform - <https://www.planitteachers.ai/>

*PlanIt Teachers* is an artificial intelligence platform designed to help teachers create curriculum-aligned lesson plans, worksheets, and assessments. Developed by educators, it offers AI tools that enable customization of teaching resources, such as

classroom slides, student worksheets, and support materials (PlanIt Teachers, 2024).

**Pedagogical dimension** (20 points total):

*Key features:* *PlanIt Teachers* offers a set of artificial intelligence-driven lesson creation tools, enabling rapid generation of curriculum-aligned lesson plans (2 points). The intelligent assessment center facilitates test creation, providing automated feedback and monitoring student progress (2 points). The platform allows for the customization of teaching materials, tailoring instruction to the specific needs of the students (2 points). It automatically generates a variety of materials such as lesson plans, presentations, activities and assessments (2 points). It offers multimodal resources, allowing the creation of slides, activity cards and other formats (2 points). While it mentions alignment with curriculum and intelligent content mapping, it does not specify which curriculum standards or guidelines are used (1 point). Subtotal: 11 points.

*Adequacy to the educational context:* the platform is applicable at different educational levels and covers more than 50 areas of knowledge (2 points). Although it mentions curricular alignment, it does not provide information on compliance with national guidelines (1 point). Flexibility in adapting the materials allows us to meet the needs of different classes and educational contexts (2 points). Subtotal: 5 points.

*Control over content:* teachers have total freedom to edit, adjust or reject the content generated by the platform (2 points). The tool offers flexibility to incorporate their own methodologies, allowing teachers to apply their own pedagogical strategies to the materials (2 points). Subtotal: 4 points.

**Technical dimension** (15 points total):

*Usability:* the *PlanIt Teachers* interface is intuitive and well structured, making it easy for educators to navigate and use (2 points). It was designed to cater to teachers with different levels of technological familiarity, offering support and accessible resources (2 points). It provides support materials, including tutorials and guides to help users with its functionality (2 points). Technical support is available to solve doubts and difficulties, ensuring adequate follow-up (2 points). Subtotal: 8 points.

*Accessibility:* compatibility with computers, smartphones and tablets allows the platform to be used on different devices and in different contexts (2 points). Although it is designed to be inclusive, there is no specific information on the availability of features such as screen readers, subtitles or contrast settings (1 point). Subtotal: 3 points.

*Teacher training and support:* the platform offers support materials and technical support to help teachers use the tool independently (2 points). In addition, it promotes the critical use of the tools, allowing the adaptation of the contents according to the pedagogical needs of the teachers (2 points). Subtotal: 4 points.

**Ethical dimension** (1 point total):

*Data privacy:* *PlanIt Teachers* does not provide details on how user data is collected, stored or used (0 points). It also does not state compliance with data protection legislation, such as the LGPD (0 points). Subtotal: 0 points.

*Algorithmic transparency:* no information on how the platform's algorithms make decisions or generate recommendations (0 points). Some customizations are allowed in the generated content, but no transparency on the impact of these configurations on the algorithm performance (1 point). Subtotal: 1 point.

With a total of 36 points, *PlanIt Teachers* is a platform that strengthens teaching autonomy, providing control over content and methodologies. It stands out for its wide range of functions oriented to the creation of lesson plans, development of evaluations and personalization of teaching, offering consistent support to teachers. Its intuitive interface, compatibility with multiple devices and the presence of guides and tutorials make the user experience accessible and effective. However, there are areas for improvement, especially in terms of algorithmic transparency - as the platform does not explain how its automated decisions are made - and the lack of clear policies on data privacy and integration with official curricula. Despite these limitations, *PlanIt Teachers* represents a viable solution for teachers who want to improve their pedagogical practices with the support of artificial intelligence.

## 4. Discussion

The analysis of the *Teachy*, *MagicSchool* and *PlanIt Teachers* platforms reveals a complex and multifaceted picture regarding the impact of generative artificial intelligence (GAI) on teacher autonomy. The data show that while all platforms offer significant support for pedagogical practice, the levels of autonomy granted to teachers vary considerably across the pedagogical, technical and ethical dimensions assessed.

In the pedagogical dimension, all three platforms presented robust resources for creating lesson plans, customizing materials and generating content automatically. This corroborates the findings of Szabó and Szoke (2024) and Butler-Ulrich et al. (2024), who highlight the potential of GAI to support innovative pedagogical practices. However, the platforms still fail to integrate with official curricula, such as BNCC, which may compromise the applicability of the resources in regulated contexts. This limitation was also pointed out by Gruzdeva (2022), who warns of the risks of curricular decontextualization in standardized digital solutions.

The technical dimension demonstrated reasonable usability and accessibility, with intuitive interfaces and effective technical support. However, the absence of specific digital accessibility resources in all the platforms analyzed (such as screen readers and contrast settings) is a concerning aspect, especially given the demands of inclusive education. As Kerssens and van Dijck (2022) point out, the centrality of platforms can deepen inequalities if they are not designed with principles of accessibility and equity.

Regarding the ethical dimension, the greatest weaknesses are identified: in none of the platforms was there sufficient transparency about the algorithms used or clarity in the data policy as required by regulations, such as the LGPD. This scenario reinforces the criticisms of Humble (2024) and Łodzikowski et al. (2024) about the risks of indiscriminate use of GAI in education, which include the loss of pedagogical control and the imposition of automated and potentially biased solutions.

In this context, the study reinforces the need for teacher training in prompt engineering, as advocated by Park and Choo (2024) and Rathod (2024). Mastering this skill enables teachers to strategically interact with platforms, adapting AI outputs accor-

ding to their pedagogical needs and promoting more critical, creative and contextualized practices. *Prompt* engineering emerges as a viable way to balance the benefits of GAI with the preservation of teacher autonomy and pedagogical intentionality.

## 5. Final Conclusions

The findings of this study show that the use of generative artificial intelligence platforms in education represents a promising development, but requires caution and critical thinking on the part of teachers.

The central contributions of this work lie in the proposal of a structured analytical framework and the application of a systematic checklist, which allowed a careful comparative evaluation between different platforms. These instruments may be useful for teachers and institutions seeking to adopt educational technologies in a more conscious and strategic way.

On the other hand, the main limitation identified refers to the need for greater technical depth in the ethical dimensions of the platforms, especially regarding the operation of algorithms and the management of users' personal data. In this context, it highlights the urgency of training teachers in skills such as *prompt* engineering, not only as an operational resource, but as a critical tool for pedagogical mediation.

In future research it is necessary to analyze other GAI tools applied to education, in order to broaden the understanding of their potentialities, limits and pedagogical impacts in different contexts of use, contributing to a more comprehensive and representative analysis.

In summary, the use of IAG in education should not only be incorporated, but also understood and reconfigured according to the needs of teaching practice. This perspective contributes to strengthening professional autonomy by articulating ethical criteria with the development of educators' capacity for technological agency.

## Contribution of the authors

**Dr. Igor Radtke Bederode:** conceptualization, data curation, formal analysis, research, methodology, validation, original draft-writing, writing-revision and editing.

**Dr. Luis Otoni Meireles Ribeiro:** conceptualization, data curation, formal analysis, research, methodology, validation, original draft-writing, writing-revision and editing.

## References





- Bahroun, Z., Anane, C., Ahmed, V. & Zacca, A. (2023). Transforming Education: a comprehensive review of Generative Artificial Intelligence in educational settings through bibliometric and content analysis. *Sustainability*, 15(17), 12983. <https://doi.org/10.3390/su151712983>
- Barroso, I., Palomares, A. I., Fernández, A. & Herrera, F. (2024). *Crafting personalized learning paths with AI for lifelong learning*. *Frontiers in Education*, 9, Article 1424386. <https://doi.org/10.3389/feduc.2024.1424386>
- Bobula, M. (2024). Generative artificial intelligence (AI) in higher education: a comprehensive review of challenges, opportunities, and implications. *Journal of Learning Development in Higher Education*, (30). <https://doi.org/10.47408/jldhe.vi30.1137>
- Bogdan, R. & Biklen, S. (1999). *Investigação qualitativa em Educação: Uma introdução à teoria e aos métodos*. Porto Editora.
- Brito, J. Brito & L. H. da S. (2024). *Uso da inteligência artificial Teachy para a educação geográfica: potencialidades e limites*. *Anais do X CONEDU*. Realize Editora. <https://bit.ly/3RYWBlx>
- Broadfoot, P. & Rockey, J. (2025). Generative AI and the social functions of educational assessment. *Oxford Review of Education*, 51(2), 281-300. <https://doi.org/10.1080/03054985.2025.2455549>
- Butler-Ulrich, T., Hughes, J. & Morrison, L. (2024). Creativity and generative AI for pre-service teachers. *IntechOpen*. <https://doi.org/10.5772/intechopen.1007517>
- Celik, I., Dindar, M., Muukkonen, H. & Järvelä, S. (2022). Promises and challenges of artificial intelligence for teachers: A systematic review of research. *TechTrends*, 66(4), 616-630. <https://doi.org/10.1007/s11528-022-00715-y>
- Chacón Molina, H. H., Simancas Malla, F. M., Maliza Muñoz, W. F. & Tapia Bastidas, T. (2024). Taller de capacitación docente para el uso de recursos didácticos digitales en la plataforma Magic School. *Código Científico Revista De Investigación*, 5(2), 1636-1662. <https://doi.org/10.55813/gaea/ccri/v5/n2/603>
- Duan, H. & Zhao, W. (2024). The Effects of Educational Artificial Intelligence-Powered Applications on Teachers' Perceived Autonomy, Professional Development for Online Teaching, and Digital Burnout. *The International Review of Research in Open and Distributed Learning*, 25(3), 57-76. <https://doi.org/10.19173/irrodl.v25i3.7659>
- Firat, M. & Kuleli, S. (2024). Fronteras educativas con ChatGPT: un análisis de redes sociales de tuits influyentes. *Alteridad*, 19(2), 224-235. <https://doi.org/10.17163/alt.v19n2.2024.06>
- Gatti, B. A. (2005). *Grupo focal na pesquisa em Ciências sociais e humanas*. Liber Livro.
- Gil, A. C. (2008). *Métodos e técnicas de pesquisa social*. 6. ed. Editora Atlas S.A.
- Gruzdeva, M. L. (2022). Digital technologies as a factor in the transformation of the educational process. In *Proceedings of the International Conference on Emerging Trends in Education* (pp. 223-228). Springer. [https://doi.org/10.1007/978-981-19-4005-7\\_25](https://doi.org/10.1007/978-981-19-4005-7_25)
- Haleem, A., Javaid, M., Qadri, M. A. & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275-285. <https://doi.org/10.1016/j.susoc.2022.03.001>
- Humble, N. (2024). Risk management strategy for generative AI in computing education: How to handle the strengths, weaknesses, opportunities, and threats? *International Journal of Educational Technology in Higher Education*, 21, Article 61. <https://doi.org/10.1186/s41239-024-00494-x>
- Kerssens, N. & van Dijck, J. (2022). Governed by Edtech? Valuing pedagogical autonomy in a platform society. *Harvard Educational Review*, 92(2), 284-303. <https://doi.org/10.17763/1943-5045-92.2.284>
- Kerssens, N. & van Dijck, J. (2023). The platformization of primary education in the Netherlands 1. En A. Rivas y C. Cobo (eds.), *The new digital education policy landscape: from education systems to platforms* (pp. 9-28). Routledge. <https://doi.org/10.4324/9781003373018-3>
- Kurtz, F. D., Silva, D. R. & Pansera-de-Araújo, M. C. (2024). Conocimiento docente: perspectivas para la formación permanente en el sur de Brasil. *Alteridad*, 19(2), 247-257. <https://doi.org/10.17163/alt.v19n2.2024.08>
- Lee, D. & Palmer, E. (2025). Prompt engineering in higher education: A systematic review to help inform curricula. *International Journal of Educational Technology in Higher Education*, 22(7). <https://doi.org/10.1186/s41239-025-00503-7>
- Li, X. (2024). Artificial intelligence in teacher education: Examining critical thinking and creativity through AI usage. *Frontiers of Educational Studies*, 7(2). <https://doi.org/10.59400/fes2727>
- Lodzиковski, K., Foltz, P. W. & Behrens, J. T. (2024). Generative AI and Its Educational Implications. En Kourkoulou, D., Tzirides, A. O. Cope, B.,

- Kalantzis, M. (eds.), Trust and inclusion in AI-Mediated Education. *Postdigital Science and Education*. Springer, Cham.  
[https://doi.org/10.1007/978-3-031-64487-0\\_2](https://doi.org/10.1007/978-3-031-64487-0_2)
- Martorell, J. R. & Tirado, F. (2024). *Inteligencia artificial y pulsación*. *Telos: Revista de Estudios Interdisciplinarios en Ciencias Sociales*, 26(3), 843-860. <https://doi.org/10.36390/telos263.05>
- Montenegro, J. N. P., Pallasco, E. A. C. & Cajamarca, L. A. M. (2024). *Inteligencia artificial para la asistencia pedagógica de los docentes: Transformación de prácticas docentes en Ecuador*. *Simbiosis Educativa*, 3(1), 49-68. <https://doi.org/10.60085/se.v3n1a2>
- Niu, S. J., Luo, J., Niemi, H., Li, X. & Lu, Y. (2022). *Teachers' and Students' Views of Using an AI-Aided Educational Platform for Supporting Teaching and Learning at Chinese Schools*. *Education Sciences*, 12(12), 858.  
<https://doi.org/10.3390/educsci12120858>
- Nyumba, T. O., Wilson, K., Derrick, C. J. & Mukherjee, N. (2018). The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and Evolution*, 9(1), 20-32.  
<https://doi.org/10.1111/2041-210X.12860>
- Park, J. & Choo, S. (2024). *Generative AI Prompt Engineering for educators: practical strategies*. *Journal of Special Education Technology*.  
<https://doi.org/10.1177/01626434241298954>
- PlanIt Teachers. (2024). *Ethical AI in education: empowering teacher technology leadership*.  
<https://bit.ly/4dc9fYf>
- Pont-Niclòs, I., Echegoyen-Sanz, Y., Orozco-Gómez, P. & Martín-Expeleta, A. (2024). *Creatividad e inteligencia artificial: Un estudio con futuros docentes*. *Digital Education Review*, 45, 91-97. <https://doi.org/10.1344/der.2024.45.91-97>
- Putri, S. D. G., Purnomo, E. P. & Khairunissa, T. (2024). *Echo Chambers and Algorithmic Bias: The Homogenization of Online Culture in a Smart Society*. *SHS Web of Conferences*, 202, 0500.  
<https://doi.org/10.1051/shsconf/202420205001>
- Rathod, J. D. (2024). *Systematic Study of Prompt Engineering*. *International Journal of Science, Technology, and Engineering*, 12(6), 597-613.  
<https://doi.org/10.22214/ijraset.2024.63182>
- Sağın, F., Özkaya, A., Tengiz, F., Geyik, Ö. Y. Geyik, C. (2023). Current evaluation and recommendations for the use of artificial intelligence tools in education. *Turkish Journal of Biochemistry*, 48(6), 620-625. <https://doi.org/10.1515/tjb-2023-0254>
- Silva, N. A. G. & Carolei, P. (2024). *Plataformização da Educação Pública: Desafios para Autonomia Docente e Inclusão Discente*. *Revista Docência e Cibercultura*, 8(4).  
<https://doi.org/10.12957/redoc.2024.84769>
- Sipahioğlu, M. (2024). Empowering teachers with Generative AI tools and support. En R. Sharma Y A. Bozkurt (eds.), *Transforming education with Generative AI: Prompt Engineering and synthetic content creation* (pp. 214-238). IGI Global Scientific Publishing.  
<https://doi.org/10.4018/979-8-3693-1351-0.ch011>
- Szabó, F. & Szoke, J. (2024). *How does generative AI promote autonomy and inclusivity in language teaching?* *ELT Journal*, 78(4), 478-488.  
<https://doi.org/10.1093/elt/ccae052>
- Vallis, C., Wilson, S. & Casey, A. (2024). *Generative AI: Beyond the binaries with metaphors*. *ASCILITE Publications*, 590-595.  
<https://doi.org/10.14742/apubs.2024.1408>
- Williamson, B. & Eynon, R. (2020). *Historical threads, missing links, and future directions in AI in education*. *Learning, Media and Technology*, 45(3), 223-235.  
<https://doi.org/10.1080/17439884.2020.1798995>
- Xia, Q., Weng, X., Ouyang, F. & Lin, T. J. (2024). *A scoping review on how generative artificial intelligence transforms assessment in higher education*. *International Journal of Educational Technology in Higher Education*, 21, Article 40.  
<https://doi.org/10.1186/s41239-024-00468-z>
- Xin, J. J. (2024). Investigating EFL teachers' use of generative AI to develop reading materials: A practice and perception study. *Language Teaching Research*, 0(0).  
<https://doi.org/10.1177/13621688241303321>
- Zawacki-Richter, O., Bond, M., Marin, V. & Gouverneur, F. (2019). *Systematic review of research on artificial intelligence applications in higher education – where are the educators?* *International Journal of Educational Technology in Higher Education*, 16, 39. <https://doi.org/10.1186/s41239-019-0171-0>



# Latent dimensions in the adoption of ChatGPT at the University: CHASSIS model

## *Dimensiones latentes en la adopción de ChatGPT en la universidad: modelo CHASSIS*

-  **Dra. Luz Marina Pereira-González** is a research professor at Universidad Técnica del Norte, Grupo de Investigación de Ciencias en Red (eCIER), (Ecuador) (Impereira@utn.edu.ec) (<https://orcid.org/0000-0002-7796-9819>)
-  **Dra. Andrea Basantes-Andrade** is a research professor at Universidad Técnica del Norte, Grupo de Investigación de Ciencias en Red (eCIER), (Ecuador) (avbasantes@utn.edu.ec) (<https://orcid.org/0000-0003-1045-2126>)
-  **Milton Mora-Grijalva** is a lecturer at Universidad Técnica del Norte (Ecuador) (mmmora@utn.edu.ec) (<https://orcid.org/0000-0001-7362-1164>)
-  **Anabela Galárraga-Andrade** is a professor at Universidad Técnica del Norte (Ecuador) (asgalarraga@utn.edu.ec) (<https://orcid.org/0000-0002-2323-1253>)

Received: 2025-03-04 / Revised: 2025-06-10 / Accepted: 2025-06-16 / Published: 2025-07-01

### Abstract

The key dimensions influencing the use of *ChatGPT* among university students are analyzed, a topic driven by the growing expansion of generative artificial intelligence across all domains. Based on a two-stage probabilistic sampling method, a questionnaire was administered to 509 students from the Faculty of Education, Science, and Technology at a public university in Ecuador. The instrument integrates well-established theories of technology adoption and includes the adaptation of relevant factors for the use of *ChatGPT* in educational contexts. Through Exploratory Factor Analysis, seven factors were extracted: ethical and academic concerns (PEA), performance expectancy (ED), cost and financial accessibility (CAF), intention to use (IU), social influence/social anxiety (IAS), perceived credibility and reliability (CFP), and facilitating conditions (CF). The latent variables explain 68.6 % of the variance and show high internal consistency (Cronbach's alpha ranging from 0.859 to 0.945), which confers strong reliability to the instrument. The main factor, PEA, highlights the relevance of academic integrity and authorship, while ED and CF underscore the importance of academic effectiveness and institutional support. The proposed model, CHASSIS, contributes to a deeper understanding of the elements influencing the intention to use *ChatGPT*, providing a theoretical foundation for future research.

**Keywords:** *ChatGPT*, artificial intelligence, exploratory factor analysis, behavioral intention to use, latent variables, higher education.

### Resumen

Se analizan las dimensiones determinantes del uso de *ChatGPT* entre estudiantes universitarios, tema impulsado por la creciente expansión que ha tenido el uso de las inteligencias artificiales generativas en todos los ámbitos. Sobre la base de un muestreo probabilístico bietápico, se aplicó un cuestionario a 509 estudiantes de la Facultad de Educación, Ciencia y Tecnología de una universidad pública de Ecuador, en el que se integran teorías consolidadas de la adopción de tecnologías e incluye la adaptación de factores pertinentes al uso de *ChatGPT* en contextos formativos. Aplicando un Análisis Factorial Exploratorio, se extrajeron siete factores: preocupaciones éticas y académicas (PEA), expectativa de desempeño (ED), costo y accesibilidad financiera (CAF) intención de uso (IU), influencia/ansiedad social (IAS), confiabilidad y fiabilidad percibidas (CFP) y condiciones facilitadoras (CF). Las variables latentes tienen un poder explicativo del 68,6 % de la varianza y presentan índices altos de consistencia interna (alfa de Cronbach de 0.859 a 0.945) lo cual confiere alta fiabilidad al instrumento. Como factor principal destaca (PEA), poniendo en evidencia la relevancia de la integridad académica y la autoría; mientras que ED y CF revelan la importancia de la eficacia académica y el apoyo institucional. El modelo propuesto, CHASSIS, contribuye a una mejor comprensión de los elementos que influyen en la intención de uso de *ChatGPT* constituyendo una base teórica para futuras investigaciones.

**Palabras clave:** *ChatGPT*, inteligencia artificial, análisis factorial exploratorio, intención de uso, variables latentes, educación superior.

**Suggested citation (APA):** Pereira-González, L. M., Basantes-Andrade, A., Mora-Grijalva, M. & Galárraga-Andrade A. (2025). Latent dimensions in the adoption of ChatGPT at the University: CHASSIS model. *Alteridad*, 20(2), 184-195. <https://doi.org/10.17163/alt.v20n2.2025.03>

## 1. Introduction

*ChatGPT* has evolved significantly in natural language processing. Initially based on GPT models that used statistical patterns to generate text (Roumeliotis and Tselikas, 2023), it has incorporated fine-tuning techniques and human *feedback* to provide more consistent and accurate responses (Latif and Zhai, 2024; Ray, 2023). This evolution is due to improvements in neural network architectures and the use of large volume of data, allowing it to adapt to diverse contexts. GPT-3 relied on a deep learning architecture with approximately 175 billion adjustable parameters (Gupta et al., 2023), which allows it to capture complex language nuances and significantly improve text generation and comprehension.

Among the advantages that differentiate *ChatGPT* from other generative artificial intelligences are its ability to sustain two-way communication, its intuitive interface, and its rapid responsiveness (Gupta, 2024), features that are especially valued in the academia. These qualities facilitate the exploration of ideas, clarification of concepts and assistance in academic writing, critical aspects in the learning process. Furthermore, recent research has evidenced that the use of conversational models such as *ChatGPT* can enhance engagement and efficiency in information search, inclining students' preference towards this tool (Bettayeb et al., 2024; Klimova and de Campos, 2024).

Since its launch, in November 2022, *ChatGPT* experienced an extraordinary expansion, being used by 100 million people in a couple of months (Leng, 2024). This technology has been rapidly adopted in academic environments, although its integration poses challenges that transcend the traditional dimensions of information technologies, requiring an in-depth analysis of its educational and research implications.

Currently, *ChatGPT* characterizes by the diversification of its versions, which include GPT-4, GPT-4o (with synthesized voice), GPT-4o-mini, 4o with programmed tasks (beta), o1 (reasoning model), o3-mini (efficient version of the second reasoning model) and o3-mini-high (optimized for programming and logic). This variety meets the specific needs of increasingly demanding users in various contexts.

In parallel, this rapid evolution requires the development of theories adapted both to the advancement of *ChatGPT* and to its various contexts of use. It is essential to create conceptual models that explain the adoption of this generative artificial intelligence in universities, where teachers and students are increasingly integrated as frequent users.

In this scenario, Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) provides a solid theoretical framework for understanding behavioral intention in the adoption of *ChatGPT* in university settings. As one of the models with the greatest relevance for predicting people's behavior, TRA establishes that actions are determined by behavioral intention, the direct antecedent of observable behavior (Bosnjak et al., 2020). This intention is shaped by two key components: individual attitudes toward the specific behavior and the perceived subjective norms of the social environment.

The attitudinal component represents the individual's personal evaluation of a specific behavior, based on beliefs about its possible consequences and appraisal of these outcomes (Din Bandhu et al., 2024). Subjective norms, on the other hand, reflect the social pressure that can be perceived to perform or avoid certain behavior, including the expectations of important referents and the motivation to comply with them (Heredia-Carroza et al., 2024). However, TRA assumes that the way a person behaves is completely under his or her voluntary control.

To overcome this limitation, Ajzen (1985) developed the Theory of Planned Behavior (TPB), adding a third factor: perceived behavioral control, which represents how the individual perceives the ease or difficulty of performing the behavior. In the educational setting, the TRA explains how the positive attitudes towards tools such as *ChatGPT*, together with the perception of social approval, increase the probability of use, as long as there is control over their access.

The Technology Acceptance Model (TAM) proposed by Davis (1989) is based on two dimensions: perceived usefulness - belief that the technology will improve performance - and perceived ease of use - degree to which adapting to the technology will not present an obstacle.

Venkatesh and Davis (2000) extended this model with TAM2, incorporating Social Influence - impact of beliefs and expectations of significant

others - and Instrumental Cognitive Processes - rational evaluations of system characteristics and performance that determine its contribution to job or personal performance.

As additional background, the UTAUT model by Venkatesh et al. (2003) integrates eight previous models to explain the intention and actual use of technological systems through four dimensions: performance expectancy -conviction that the technology will increase efficiency-, effort expectancy -perception of ease of use, social influence -social pressure or support- and facilitating conditions -resources and circumstances that facilitate technological adoption. Subsequently, Venkatesh et al. (2012) extended this theoretical framework with the UTAUT2 model, incorporating additional constructs that better capture the dynamics of acceptance in consumer contexts: hedonic motivation -conceptualized as the enjoyment or personal satisfaction produced by the use of the technology-, price/value -which represents the evaluation of the cost of the technology in relation to the benefits it provides- and habit, which is identified with the tendency to use the technology automatically, based on previous experience. In both models (UTAUT and UTAUT2), intention to use is considered the dependent variable.

In the context of *ChatGPT*, Sallam et al. (2023) propose the *TAME-ChatGPT*, «Technology Acceptance Model Edited to Assess *ChatGPT* Adoption», based on Davis' (1989) TAM. This includes: perceived risk -probability of negative consequences such as privacy problems-, perceived usefulness -consistent with TAM- and social influence, consistent with TAM2 and UTAUT.

Menon and Shilpa (2023) corroborated the UTAUT model factors, adding perceived interactivity-the ability of the system to facilitate two-way communication with adaptive responses-and privacy concerns, similar to perceived risk.

Social influence also appears in studies by Bilquise et al. (2023) and Abdaljaleel et al. (2024), which also consider performance expectancy (or perceived usefulness). The former propose a conceptual model based on TAM and UTAUT.

Bolivar-Cruz and Verano-Tacoronte (2025) found that perceived usefulness and facilitating conditions are common determinants in both sexes.

Choudhury and Shamszare (2023) conducted research showing that trust-understood as credibi-

lity in the accuracy, truthfulness, and reliability of the information provided by *ChatGPT*- determines intention to use. Similarly, Shahzad et al. (2024) include perceived trust as a moderator between ease of use, usefulness, and perceived intelligence.

Romero-Rodriguez et al. (2023) found that experience, performance expectancy, hedonic motivation, price/value, and habit directly influence intention to use *ChatGPT*, while Strzelecki (2024) found that habit, performance expectancy, and hedonic motivation were the determining variables.

Almogren et al. (2024), using structural modeling analysis (SEM), corroborated that perceived ease of use and attitude toward technology predict behavioral intention to use *ChatGPT*.

In their study on the acceptance of *ChatGPT* in university students of social sciences, García-Alonso et al. (2024) found that the latent variables determining intention to use were: perceived usefulness and credibility; in contrast, social impact was not relevant. These factors are integrated in the model proposed by the authors to jointly explain the adoption of *ChatGPT* in the academic environment.

Finally, Surya Bahadur et al. (2024), using PLS-SEM, evidenced that habit, learning value (a concept assimilable to perceived usefulness in the context of academic skills) and social influence exert a positive influence on the intention to use *ChatGPT*, while other latent variables-such as hedonic motivation, effort expectancy, facilitating conditions or performance expectancy- showed no significant effects in their study.

It is important to note that although these models have been important to understanding technological adoption in general, it is necessary to adapt them by reviewing latent variables to specifically address the use of generative AI in higher education in the Latin American context. The emergence of *ChatGPT* as a tool in university environments cannot be understood solely from a functional or instrumental logic, but as part of a broader cultural ecosystem marked by cyberculture, where educational practices, links to knowledge and notions of authorship are profoundly transformed (Vieira Neto and Rocha Bruno, 2025).

In this sense, the purpose of this research was to propose, based on an Exploratory Factor Analysis, a model contextualized to the academic environment, starting from the conceptual basis of

UTAUT+UTAUT2, which explains the expectations of *ChatGPT* use for academic purposes in students of the Faculty of Education, Science and Technology of a public university in Ecuador.

In response to the rapid expansion of generative artificial intelligence and its use among higher education students, specifically in Latin American contexts, this research proposes the CHASSIS model (CHatGPT Adoption and Sustained use among Students in Institutional Settings), a conceptual model that integrates foundations of theories of adoption of the use of TAM, TPB and UTAUT/UTAUT2 technologies, adapted to the phenomenon of *ChatGPT* use that is emerging with great force in educational contexts. Applying an Exploratory Factor Analysis to a probabilistic, stratified, two-stage, stratified sample, seven determinant dimensions were identified that explain the intention to use *ChatGPT* by university students: ethical and academic concerns (EAC), performance expectation (PE), cost and affordability (CFA), intention to use (IU), social influence/anxiety (SIA), perceived reliability and trustworthiness (PCR), and facilitating conditions (FC). These latent variables, in addition to including the main classical dimensions of technology acceptance theories, incorporate components relevant to the contemporary higher education system, such as authorship, perceived risk and institutional support.

The proposed model, CHASSIS, also stands out because by capturing the complexities of students' intention to use *ChatGPT*, it integrates, on the one hand, the motivational elements and, on the other, the contextual barriers that may shape its adoption in this specific population. CHASSIS has a structure that has been empirically validated and adapted to the characteristics of the Ecuadorian university environment. It has an explanatory power of 68.6% of the variance and exhibits high internal consistency indexes in all its factors ( $\alpha > 0.85$ ), this model represents a solid theoretical contribution for future research that seeks to understand and promote an ethical, efficient and sustained use of *ChatGPT* in higher education.

## 2. Methodology

The approach of this research is quantitative with an exploratory scope, since the objective of the statistical technique employed - exploratory factor

analysis - is to identify underlying patterns, i.e., to discover factors that allow us to interpret the structure of relationships between variables, without establishing definitive causal relationships. The target population consisted of 2955 students enrolled in the period October 2024-February 2025, in the Faculty of Education, Science and Technology of a public university in Ecuador.

To obtain the sample size, the formula corresponding to a finite population with categorical variable (1) was used, considering  $p = q = 0.5$ , which represents the most unfavorable condition. A Z value equal to 1.96 was considered, which corresponds to a significance level of 5% and a sampling error,  $e$ , of 5%.

$$n = \frac{Z^2 pqN}{e^2(N-1) + Z^2 pq} \quad (1)$$

The minimum sample size required was 341 and, for practical purposes of applying the instrument, a final sample size of 509 students was used.

A two-stage stratified probability sampling was used, with items selected using SPSS 29.0.2.0, based on the data of students enrolled in the 13 careers of the faculty. In the first stage, the careers were considered as strata and the semesters as clusters, assigning unit weight to all the elements. Simple random sampling without replacement was applied, considering proportional values according to the number of students per course. In the second stage, we stratified by sex using simple random sampling without replacement, with values adjusted according to the proportions by career, level and sex. After selecting the sample, the questionnaire was administered to students who provided written informed consent. The participants were informed about the academic use of the data for publication of the results, guaranteeing their anonymity and confidentiality in the handling of the information.

Table 1 shows the ages of the students in the sample by career and gender.

The technique used in the research was the survey, and the instrument was the questionnaire, with closed and open questions, the latter to obtain informed consent in which the name of the student (subsequently anonymized), sector, city and province of residence were requested. In order to better understand the context of the application, they were asked about their nationality, ethnic self-recognition

and grade point average. The questionnaire was placed online in Microsoft Office 360. Two surveyors were designed for each level of each career, who, in person, explained to the students the objectives and scope of the project, provided additional information on the anonymous treatment of the data and gave general instructions for filling out the form.

Based on the previous review of theories and models found in the background, a strategy matrix was constructed for elaborating the questionnaire, which was validated by two experts. Subsequently, a pilot test was conducted with 30 volunteer students from the Faculty and the refined instrument

was applied to cover the eight factors of interest in the study: 1) Perceived Academic Usefulness and Effectiveness (expectation of performance or achievement), PE; 2) Hedonic Motivation, MH; 3) Social Influence/Anxiety, SIA; 4) Cost and affordability, CFA; 5) Facilitating Conditions (institutional support and technological competencies), FC; 6) Intention to use (behavioral intention to use, referring to the propensity to act, i.e., to continue using the tool), IU; 7) Ethical and academic concerns, EAC; 8) Perceived reliability and trustworthiness, PCR. Both Kaiser's (1960) criteria and the sedimentation plot were used to select the number of factors.

**Table 1.** Descriptive statistics of the age of the students in the sample by career and gender

Career	Age		Minimum	Maximum	Mean	Standard deviation
	Women	Men				
Fine Arts	17	10	19	30	21.52	2.39
Communication	21	17	18	27	21.39	2.07
Graphic Design	14	23	18	26	20.86	2.03
Basic Education	35	9	18	29	21.32	1.99
Initial Education	40	3	19	28	21.47	1.94
Sports Training	8	30	18	35	22.03	3.15
Physical Activity and Sport Pedagogy	10	31	18	33	21.27	2.65
Arts and Humanities Pedagogy	22	11	18	33	22.06	2.77
Pedagogy of Experimental Sciences	19	17	18	31	21.22	2.49
Pedagogy of national and foreign languages	33	12	18	31	21.31	2.33
Psychology	33	13	18	29	21.15	2.40
Psychopedagogy	38	9	19	33	21.47	2.67
Advertising	15	19	19	38	22.09	3.31
509						

It was decided to use the Kaiser criterion to determine how many factors should be extracted in the exploratory factor analysis because it is a method widely recognized for its effectiveness and frequent use in psychometric and educational research. According to this criterion, only those factors whose eigenvalue is greater than 1.0 are retained, which implies that the factors involved are capable of explaining more variance than an individual variable. The exploratory nature of the study means that it is aimed at discovering a clear latent structure that will serve as a basis for future confirmatory validations. Although there

are other approaches to determine the number of factors to extract in an exploratory factor analysis, such as parallel analysis or Velicer's MAP test, Kaiser's criterion provided results that were entirely consistent with the sedimentation plot, reaffirming the validity of the seven factors identified. Moreover, considering the high sample adequacy (KMO = 0.939) and the significant number of variables analyzed, the number of factors extracted on the basis of the Kaiser criterion made it possible to avoid the inclusion of factors of little relevance and ensure a solid and parsimonious CHASSIS model.

In this first product of the research, the sample data were treated with the technique for dimension reduction of the Exploratory Factor Analysis, EFA. The software used for the study of assumptions and exploratory factor analysis was JASP 0.19.3.

### 3. Results

The purpose of the instrument applied in this study was to find an appropriate model, adapted to the context of *ChatGPT* use in universities, based on previous theories that were proposed for research on the use of technology. Therefore, the name proposed for this model is «Adoption and Sustained usage of *ChatGPT* among Students in Institutional Settings», CHASSIS (CHatGPT Adoption and Sustained usage among Students in Institutional Settings).

The AFE application in the model showed that the hedonic motivation factor (Venkatesh et al., 2012; Romero-Rodríguez et al., 2023; Strzelecki, 2024) was not present among university students, being finally constituted by the other seven factors.

The review of previous assumptions as to whether there was sufficient correlation between the items was established through Bartlett's test of sphericity (1951) and the Kaiser-Meyer Olkin test (KMO), Kaiser (1970). The test of sphericity evaluates the null hypothesis that the correlation matrix is an identity matrix. The result of Bartlett's test of sphericity was significant, suggesting that the data

present sufficient correlations to perform a factor analysis. The Kaiser-Meyer-Olkin sampling adequacy index (KMO) was 0.939, with individual values ranging from 0.902 to 0.960, confirming the suitability of the data for factor analysis (Kaiser, 1974).

The results of Cronbach's alpha (1951) indicated internal consistency levels ranging from 0.859 to 0.945, evidencing a high reliability of the scales used (Table 2).

Table 3 shows the eigenvalues and variance explained in the unrotated and rotated solution of the exploratory factor analysis. It can be seen that with the seven factors extracted, 68.6% of the variance is explained.

Table 4 shows the matrix of factor loadings for the CHASSIS model. The loadings on other factors have been intentionally suppressed for a better visualization of the behavior, but it is important to note that the factor loadings show a well-defined structure, with each item loading predominantly on a single factor. Loadings on other factors are less than 0.18, indicating low collinearity and minimizing the risk of factor overlap. This suggests that the extracted factors are clearly distinguishable and that each item contributes specifically to its respective construct. Furthermore, the low magnitude of the cross-loadings (< 0.18) indicates that the items do not present ambiguity in their association with the factors, which reinforces the discriminant validity of the factor model obtained..

**Table 2.** Cronbach's alpha results and 95% confidence intervals for the factors evaluated

Factor	Interval of confidence interval 95 %			
	Alpha of Cronbach's Factor	Error standard error	Limit lower limit	Limit upper limit
Ethical and Academic Concerns (EAC)	0.939	0.06	0.928	0.95
Expectation of performance (PE)	0.930	0.05	0.921	0.94
Cost and affordability (CFA)	0.928	0.007	0.913	0.942
Intention to use (IU)	0.912	0.010	0.892	0.932
Influence/social anxiety (SIA)	0.859	0.014	0.832	0.886
Perceived reliability and trustworthiness (PCR)	0.904	0.012	0.880	0.928
Facilitating conditions (FC)	0.889	0.014	0.862	0.917
Total	0.945	0.006	0.933	0.957

**Table 3.** Eigenvalues and explained variance in the unrotated and rotated solution of the exploratory factor analysis

Factor	Eigenvalue	Untotated solution			Rotated solution		
		Sum of loads to squared	Ratio of variance	Cumulative	Sum of loads to squared	Ratio of variance	Cumulative
EAC	12.539	12.229	0.340	0.340	5.847	0.162	0.162
PE	4.549	4.243	0.118	0.458	4.782	0.133	0.295
CFA	4.174	3.858	0.107	0.565	4.167	0.116	0.411
IU	1.649	1.369	0.038	0.603	2.890	0.080	0.491
SIA	1.486	1.177	0.033	0.635	2.466	0.069	0.560
PCR	1.234	0.961	0.027	0.662	2.307	0.064	0.624
FC	1.128	0.855	0.024	0.686	2.235	0.062	0.686

In Table 4, the uniqueness column represents the proportion of the variance of each item that is not explained by the common factors. The uniqueness values obtained in the factor analysis reflect that most of the items are well represented by the extracted factors, with values below 0.40. However, some items present higher values ( $\geq 0.45$ ), suggesting a higher specific variance not explained by the common factors. These items could be analyzed in terms

of their wording, conceptual relevance or even their relationship with other items in order to determine whether their integration into the model is adequate or whether they require adjustments. Nevertheless, in general terms, the factor structure shows an adequate representation of the items, with a distribution of variance that supports the validity of the model.

Finally, Table 5 presents the matrix of factorial correlations.

**Table 4.** Matrix of factor loadings of the CHASSIS model

	F1_F1_EAC	F2_PE	F3_CFA	F4_IU	F5_SIA	F6_PCR	F7_FC	Uniqueness
EAC_I1	0.957							0.211
EAC_I2	0.924							0.270
EAC_I3	0.896							0.284
EAC_I4	0.888							0.242
EAC_I5	0.812							0.338
EAC_I6	0.810							0.327
EAC_I7	0.675							0.466
EAC_I8	0.619							0.442
EAC_I9	0.549							0.549
PE_I1		0.897						0.277
PE_I2		0.893						0.269
PE_I3		0.869						0.292
PE_I4		0.835						0.357
PE_I5		0.732						0.367
PE_I6		0.720						0.389
PE_I7		0.661						0.354
CFA_I1			0.924					0.238
CFA_I2			0.918					0.211
CFA_I3			0.798					0.311
CFA_I4			0.784					0.311

	F1_F1_EAC	F2_PE	F3_CFA	F4_IU	F5_SIA	F6_PCR	F7_FC	Uniqueness
CFA_I5			0.779					0.319
CFA_I6			0.701					0.414
IU_I1				0.885				0.223
IU_I2				0.841				0.238
IU_I3				0.827				0.251
IU_I4				0.712				0.348
SIA_I1					0.871			0.258
SIA_I2					0.779			0.418
SIA_I3					0.767			0.370
SIA_I4					0.650			0.459
PCR_I1						0.860		0.226
PCR_I2						0.854		0.208
PCR_I3						0.850		0.280
FC_I1							0.892	0.230
FC_I2							0.834	0.258
FC_I3							0.786	0.302

**Table 5.** Matrix of factorial correlations

FACTOR	EAC	PE	CFA	IU	SIA	PCR	FC
EAC	1.000	0.304	0.299	0.521	0.372	0.237	0.260
PE	0.304	1.000	0.346	0.644	0.192	0.558	0.355
CFA	0.299	0.346	1.000	0.376	0.603	0.463	0.554
IU	0.521	0.644	0.376	1.000	0.267	0.510	0.402
SIA	0.372	0.192	0.603	0.267	1.000	0.373	0.401
PCR	0.237	0.558	0.463	0.510	0.373	1.000	0.525
FC	0.260	0.355	0.554	0.402	0.401	0.525	1.000

#### 4. Discussion and conclusions

The Cronbach's alpha values (1951) obtained in Table 2 indicate that the items that make up each factor present high internal consistency, which supports the reliability of the scales that have been used in the measurement of the constructs, and even the factor with the lowest value (Social influence/anxiety, 0.859) is in an acceptable and robust range for research purposes (Tavakol and Dennick, 2011). Although very high values may indicate redundancy among the items, in this case, when analyzing the subdomains or factors individually, it is observed that each one provides specific information on differentiated theoretical dimensions.

Regarding the percentage of variance explained (Table 3), the first factor (EAC) concentrates a

very high eigenvalue (12.539), explaining about 34% of the variance. This is usual in unrotated solutions, where the first factor tends to absorb a large part of the shared variance due to the lack of fit in the structure. With oblique rotation, a more balanced distribution of variance among the factors is observed. The results of the percentage of variance explained in the unrotated and rotated solutions confirm the presence of a complex factor structure and reinforce the usefulness of applying rotation to obtain a more interpretable solution. Table 5 about correlations between factors confirms the selection adequacy of the oblique rotation with the promax method (Akhtar-Danesh, 2023), since it was found that the factors are not completely independent, for example, between factors 2 and 4 and between 3 and 5, there are correlations higher than 0.6, which are tolerated

by the promax method. In the field of social sciences, factor solutions that explain around 50 %-60 % of the total variance are usually considered acceptable (Hair et al., 2019). In this case, reaching almost 69 % is evidence of a robust structure.

In the factor analysis conducted in this research, it has been possible to establish the relevance of seven factors related to the intention to use *ChatGPT* in an institutional setting. Most of the items present high loadings, above 0.70, indicating a strong association between each item and its factor (Hair et al., 2019). A clear distribution of items is observed: each item is grouped in a specific factor without relevant cross-loadings (no loadings above 0.18), suggesting good convergent validity (Brown, 2015). In general, Table 4 shows that most of the items have a moderate-low uniqueness, which confirms that each factor explains a relevant part of the variance of its items.

The results are consistent with a hybrid model of preceding theories related to both Reasoned Action and Planned behavior (TRA and TBP) and the Technology Acceptance Model (TAM) and the unified theories of acceptance and use of technologies in original and extended version (UTAUT, UTAUT2); but it has its own traits of using a generative artificial intelligence, specifically in a university context.

Of the seven factors, the one that contributes most to explaining the variance is that of ethical and academic concerns, EAC, which can be explained as the perceived risk in relation to the development of critical thinking, authorship, originality, unintentional plagiarism, adequate recognition of the tool's contribution, and the importance of questioning ethical aspects. High loadings indicate that these items consistently describe aspects such as concern about fraud or academic dishonesty. The item with the lowest loading (0.549) is still relevant, pointing to small fears associated with ethical aspects in the use of the tool. This result is in line with the studies of Sallam et al. (2023), Menon and Shilpa (2023), Farhi et al. (2023), Abdaljaleel et al. (2024) and Stahl and Eke (2024), who found that the use of *ChatGPT*, in university students, raises concerns and worries about authorship, integrity and ethics.

The second factor obtained is related to the expectation of performance, PE. This is the factor most frequently considered in technology use models (UTAUT, TAM). It was found that students perceive

that using *ChatGPT* has a positive impact on academic performance and makes them more efficient, mainly because of the resources it provides that facilitate learning and understanding of academic subjects, so they are satisfied with the experience. The high loadings indicate that students positively value the improvement in the quality of their assignments and that the use of *ChatGPT* allows them to quickly obtain good results, but they are slightly less satisfied with the overall experience (0.661). This result is consistent with the studies of Davis (1989), Venkatesh and Davis (2000), Venkatesh et al. (2003), Bilquise et al. (2023), Sallam et al. (2023), Abdaljaleel et al. (2024), Garcia-Alonso et al. (2024), Bolivar-Cruz and Verano-Tacoronte (2025), Firat and Kuleli (2025), Romero-Rodriguez et al. (2023), Menon and Shilpa (2023), Strzelecki (2024), Surya Bahadur et al. (2024) and Shahzad et al. (2024).

The third factor found was cost and affordability, CFA, which is considered by Venkatesh et al. (2012) in UTAUT2, and relates to the impact that lack of resources may have on the use of *ChatGPT*. Given that the range of loadings is high (mostly above 0.78), it is perceived that the dimension of «financial accessibility» is very present and that respondents consistently rate whether *ChatGPT* use entails financial barriers or constraints. Significant effects of this factor were also found in the work of Romero-Rodriguez et al. (2023) and Abdaljaleel et al. (2024).

The fourth factor corresponded to intention to use, IU, included in TAM and congruent with the studies of Venkatesh et al. (2003), Venkatesh et al. (2012), Bilquise et al. (2023) and Strzelecki (2024). High loadings indicate that participants who score high on these items have a clear willingness to employ the tool for their studies or research.

The fifth factor relates to social influence/anxiety, SIA, and relates to the use of *ChatGPT* causing some nervousness, stress or anxiety and to the influence of peer opinion on the decision to use. The social influence factor has also been found to be relevant in research by Bilquise et al. (2023), Choudhury and Shamszare (2023), Shahzad et al. (2024), and Garcia-Alonso et al. (2024). In this study, no negative influence was found between the presence of anxiety and intention to use *ChatGPT*. Budhathoki et al. (2024) also studied the influence of anxiety in the UK and Nepal, finding a negative effect on intention

to use behavior in the UK, but not on use behavior; while in Nepal it had no effect on intention to use.

The sixth factor was Perceived reliability and trustworthiness (PCR) in which a positive perception was found in relation to the accuracy and reliability of the responses issued by *ChatGPT*. This factor is considered by Bilquise et al. (2023), Choudhury and Shamszare (2023), Shahzad et al. (2024), Garcia-Alonso et al. (2024), and Lai et al. (2024). High loadings suggest that participants clearly distinguish this factor and tend to agree that *ChatGPT* provides them with reliable answers.

Finally, the seventh factor was constituted by the facilitating conditions (FC) in which students expressed their perception that the institution facilitates access and support to use generative artificial intelligence tools. This result is in agreement with the UTAUT model (Venkatesh et al., 2003), Menon and Shilpa (2023) and Bolivar-Cruz and Verano-Tacoronte (2025).

The CHASSIS model constitutes a contextualized proposal to analyze *ChatGPT* adoption in the university setting by integrating relevant factors from previous theories (UTAUT, TAM, TPB, TAR) and adapting them to the use of a generative AI. Among its contributions, the identification of ethical and academic concerns as the main factor explaining variance stands out, evidencing the importance of addressing issues such as authorship, integrity and originality in this context, this factor being crucial in the case of socio-educational research (Pastor-Andrés et al., 2025). In addition, the scale shows high levels of internal consistency in most of the factors, which reinforces its reliability. Nevertheless, the findings should be interpreted with caution, since the fact that the study is cross-sectional limits the possibility of inferring causal relationships and, given the specificity of the setting analyzed, generalization to other universities or regions could require additional adaptations.

The adoption of *ChatGPT* depends not only on the expectation of performance and intention to use it, but also on trust in the tool and the presence of facilitating conditions promoted by the institution. The strong correlation between certain factors suggests that institutional support and perceived trustworthiness may enhance responsible use, but at the same time social influence/anxiety and cost may act as barriers. For future studies, it is recommended to (a) perform confirmatory validations and longitudinal

analyses that explore how perceptions and behaviors evolve, (b) contrast this model with other AI technologies, and (c) delve into the incidence of cultural and normative aspects in different university contexts.

In conclusion, the CHASSIS model offers a robust and relevant framework for understanding the dimensions that influence the acceptance of *ChatGPT* in an academic environment, confirming the relevance of ethical and academic factors, performance, trustworthiness, social influence, financial and institutional support. The high internal consistency indices (0.859-0.939), the high percentage of variance explained, 68.6 %, and the clear differentiation of the constructs highlight their potential for guiding interventions that seek to promote ethical and efficient use of generative AI. Although further studies will be required to corroborate these findings and analyze their applicability in diverse contexts, the present research establishes a significant starting point for the theoretical and practical development of *ChatGPT* integration in higher education.

## Author contributions

**Luz Marina Pereira-González:** conceptualization, data curation, formal analysis, research, methodology, project management, resources, supervision, validation, visualization, original draft-writing, writing-revision and editing.

**Andrea Basantes-Andrade:** conceptualization, formal analysis, research, methodology, supervision, validation, original draft-writing, writing-revision and editing.

**Milton Mora-Grijalva:** conceptualization, research, supervision, validation, writing-revision and editing.

**Anabela Galárraga-Andrade:** conceptualization, research, supervision, validation, writing-revision and editing.

## References

- Abdaljaleel, M., Barakat, M., Alsanafi, M., Salim, N. A., Abazid, H., Malaeb, D., Mohammed, A. H., Hassan, B. A. R., Wayyes, A. M., Farhan, S. S., Khatib, S. E., Rahal, M., Sahban, A., Abdelaziz, D. H., Mansour, N. O., AlZayer, R., Khalil, R., Fekih-Romdhane, F., Hallit, R., Hallit, S. & Sallam, M. (2024). A multinational study on the factors influencing university students' attitudes



- and usage of *ChatGPT*. *Scientific Reports*, 14(1), Article 19831. <https://doi.org/10.1038/s41598-024-52549-8>
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. En J. Kuhl & J. Beckmann (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Springer.
- Akhtar-Danesh, N. (2023). Impact of factor rotation on Q-methodology analysis. *PLOS ONE*, 18(9), Article e0290728. <https://doi.org/10.1371/journal.pone.0290728>
- Al-Abdullatif, A. M. & Alsubaie, M. A. (2024). *ChatGPT* in learning: Assessing students' use intentions through the lens of perceived value and the influence of AI literacy. *Behavioral Sciences*, 14(9), Article 845. <https://doi.org/10.3390/bs14090845>
- Bartlett, M. S. (1951). The effect of standardization on a  $\chi^2$  approximation in factor analysis. *Biometrika*, 38(3/4), 337-344. <https://doi.org/10.2307/2332580>
- Bettayeb, A. M., Abu Talib, M., Sobhe Altayasinah, A. Z. & Dakalbab, F. (2024). Exploring the impact of *ChatGPT*: Conversational AI in education. *Frontiers in Education*, 9, Article 1379796. <https://doi.org/10.3389/educ.2024.1379796>
- Bilquise, G., Ibrahim, S. & Salhieh, S. M. (2023). Investigación sobre la aceptación de un chatbot de asesoramiento académico por parte de los estudiantes en instituciones de educación superior. *Educación y Tecnologías de la Información*, 29(5), 6357-6382. <https://doi.org/10.1007/s10639-023-12076-x>
- Bolívar-Cruz, A. y Verano-Tacoronte, D. (2025). Is anxiety affecting the adoption of *ChatGPT* in university teaching? A gender perspective. *Tech Know Learn*, 9(4), 1-20. <https://doi.org/10.1007/s10758-025-09830-0>
- Bosnjak, M., Ajzen, I. & Schmidt, P. (2020). The theory of planned behavior: selected recent advances and applications. *Europe's Journal of Psychology*, 16(3), 352-356. <https://doi.org/10.5964/ejop.v16i3.3107>
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.
- Budhathoki, T., Zitar, A., Njoya, E. T. & Timsina, A. (2024). *ChatGPT* adoption and anxiety: a cross-country analysis utilising the unified theory of acceptance and use of technology (UTAUT). *Studies in Higher Education*, 49(5), 831-846. <https://doi.org/10.1080/03075079.2024.2333937>
- Choudhury, A. & Shamszare, H. (2023). Investigating the impact of user trust on the adoption and use of *ChatGPT*: Survey analysis. *JMIR Human Factors*, 25, Article e47184. <https://doi.org/10.2196/47184>
- Cronbach, L. J. (1951). *Coefficient alpha and the internal structure of tests*. *Psychometrika*, 16, 297-334. <https://doi.org/10.1007/BF02310555>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340. <https://doi.org/10.2307/249008>
- Din Bandhu, M., Murali Mohan, M., Nittala, N. A. P., Jadhav, P., Bhadauria, A. & Saxena, K. K. (2024). Theories of motivation: A comprehensive analysis of human behavior drivers. *Acta Psychologica*, 244, Article 104177. <https://doi.org/10.1016/j.actpsy.2024.104177>
- Farhi, F., Jeljeli, R., Aburezeq, I., Dweikat, F. F., Al-shami, S. A. & Slamene, R. (2023). Analyzing the students' views, concerns, and perceived ethics about *ChatGPT* usage. *Computers and Education: Artificial Intelligence*, 5, Article 100180. <https://doi.org/10.1016/j.caeai.2023.100180>
- Firat, M. & Kuleli, S. (2024). Fronteras educativas con *ChatGPT* / Educational frontiers with *ChatGPT*: un análisis de redes sociales de tuits influyentes / a social network analysis of influential tweets. *Alteridad. Revista de Educación*, 19(2), 224-235. <https://doi.org/10.17163/alt.v19n2.2024.06>
- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Addison-Wesley.
- García-Alonso, E. M., León-Mejía, A. C., Sánchez-Cabrero, R. & Guzmán-Ordaz, R. (2024). Training and technology acceptance of *ChatGPT* in university students of social sciences: A net-coincidental analysis. *Behavioral Sciences*, 14(7), Article 612. <https://doi.org/10.3390/bs14070612>
- Gupta, B., Mufti, T., Sohail, SS & Madsen, D. Ø. (2023). *ChatGPT*: una breve revisión narrativa. *Cogent Business & Management*, 10 (3), Article 2275851. <https://doi.org/10.1080/23311975.2023.2275851>
- Gupta, V. (2024). An empirical evaluation of a Generative Artificial Intelligence Technology Adoption Model from entrepreneurs' perspectives. *Systems*, 12(3), Article 103. <https://doi.org/10.3390/systems12030103>
- Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. (2019). *Multivariate Data Analysis* (8th ed.). Cengage Learning.
- Heredia-Carroza, J., Chavarría-Ortiz, C., López-Estrada, S. & Zacharewicz, T. (2024). How to enhance the entrepreneurial intentions of the young population in rural areas: An approach from personal values and the socioeconomic environment. *European Research on Management and Business Economics*, 30(3), Article 100261.

- <https://doi.org/10.1016/j.iedeen.2024.100261>
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20(1), 141-151.  
<https://doi.org/10.1177/001316446002000116>
- Kaiser, H. F. (1970). A second generation little jiffy. *Psychometrika*, 35(4), 401-415.  
<https://doi.org/10.1007/BF02291817>
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31-36.  
<https://doi.org/10.1007/BF02291575>
- Klimova, B. & de Campos, V. P. L. (2024). University undergraduates' perceptions on the use of *ChatGPT* for academic purposes: evidence from a university in Czech Republic. *Cogent Education*, 11(1), Article 2373512.  
<https://doi.org/10.1080/2331186X.2024.2373512>
- Lai, C. Y., Cheung, K. Y., Chan, C. S. & Law, K. K. (2024). Integrating the adapted UTAUT model with moral obligation, trust and perceived risk to predict *ChatGPT* adoption for assessment support: A survey with students. *Computers and Education: Artificial Intelligence*, 6, Article 100246.  
<https://doi.org/10.1016/j.caeai.2024.100246>
- Latif, E. & Zhai, X. (2024). Fine-tuning *ChatGPT* for automatic scoring. *Computers and Education: Artificial Intelligence*, 6, Article 100210.  
<https://doi.org/10.1016/j.caeai.2024.100210>
- Leng, L. (2024). Challenge, integration, and change: *ChatGPT* and future anatomical education. *Medical Education Online*, 29, 2304973.  
<https://doi.org/10.1080/10872981.2024.2304973>
- Menon, D. & Shilpa, K. (2023). "Chatting with *ChatGPT*": Analyzing the factors influencing users' intention to use the OpenAI's *ChatGPT* using the UTAUT model. *Heliyon*, 9(11), Article e20962.  
<https://doi.org/10.1016/j.heliyon.2023.e20962>
- Pastor-Andrés, D., Gezuraga-Amundarain, M., Darretxe-Urrutxi, L. & Rodríguez-Torre, I. (2025). Reflexiones y desafíos sobre la importancia de la ética en la investigación socioeducativa. *Alteridad*, 20(1), 74-83.  
<https://doi.org/10.17163/alt.v20n1.2025.06>
- Ray, P. P. (2023). *ChatGPT*: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope. *Internet of Things and Cyber-Physical Systems*, 3, 121-154.  
<https://doi.org/10.1016/j.iotcps.2023.04.003>
- Romero Rodríguez, J. M., Ramírez Montoya, M. S., Buenestado Fernández, M. & Lara-Lara, F. (2023). Uso de *ChatGPT* en la universidad como herramienta para el pensamiento complejo: Utilidad percibida por los estudiantes. *Journal of New Approaches in Educational Research*, 12, 323-339.  
<https://doi.org/10.7821/naer.2023.7.1458>
- Roumeliotis, K. I. & Tselikas, N. D. (2023). *ChatGPT* and open-ai models: a preliminary review. *Future Internet*, 15(6), Article 192.  
<https://doi.org/10.3390/fi15060192>
- Sallam, M., Salim, N., Barakat, M., Al-Mahzoum, K., Al-Tammemi, A., Malaeb, D., Hallit, R. & Hallit, S. (2023). Assessing health students' attitudes and usage of *ChatGPT* in Jordan: Validation study. *JMIR Medical Education*, 9, Article e48254.  
<https://doi.org/10.2196/48254>
- Shahzad, M.F., Xu, S. & Javed, I. (2024). *ChatGPT* awareness, acceptance, and adoption in higher education: the role of trust as a cornerstone. *Int J Educ Technol High Educ*, 21(46), 1-23.  
<https://doi.org/10.1186/s41239-024-00478-x>
- Stahl, B. C. & Eke, D. (2024). The ethics of *ChatGPT* – Exploring the ethical issues of an emerging technology. *International Journal of Information Management*, 74, Article 102700.  
<https://doi.org/10.1016/j.ijinfomgt.2023.102700>
- Strzelecki, A. (2024) Students' Acceptance of *ChatGPT* in Higher Education: An extended unified theory of acceptance and use of technology. *Innov High Educ*, 49, 223-245.  
<https://doi.org/10.1007/s10755-023-09686-1>
- Tavakol, M. & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53-55.  
<http://doi.org.10.51116/ijme.4dfb.8dfd>
- Venkatesh, V. & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.  
<https://doi.org/10.1287/mnsc.46.2.186.11926>
- Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.  
<https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y. L. & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178.  
<https://doi.org/10.2307/41410412>
- Vieira Neto, O. S. de S. & Rocha Bruno, A. (2025). Ontología del presente del ser maestro y ciberformación en docencia universitaria / Ontology of the present of being a teacher and cyberformation in university teaching. *Alteridad*, 20(1), 99-112.  
<https://doi.org/10.17163/alt.v20n1.2025.08>



# What does ChatGPT know about gamification in education? From AI to the human touch

*¿Qué sabe ChatGPT de gamificación en educación?  
De la IA a la artesanía*

-  **Dr. Isaac J. Pérez-López** is a lecturer at the University of Granada (Spain) (isaacj@ugr.es) (<https://orcid.org/0000-0002-4156-7762>)
-  **Dra.(c) Carmen Navarro-Mateos** is a doctoral candidate at the University of Granada (Spain) (carmenavarr@correo.ugr.es) (<https://orcid.org/0000-0002-0757-7975>)

Received: 2025-03-06 / Revised: 2025-05-28 / Accepted: 2025-06-16 / Published: 2025-07-01

## Abstract

This article analyzes gamification in education and how artificial intelligence can contribute to its development. Gamification involves applying game-like elements to other contexts, but one of its biggest challenges is creating coherent and engaging narratives. Many teachers struggle with this aspect, which limits its implementation. Artificial intelligence can serve as a tool to generate initial ideas and structures, but it does not guarantee effective proposals on its own. Human intervention is essential to ensure coherence, credibility, and the personalization of the educational experience. The article tests artificial intelligence in creating a gamification proposal based on the television series "Game of Thrones", comparing its results with theoretical approaches and models applied in education. It concludes that human involvement is indispensable for adapting and improving proposals, leading to more immersive and motivating experiences. Additionally, teachers can incorporate elements that enhance the proposal's impact, integrating the emotional component—one of AI's greatest shortcomings. Ultimately, while this technology can be a valuable tool, the human factor remains key to ensuring meaningful and engaging educational experiences.

**Keywords:** education, technology, artificial intelligence, narrative, gamification, teacher's role.

## Resumen

Este artículo analiza la gamificación en educación y cómo la inteligencia artificial puede contribuir a su desarrollo. La gamificación consiste en aplicar elementos propios de los juegos a otros contextos, siendo uno de sus mayores desafíos la creación de narrativas coherentes y atractivas. Muchos docentes encuentran dificultades en este aspecto, lo que limita su implementación. La inteligencia artificial puede servir como herramienta para generar ideas y estructuras iniciales, pero no garantiza propuestas efectivas por sí sola. La intervención humana es esencial para asegurar coherencia, credibilidad e individualización de la experiencia educativa. El artículo pone a prueba a la inteligencia artificial en la creación de una propuesta de gamificación basada en la serie *Juego de Tronos*, contrastando sus resultados con enfoques teóricos y modelos aplicados en educación. Se concluye que la participación humana es indispensable para adaptar y mejorar las propuestas, logrando experiencias más inmersivas y motivadoras. Además, el docente puede incorporar elementos que aumenten el impacto de la propuesta, integrando el componente emocional, una de las mayores carencias de la inteligencia artificial. En definitiva, aunque esta tecnología puede ser una herramienta valiosa, el factor humano sigue siendo clave para garantizar experiencias educativas significativas y atractivas.

**Palabras clave:** educación, tecnología, inteligencia artificial, narrativa, gamificación, rol docente.

## 1. Introduction

Important contributions in teaching methodologies should be explored in the educational field, since education should be relevant and attractive to all students (Quintero-Chavez, 2024). Educational demands must be addressed through methods that are adapted to each individual, giving value to education and seeking meaningful learning (Duque-Romero and Acero-Quilumbaquín, 2022). In this context, there must be a direct relationship between what students learn and their future professional practice (Rodríguez-Gómez et al., 2018; Trede and McEwen, 2016). To this end, it will be essential to create environments that support flexibility, active learning, collaboration and interdisciplinarity in research, teaching and learning (Qureshi et al., 2023).

Following authors such as Chrobak (2017) and Giménez-Giubbani (2016), it is essential to promote teaching that prioritizes student autonomy, with proposals aligned with the demands of life in society, establishing more direct connections with their environment and responding to the needs of the future. It is even more relevant if considering Serrano and Pontes (2017) who indicate that many future teachers have a pessimistic perception about teaching in secondary education. Therefore, it is necessary to have teachers and projects capable of highlighting the value of teaching as a creative and open work, linked to innovation and research, while facing current challenges to engage students' interest, promoting the acquisition of the necessary competencies through an active and experiential approach (García-Jiménez et al., 2024; Hashmi et al., 2019).

### 1.1 Gamification

*Gamification*, which leverages elements and mechanics of games with the aim of enhancing engagement and motivation in non-game contexts, is relevant in this context (Kapp, 2012; Zichermann and Cunningham, 2011). Despite the concept emerging in the early years of the 21st century, significant academic interest began to emerge a decade later (Al-Hafdi and Alhalafawy, 2024). This lag in academic focus can be due to a variety of factors, including the need for empirical validation of *gamification* effectiveness, and the development of more robust frameworks and methods (Bezzina and Dingli, 2023; Navarro-Mateos et al., 2021).

*Gamification* in education aims to achieve transcendent objectives, i.e., objectives that will require influencing intrinsic motivation for their achievement (Pérez-López, 2020). Hence, it cannot be limited to a set of rewards, points and rankings, because although they can boost initial student participation, and provide some motivation, they often fail to address the nuanced needs and preferences of individual users (Bezzina and Dingli, 2023).

Therefore, it represents a great challenge for teachers, and even more so if the different learner profiles are not catered to in order to motivate and engage them in the proposal. If so, there may be a loss of interest and a decrease in participation over time in the perceived challenges, since cognitive ability and behavioral condition, which correlate with good performance, may vary according to the characteristics of the individuals and the task (Bennani et al., 2022; Rozi et al., 2019).

This impersonal and static nature of *gamification* is interesting for researchers and designers because it allows them to explore a more personalized and adaptive way of *gamification*, which considers the individual differences of users and can tap into a more intrinsic form of motivation (Bezzina and Dingli, 2023). In fact, intrinsic motivation is a key aspect when proposing a truly meaningful and transcendent *gamification* proposal (Jones et al., 2022; Pérez-López and Navarro-Mateos, 2023a), as it is the crucial element that stimulates students' efforts and commitment to achieve learning success. In contrast, extrinsic motivation was found not to exert a positive influence on students' cognitive engagement (Ngo et al., 2021).

#### 1.1.1 Motivators and barriers

Lester et al. (2023), in the research that studied the factors that university teachers considered to positively influence the use of *gamification* in the classroom, highlighted the promotion of interactions between students and collaborative learning, and the fact that it increased fun and improved engagement. In terms of barriers, the lack of time to develop *gamification* approaches, the absence of proven benefits and management problems related to the classroom environment stand out. In fact, it is necessary to devote a lot of time and effort to design a project like this, since there is evidence showing that an inadequate

design can result in students' attitudes being negatively affected (Sabornido et al., 2022). In this sense, it is striking the lack of knowledge of many teachers when mentioning the absence of scientific evidence, since there are more and more works that show this, for example, affecting variables related to classroom environment (Pérez-López et al., 2019), psychological well-being (Navarro-Mateos et al., 2024a) or physical condition (Mora-González et al., 2020).

Valencia-Quecano and Orellana-Viñambres (2019) also analyzed the barriers in the implementation of *gamification* in higher education. Among them, they highlighted technology, strategy design, pedagogy or the relationship between teacher and student. Within the strategy design barrier, the narrative barrier should be noted, which focuses on the creation of logical lines in the established script, or in the concrete narration of the story. In this sense, the narrative within a proposal is essential, since it is the key element that should articulate a *gamification* project in education (Navarro-Mateos and Pérez-López, 2022; Pérez-López and Navarro-Mateos, 2023).

## 1.2 Artificial intelligence

The inclusion of technology in education represents a reality in today's society, and its appropriate use is considered the most important resource for increasing academic development (Atencio-González et al., 2023). It facilitates access to digital content and the development of competencies that help education adapt to current needs (Sánchez-Prieto et al., 2017).

Artificial intelligence (AI) has been introduced into our daily lives, playing novel roles that make it one of the main drivers of change in socio-economic life (Jian et al., 2022). In its beginnings, it was more linked to areas related to engineering, but nowadays it has become a key element in teaching-learning processes, providing new tools to redefine and reinvent traditional training processes (Moreno-Padilla, 2019). In fact, among the applications of AI, three main approaches stand out in the training context: chatbots (conversational software agents), the creation of online platforms that bet on an autonomous learning approach and educational robotics (Moreno-Padilla, 2019).

*ChatGPT* is a technological tool, materialized through AI chatbot, which can generate highly

accurate content in a few seconds, starting from the questions posed to it (Diego-Olite et al., 2023). It has been progressing significantly due to its multiple possibilities, becoming a great opportunity for teachers, when identifying assessment strategies or creating innovative pedagogical solutions (Dempere et al., 2023).

## 2. What does ChatGPT know about gamification?

The first thing to keep in mind when dealing with this chatbot is the information that appears just below the text box: «*ChatGPT* may contain errors. Consider verifying important information». Hence, it is important to question everything that *ChatGPT* shares, so that the human filter can detect the possible lack of accuracy of the information obtained. In fact, as Deleon-Villagran (2023) states, the cold accuracy that AI possesses requires the validity and support of experts to review and certify the information.

Therefore, the aim of this article is to test AI, checking the information it provides in relation to *gamification* in education: what it consists of, what are the main elements that make it up, and some concrete examples, contrasting it with the scientific literature, analyzing it with a critical and human perspective to complement the information obtained.

### 2.1 What is gamification in education and what are its main elements?

Faced with this question of what is considered gamification in education, the answer given by the AI is the following: *Gamification* in education refers to the use of elements, dynamics and principles typical of games in educational contexts with the aim of motivating, involving and improving student learning. In addition, in practice, *gamification* can include the use of points, badges, levels, challenges and rewards, which are integrated into academic activities to make learning more interactive and fun. Doing so promotes an environment in which students are more motivated to overcome challenges, collaborate with peers and improve their performance.

In this case, the AI uses a very generic definition of gamification, which can generate confusion in readers, since it includes elements that are directly connected to extrinsic motivation, such as points,

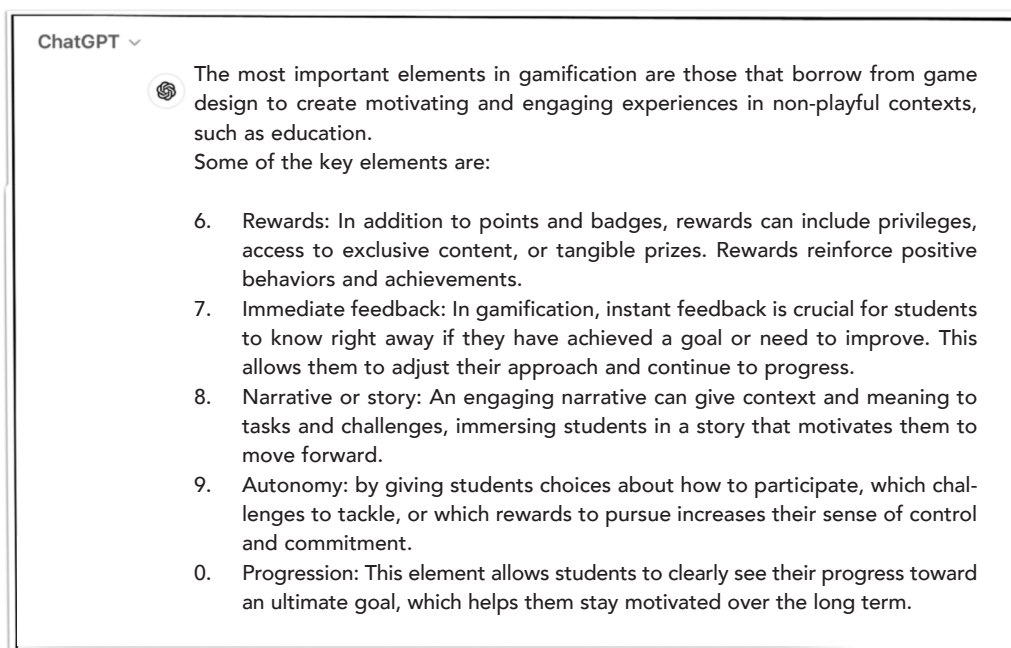
badges or rewards. Thus, the information provided by the AI is inaccurate, as it is much closer to a PBL (Points, Badges and Leaderboards) approach than to *gamification*. Authors such as Kapp (2012) or Marczewski (2018), say that *gamification* should have a much richer and deeper meaning, not being limited to the use of badges or rewards. It is necessary to clarify that *gamification* is not synonymous with fun, an idea that can end up trivializing the term, but rather with emotion (Pérez-López and Navarro-Mateos, 2023b). A well-thought-out proposal assumes a great emotional management in students, a fundamental aspect so that, as expressed by neuroeducation, learning takes place (Mora, 2017).

It would be much more interesting to use the definition proposed by Pérez-López (2020), who understands gamification as:

Captivating students to immerse them in an adventure that allows them to achieve an educational purpose that transcends the end of the experience, based on an exciting purpose and where the challenges and resources posed by the teacher (guide, but not protagonist) must be coherently integrated into the narrative that has been constructed (p. 39)

When asked about the most important elements, *ChatGPT* provides the information presented in Figure 1, where it numbers and develops them.

**Figure 1.** *Fundamental elements in gamification for AI*



Striking in Figure 1, for example, is the fact that points or leaderboards appear before narrative or a sense of progress. According to the «10-40 Model» (Pérez-López and Navarro-Mateos, 2023a), most of the elements highlighted by *ChatGPT* would be triggers that would enrich any educational proposal, but would not be the key pillars for designing a *gamification* project. These pillars would be the following: Transcendent objective, thematic, exciting purpose, actions and emotions, challenges and missions, *feedback*, care for details, *in & out*, «game» rules and intrigue campaign.

It is interesting to focus on the concept of *flow* or flow channel, closely related to intrinsic motivation. This state is highly desirable in any training process, as it characterizes by facing attainable challenges in which continuous *feedback* allows for a sense of progress, and adjusting actions according to that feedback. When a person is in *flow*, their concentration levels are high, they have a sense of control over their actions and perceive the activity as intrinsically rewarding, so that the final goal is often just an excuse to enjoy the process (Nakamura and Csikszentmihalyi, 2002).

When asking *ChatGPT* how to generate the flow channel, presented by Csikszentmihaly (1997), in an educational *gamification* proposal, its answer is the following: To generate the flow channel proposed by Mihaly *Csikszentmihalyi* in an educational *gamification* proposal, it is essential to design an experience that carefully balances the level of challenge and the skills of the students, maximizing intrinsic motivation. Once again, the human factor is an essential component, since the teacher is the only person capable of knowing the needs and level of competence of the students. All this will be fundamental to adapt and adjust the challenges to generate meaningful learning, based on their individual characteristics. According to the results obtained in previous proposals, the teacher is a differentiating factor in this type of project, as it encourages greater student involvement and satisfaction with the proposal (Navarro-Mateos et al., 2024b).

## 2.2 Is there an example of gamification in education?

The idea in this phase is to check what *ChatGPT* understands as an example of *gamification*. The answer was: An example of a gamified activity in education could be a «*Digital Escape Room*» to review concepts of a specific subject. As seen, there are quite a few serious conceptual errors, which can generate confusion about what *gamification* is and implies.

The concept of *gamification* cannot be reduced to a specific activity (Pérez-López and Navarro-Mateos, 2022) because, as mentioned above, it seeks to achieve complex, transcendent objectives. Thus, it makes no sense to speak of gamified activity or task, since these are specific, and require a reduced time for their conduction. The intrinsic motivation of students cannot be developed through specific activities because, as Deci and Ryan (2002) say in their self-determination theory, it is necessary to satisfy the competence, autonomy and relationship with others, which is a complex challenge.

Furthermore, the practical example presented is also mistaken, since the escape room or *breakout* can be included within a *gamification* proposal to enrich it, but they are not considered *gamification* as such (Pérez-López, 2020). In fact, these are placed with iGMB (Game-Based Learning -Fotaris and Mastoras, 2019-), offering participants very intense and tension-filled experiences, since there is a time limit to decipher different puzzles and enigmas, and thus manage to escape from a room (escape room) or open a box (*breakout*).

Another practical example is shown in Figure 2, where there is also an error in the conceptualization of *gamification*. In fact, as expressed by Navarro-Mateos et al. (2021), in a systematic review on the state of *gamification* in the Spanish educational landscape, in several moments the term GBL and *gamification* are used interchangeably, which is a serious error. This occurs in the new example provided by AI, as it suggests adapting a game board similar to *Monopoly* to include questions related to subject content. In this case, what *ChatGPT* proposes is an example of a *serious game*, since it proposes the design of a game with specific educational purposes, incorporating content that facilitates the learning of relevant topics through the fun and dynamic approach that characterizes games (Pérez-López, 2020).

In this sense, it is important to mention that *ChatGPT* has been trained with a large volume of data from articles, books and online sources to answer the questions posed. Therefore, the problem lies in the reference sources, with special concern regarding the scientific literature given the great conceptual and terminological confusion that exists regarding *gamification* (Navarro-Mateos et al., 2021), conditioning the results reported by *ChatGPT* and, as a result, the concept that many teachers have about *gamification*. Hence the relevance of the filtering phase that must be done after any query (Deleon-Villagrán, 2023) to avoid the errors that AI itself, in this case *ChatGPT*, makes.

**Figure 2.** Example of activity presented by ChatGPT

**5. Giant learning board**

- Objective: to reinforce concepts in a fun and competitive way
- How it works:
  - A physical board (similar to games such as Monopoly or Snakes and Ladders) is designed with squares containing questions, challenges, or rewards.
  - Students advance by rolling a die and facing whatever the square indicates (solving a problem, performing a physical activity, etc.).
- Technological variation: to create an interactive digital board using tools such as PowerPoint or Google Slides.

### 3. A gamification based on Game of Thrones: AI vs. craftsmanship

As seen in the first section, one of the barriers that teachers report having when creating a *gamification* project is the creation of the narrative. In this sense, it helps a lot to have a ludic and narrative background, i.e., to have references from video games, board games and movies that can facilitate the fact of facing the blank page syndrome. This can be defined as the fear of having to start a project from scratch, being linked to creative processes (Villagrà-Arnedo et al., 2016). For example, if at the time of designing a *gamification* the teacher, depending on the interests of the students (and the suitability of the contents and competencies of the subject), considers it interesting to use a pirate-themed universe, it will be helpful to have as a reference the aesthetics and narrative of video games like Assassin's Creed IV: Black Flag, board games like Skull King or fictions such as Pirates of the Caribbean or Black Sails. In the absence of this type of references or experiences, *ChatGPT* can be a very useful tool when it comes to propose an initial narrative script that provides a structure from which to develop the educational proposal. However, the human filter will also be essential to detect possible errors, and to generate the necessary emotions to make the proposal credible and immersive, since the emotional aspect is one of *ChatGPT's* pending subjects, as will be shown below.

In this section, the AI will be tested to propose a *gamification* based on one of the most popular series of all times: *Game of Thrones*. In addition, each of the sections generated with the AI will be analyzed, complementing them with a «handmade» example carried out in a real way in university teaching. The expression «handcrafted» means that AI was not used in the design phase. But with the intention of «playing» on equal terms, the contextualization of the proposal is the same that was proposed to *ChatGPT*, i.e., the subject «Fundamentals of Physical Education», in physical activity and sport sciences.

The main objectives of this subject (which were also indicated to *ChatGPT*) are: to understand how to plan physical education at the secondary education level, taking into account the key elements of the curriculum; to develop the essential skills for effective teaching, responding to the needs of both the context and the students; and to internalize the importance of innovation as a way to improve the quality of education.

In addition, among the competencies to be developed are: organizational and planning skills, problem solving, decision making, critical awareness, autonomous learning, flexibility and adaptability to new situations, as well as the development of creativity and teamwork skills. Thus, in accordance with the objectives and competencies of the subject, it was decided to choose *Game of Thrones* as the narrative, since it would generate situations that would require great emotional management, which would provide the proposal with great educational value. To create

it, the key aspects established in the «Tetris of *gamification*» (Pérez-López and Navarro-Mateos, 2019) were taken into account: time, aesthetics, plots, roles and characters and interactions.

The concept of *gamification* (Pérez-López, 2018) refers to the adaptation of a filmic reference (television series or movie) to take advantage of the motivation of students to experience in first person what they have previously enjoyed as spectators. Figure 3 shows the elements to be taken

into account when implementing an educational proposal inspired by a fiction. At first glance, one can intuit the complexity of the event since there are elements and emotions that characterize it and that, therefore, must be part of the proposal, given that the students who know it and follow it expect to find it. Otherwise, credibility and immersion would be significantly reduced (Pérez-López and Navarro-Mateos, 2019).

**Figure 3.** *Gamification Tetris spreadsheet*

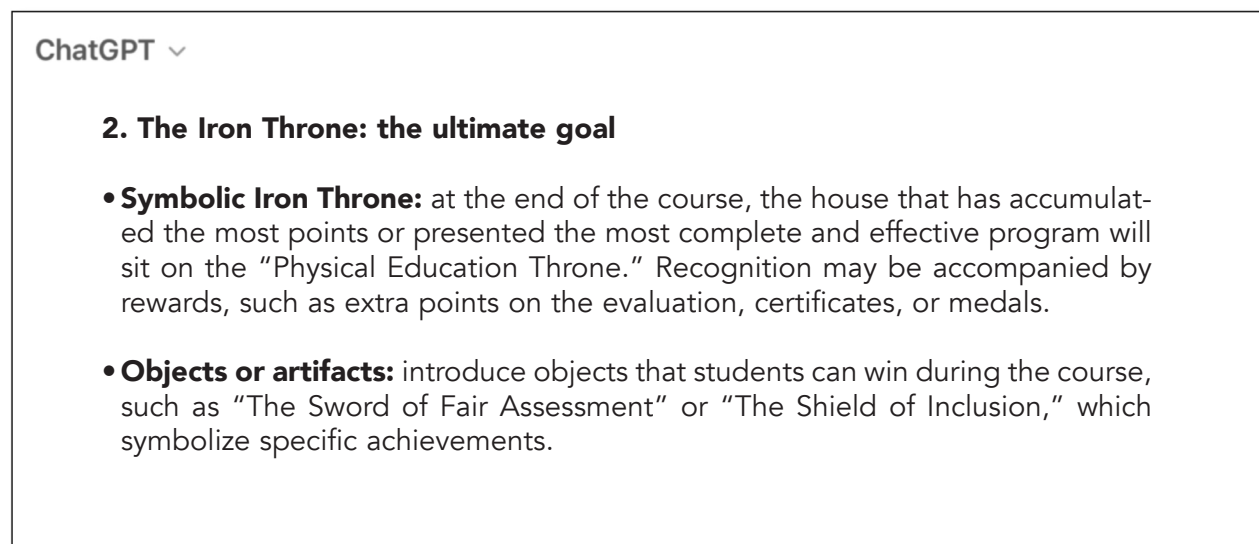


### 3.1 Objective and key emotions

When *ChatGPT* was asked how to make an adaptation of the TV series to the educational field (specifically to the subject “Fundamentals of Physical Education”, in Physical Activity and Sport Sciences), after a first section of contextualization of the series

(the plot of the series combines drama and medieval fantasy, including elements such as confrontations, betrayals and struggles to achieve the Iron Throne, and with it the power over the seven

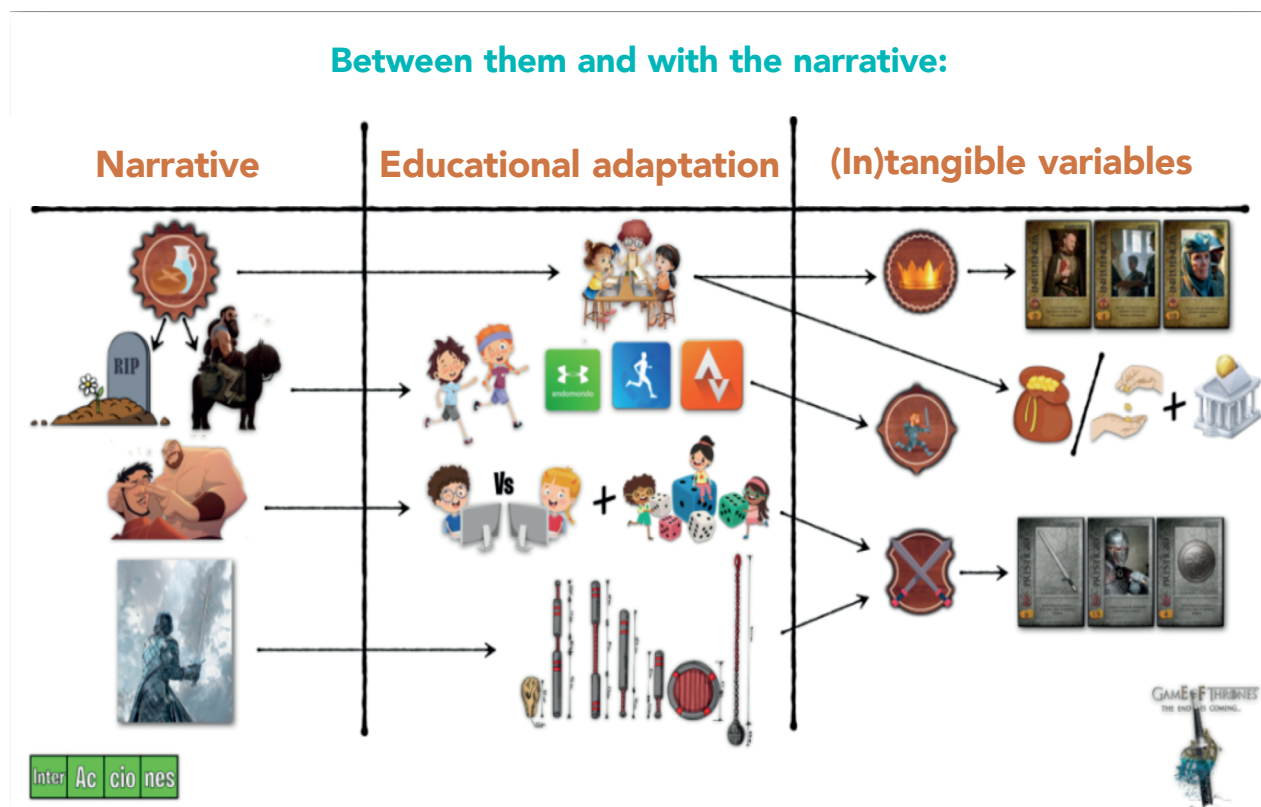
kingdoms of Westeros), it begins by presenting the final objective (Figure 4), which would correspond to the exciting purpose (the narrative).

**Figure 4.** Final goal and objects presented by the AI

First of all, it can be seen how there is no connection between what is required to achieve the Iron Throne in the series (allies, strategy, battle, resource gathering, planning capacity, etc.) and what is involved in achieving it in what *ChatGPT* proposes (delivering a didactic program). For the proposal to be credible, the emotions involved in achieving the Iron Throne (such as tension, pressure or loss of property) should be identified, and situations should be presented that generate these feelings in the students (Pérez-López and Navarro-Mateos, 2023a). Therefore, following Pérez-López (2020), the exciting purpose that was set for the students was: To become the King (Queen) of Westeros, conquering King's Landing. To do this, they did not have to get more points than other kingdoms (teams) or do a certain job, but, being

faithful to the series, they had to advance from their place of origin through the map of Westeros, defeating the rest of kingdoms, getting alliances with some of them and avoiding possible betrayals of their own lineage (team). Moreover, the means to achieve this was what connected the narrative with the formative, as will be described below.

The first thing to consider to adapt the fiction to the educational environment was to detect the fundamental actions of *Game of Thrones*: feeding (in order to survive and advance in the territory), training for battles, and fighting. After this, the fundamental key was to identify the emotions inherent to each verb, in order to make a faithful educational adaptation, and to link them to variables inherent to the narrative, such as gold or influence (Figure 5).

**Figure 5.** Relationships between narrative and their educational adaptation

Regarding the narrative, in the first place, there is the verb «to feed». In order to survive in Westeros, the different members of the Houses had to buy food (formative challenges), paying with gold coins. In this way they «fed» (nourishing themselves with the contents of the subject) and could have energy to travel to other kingdoms and battle. Travel to other territories was simulated in a real way, as each member of the House had to accumulate five days of running at a certain pace (recorded by means of the applications shown in Figure 5: Endomondo, Runtastic or Strava). In this way, sensations similar to those occurring in the original series were generated, as the students had to invest time and effort in commuting, also assuming possible setbacks.

They could also «train» in 1x1 situations or between groups. To recreate the sensations of a confrontation, board games were used that included mechanics linked to emotions such as tension or the feeling of responsibility (typical of a confrontation in the series). In addition, to review content related to the subject and to continue «training», confrontations were also included using different applications

and digital platforms such as, for example, Kahoot! or Quizizz.

Finally, we could not miss one of the most typical actions of *Game of Thrones*: the battles and struggles for power. To recreate the confrontations, *jugger*, a sporting activity that mixes elements of fencing and rugby, including foam weapons, was used. The official rules were used, maintaining the different roles and existing weapons. In this way, the emotions of the confrontations in *Game of Thrones* were recreated, relating it also with the area in which the subject was developed (Physical Education), given the great physical demand of the *jugger*.

In addition, these actions were linked to variables that appear in the series, such as gold, influence or prestige. Each House had a weekly allotment of coins (which varied depending on the characteristics of the territory, as in *Game of Thrones*) with which they could buy food, and there was also the possibility of asking the Iron Bank for a loan, whose «interest» was the completion of a training challenge. Depending on the valuation that the Houses had in the challenges related to the provisions, they

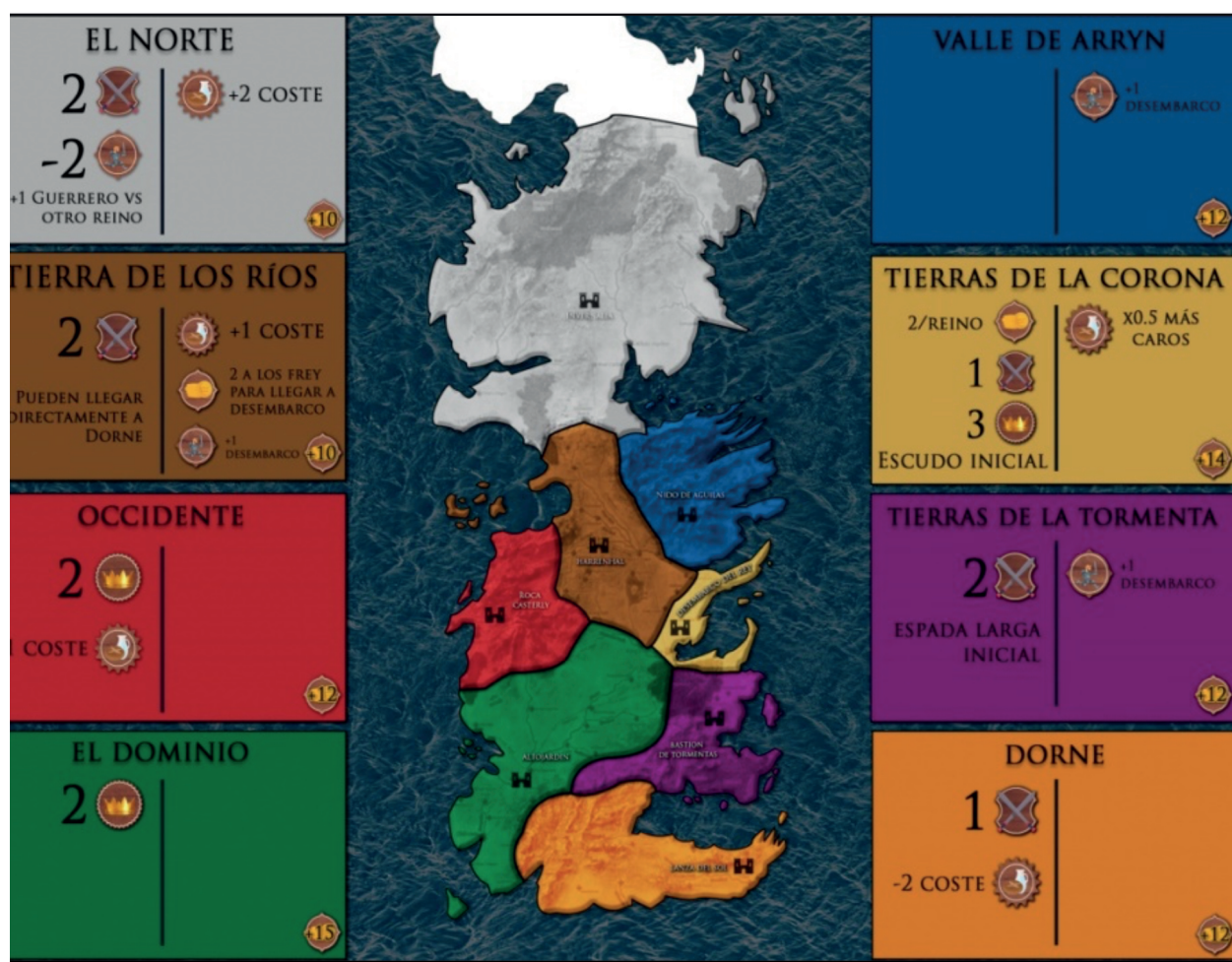
obtained influence cards (shown in gold in figure 5), which gave them privileges in the adventure (for example, preventing a member of the House from being sent to the Wall). Prestige was also included, materialized through cards (silver colored). This was achieved by winning battles and allowed access to special materials in the *jugger* competition.

In *Game of Thrones*, armies must make a physical advance (which requires time and effort), plan an attack strategy, expose themselves to the consequences of the battle (loss of resources) and, in case of losing the confrontation, return to their territory. This investment of time and effort is not comparable to the delivery of a challenge linked to one of the areas of the curriculum. On the other hand, the competition in *Game of Thrones* is not in any case friendly, so it would be necessary to go

to the root of the problem, and not to soften such a characteristic aspect of the series, but instead (in the case of considering that it does not fit the desired educational approach) choose another thematic universe. However, it is necessary to highlight the enormous educational value of generating a learning context with competition, since it generates behaviors and reflections with enormous transfer to real life (Navarro-Mateos et al., 2024b).

In the case of the *gamification* project, a territory map was created so that all the kingdoms knew both the location of the other Houses and the benefits and considerations of each one of them (Figure 6). In addition, we tried to make it aesthetically attractive and coherent with the kingdoms that appear in the series.

**Figure 6.** Map of Westeros and advantages and considerations of each kingdom



Another aspect to consider is that the objects proposed by ChatGPT have nothing to do with those that appear in the series (as would be the Valyrian steel sword, the dragonglass dagger or the banners of the Houses), nor with the values of the series, where there is continually a power struggle to improve the position of the different kingdoms with respect to the others, so it would make no sense to include artifacts related to fair assessment or inclusion. This does not mean that situations that give rise to reflection on fairness and inclusion cannot (and should) be generated, of course they can, but they should be included in a more natural and coherent way with the narrative.

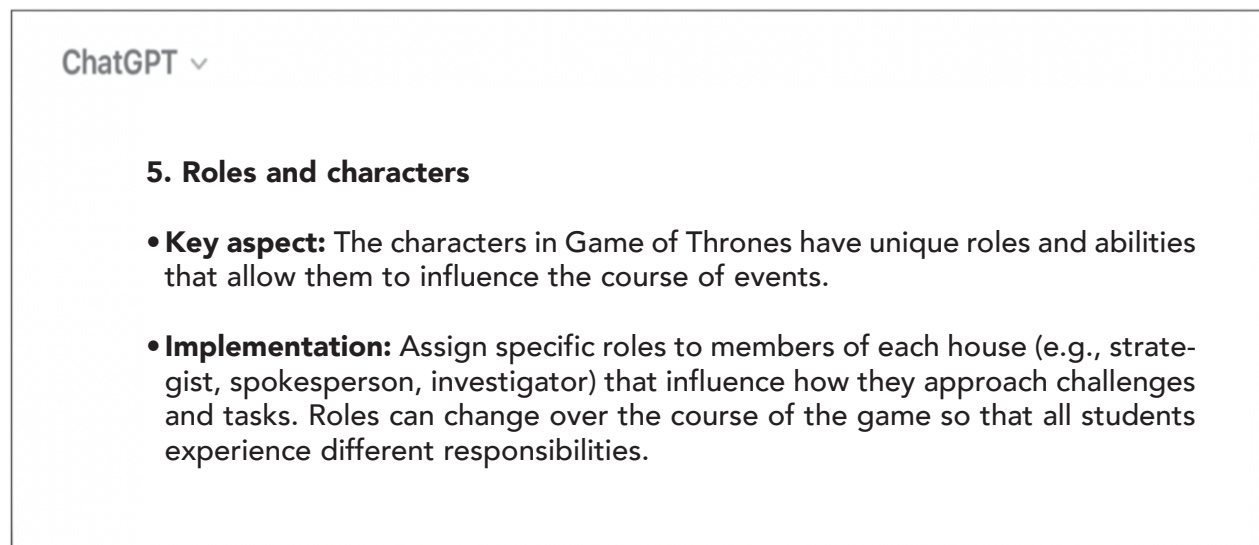
In the case of the «artisan» proposal, different objects were proposed that were coherent with the narrative (at an aesthetic level and at the level of internal logic with the plots), and that significantly increased the immersion and motivation of the stu-

dents. Coins were created using a 3D printer with the project logo, and territory, prestige and influence cards were made with characters and phrases from the series. The feedback after the delivery of a challenge was given through phrases from the series (the best evaluation being «I'm almost more flipped out than the Red Wedding episode» and the worst «The same value as Littlefinger's word»). In addition, in the series, the inhabitants of Westeros communicated through ravens, so a mail domain («cuervo@poniente.tv») was purchased so that students would receive a «raven» in their mail when communicating with Maester Valyr (the teacher's alter ego in the project).

### 3.2 Roles and characters

Regarding roles and characters, *ChatGPT* points out as a key aspect the information shown in Figure 7.

**Figure 7.** Roles proposal presented by *ChatGPT*



The AI is quite right when it says that the roles and skills of the characters influence the course of events. Now, the roles that appear in *Game of Thrones* are directly related to status as, for example, King of Westeros or Lord Commander. However, the roles posed by the AI have absolutely nothing to do with the narrative, but rather with those granted in active methodologies such as cooperative learning. Moreover, in the series there are no role changes without justification, one can progress and climb (for example, if one is a member of the Night's Watch,

one can become Lord Commander of the Night's Watch), but not leave aside the origin and context.

The proposal carried out in a real way included the main roles of the series: King/Queen of Westeros, Hand of the King/Queen, Lineage or Kingsguard, Lords/Ladies of the Houses, Lord Commander, Lineage, Lord Commander of the Night's Watch, member of the Night's Watch. After a first session in which the Houses were formed (where chance played a great role, as it happens in real life, and in the series itself, since nobody is born

where they want to be), the members of each one of them chose the roles with which they would start the adventure. In addition, to increase credibility, each role was assigned a series of benefits and considerations, as in *Game of Thrones*. For example, the King/Queen of Westeros received gold on a weekly basis due to the taxes he/she collected from the different kingdoms, which was a great benefit. Now, it was the person on the Iron Throne who stipulated the weekly amount, having to decide whether to prioritize his/

her own benefit and set a high amount, or try not to generate too much discomfort in the rest of the territories and turn them against him/her (and even favor alliances with some of them), thus decreasing the amount of coins obtained. All this required enormous decision-making and emotional management skills, aspects that are essential in fiction, and which have an enormous significance for their future teaching work.

**Figure 8.** Word cloud summarizing the essence of the gamification project



At the end of the project, students were given the opportunity to share, through an anonymous Google form, three words to summarize the essence of the adventure they had lived. Figure 8 shows the resulting word cloud, represented by a raven, a very typical element of *Game of Thrones*. It can be

seen how the most repeated word was “Learning”, demonstrating that *gamification* does not dilute learning, on the contrary, it contextualizes it and gives it value. Other words stand out such as «Passion», «Illusion», «Motivating», «Passionate», «Unforgettable» or «Special». All these terms have an

enormous value, since they are linked to experiential and emotional aspects that are key to significant learning, and thus have an impact on real life. This is where the role of the teacher is fundamental, having the opportunity to generate meaningful and exciting learning contexts that meet the needs and characteristics of the students.

#### 4. Conclusions

The use of artificial intelligence tools such as *ChatGPT* to design educational gamification proposals represents a resource with great potential, especially for teachers who feel they lack experience and creativity. AI can provide a first general story structure to help overcome initial blocks and facilitate the generation of ideas, which is especially useful in the face of the so-called «blank page syndrome». However, this article has shown that AI cannot be relied upon exclusively to create gamification experiences that are truly coherent and have a formative and personal impact on learners. Teachers must intervene in a «handcrafted» way to adjust, personalize and contextualize AI-generated proposals, including the emotions needed to maintain the motivation and engagement of different learner profiles.

One of the main shortcomings detected in the proposals generated by *ChatGPT* is the terminological and conceptual confusion, reflecting the existing scientific literature. Examples such as an «escape room» or the adaptation of «Monopoly» show the use of game-based learning and gamification as synonyms. On the other hand, it is a mistake to relate gamification to a specific activity, instead of understanding it as an ambitious and complex approach. Likewise, the comparative analysis between the AI-generated proposal and a real gamification experience based on Game of Thrones has clearly illustrated the substantial differences between an AI-generated narrative and a handcrafted one. While the *ChatGPT* proposal lacks coherence, emotional depth and narrative fidelity, the real proposal incorporates attention to detail, the series' own roles and characteristic objects, thus achieving an immersive and credible experience.

In short, the true richness of gamification does not lie in the use of game mechanics and elements, but in its ability to generate a learning environment where students feel protagonist, involved and emo-

tionally connected with the experience. This is where the role of the teacher becomes meaningful: designing meaningful contexts that transcend the classroom, that awaken emotions and leave a mark on the different student profiles. *ChatGPT* can be a useful tool to break down some barriers in gamification, but human direction and supervision are essential to ensure an enriching and memorable educational experience.

#### Author contributions

**Isaac J. Pérez-López:** conceptualization, research, software, supervision, writing (review and editing).

**Carmen Navarro-Mateos:** research, visualization, writing (original draft).

#### References

- Al-Hafdi, F. S. & Alhalafawy, W. S. (2024). Ten years of Gamification-Based Learning: A Bibliometric Analysis and Systematic Review. *International Journal of Interactive Mobile Technologies*, 18(07), 188-212.  
<https://doi.org/10.3991/ijim.v18i07.45335>
- Atencio-González, R. E., Bonilla-Ron, D. E., Miles-Flores, M. V. & López-Zavala, S. Á. (2023). Chat GPT como recurso para el aprendizaje del pensamiento crítico en estudiantes universitarios. *Cienciamatria. Revista Interdisciplinaria de Humanidades, Educación, Ciencia y Tecnología*, 9(17), 36-44.  
<https://doi.org/10.35381/cm.v9i17.1121>
- Bennani, S., Maalel, A. & Ben-Ghezala, H. (2022). Adaptive gamification in e-learning: a literature review and future challenges. *Computer Applications in Engineering Education*, 30(2), 628-642.  
<http://dx.doi.org/10.1002/cae.22477>
- Bezzina, S. & Dingli, A. (2023). Rethinking gamification through Artificial Intelligence. In Fang, X. (eds.), *HCI in Games. HCII 2023. Lecture Notes in Computer Science* (pp. 252-263). Springer, Cham.
- Csikszentmihalyi, M. (1997). Flow and education. *NAMTA Journal*, 22(2), 2-35.
- Chrobak, R. (2017). El aprendizaje significativo para fomentar el pensamiento crítico. *Archivos de Ciencias de la Educación*, 11(12).  
<https://doi.org/10.24215/23468866e031>
- Deci, E. L. & Ryan, R. M. (2002). *Handbook of self-determination research*. University Rochester Press.

- Deleon-Villagrán, M. (2023). Perspectivas sobre el ChatGPT: una herramienta potente en la Educación Superior. *Panorama UNAB*, (5), 11-14.
- Dempere, J., Modugu, K., Hesham, A. & Ramasamy, L. K. (2023). The impact of ChatGPT on higher education. *Frontiers in Education*, 8. <https://doi.org/10.3389/feduc.2023.1206936>
- Diego-Olite, F. M., Morales-Suárez, I. D. R. & Vidal-Ledo, M. J. (2023). Chat GPT: origen, evolución, retos e impactos en la educación. *Educación Médica Superior*, 37(2).
- Duque-Romero, M. V. & Acero-Quilumbaquín, E. C. (2022). Herramientas educativas como apoyo en la enseñanza. *Mendive. Revista de Educación*, 20(4), 1099-1108.
- Fotaris, P. & Mastoras, T. (2019). Escape rooms for learning: A systematic review. En *Proceedings of the European Conference on Games Based Learning*. Dinamarca (pp. 235-243). Universidad de Dinamarca del Sur.
- García-Jiménez, M., Fernández Cabezas, M. & Pérez-García, P. (2024). Learning strategies in initial teacher training: a systematic review. *London Review of Education*, 22(1). <https://doi.org/10.14324/LRE.22.1.03>
- Giménez-Giubbani, A. (2016). El papel de la gestión de centros educativos en un modelo de aprendizaje basado en competencias. *Páginas de Educación*, 9(1), 5-15.
- Hashmi, A., Khalid, M. & Shoaib, A. (2019). A cross-sectional study of assessing metacognitive knowledge and metacognitive regulatory skills among prospective teachers and its relation to their academic achievement. *Bulletin of Education and Research*, 41(2), 215-234.
- Jiang, Y., Li, X., Luo, H., Yin, S. & Kaynak, O. (2022). Quo vadis artificial intelligence? *Discover Artificial Intelligence*, 2(1), 4. <https://doi.org/10.1007/s44163-022-00022-8>
- Jones, M., Blanton, J. E. & Williams, R. E. (2022). Science to practice: Does gamification enhance intrinsic motivation? *Active Learning in Higher Education*, 24(3), 273-289. <https://doi.org/10.1177/14697874211066882>
- Kapp, K. M. (2012). *The gamification of learning and instruction: game-based methods and strategies for training and education*. John Wiley & Sons.
- Lester, D., Skulmoski, G. J., Fisher, D. P., Mehrotra, V., Lim, I., Lang, A. & Keogh, J. W. (2023). Drivers and barriers to the utilisation of gamification and game-based learning in universities: A systematic review of educators' perspectives. *British Journal of Educational Technology*, 54(6), 1748-1770. <http://dx.doi.org/10.1111/bjet.13311>
- Marczewski, A. (2018). *Even ninja monkeys like to play: Unicorn edition*. Gamified UK.
- Mora, F. (2017). *Neuroeducación. Solo se puede aprender aquello que se ama*. Alianza Editorial.
- Mora-González, J., Pérez-López, I. J., Esteban-Cornejo, I. & Delgado-Fernández, M. (2020). A gamification-based intervention program that encourages physical activity improves cardiorespiratory fitness of college students: 'The Matrix rEFvolution Program'. *International Journal of Environmental Research and Public Health*, 17(3). <https://doi.org/10.3390/ijerph17030877>
- Moreno-Padilla, R. D. (2019). La llegada de la inteligencia artificial a la educación. *Revista de Investigación en Tecnologías de la Información: RITI*, 7(14), 260-270. <https://doi.org/10.36825/RITI.07.14.022>
- Nakamura, J. & Csikszentmihalyi, M. (2002). The concept of flow. En *Handbook of positive psychology*, (pp. 239-263). Oxford University Press.
- Navarro-Mateos, C., Mora-Gonzalez, J. & Pérez-López, I. J. (2024a). The "Star Wars: The First Jedi" program-effects of gamification on psychological well-being of college students. *Games for Health Journal*, 13(2), 65-74. <https://doi.org/10.1089/g4h.2023.0059>
- Navarro-Mateos, Carmen. & Pérez-López, I. J. (2022). Una app móvil potencia la motivación del alumnado en una experiencia de gamificación universitaria. *Alteridad. Revista de Educación*, 17(1), 64-74. <https://doi.org/10.17163/alt.v17n1.2022.05>
- Navarro-Mateos, C., Pérez-López, I. J. & Femia, P. (2021). La gamificación en el ámbito educativo español: revisión sistemática. *Retos*, 42, 507-516. <https://doi.org/10.47197/retos.v42i0.87384>
- Navarro Mateos, C., Pérez López, I. J. & Trigueros Cervantes, C. (2024b). Análisis del rol docente en una propuesta de gamificación en el máster de profesorado. *Revista de Educación*, 405, 275-301. <https://doi.org/10.4438/1988-592X-RE-2024-405-635>
- Ngo, H. Q., Nguyen, T. H. & Nguyen, T. N. T. (2021). The roles of student engagement motivations in learning and managing. *International Journal for Innovation Education and Research*, 9(4), 223-234. <http://dx.doi.org/10.31686/ijer.vol9.iss4.3043>
- Pérez-López, I. J. (2018). La docencia es un juego donde gana el que más disfruta. *Habilidad motriz*, 50, 2-3.
- Pérez-López, I. J. (2020). *De las 7 Bolas de Dragón a los 7 Reinos de Poniente: viajando por la ficción para transformar la realidad*. Copideporte, S. L.

- Pérez-López, I. J. & Navarro-Mateos, C. (2019). Gamificación: qué, cómo y por qué. Un relato basado en hechos reales. En *Proceedings of the 15th Congreso Internacional de Ciencias del Deporte y la Salud*, Pontevedra (pp.108-119). Sportis.
- Pérez-López, I. J. & Navarro-Mateos, C. (2022). Gamificación: lo que es no es siempre lo que ves. *Sinéctica. Revista Electrónica de Educación*, (59). [https://doi.org/10.31391/S2007-7033\(2022\)0059-002](https://doi.org/10.31391/S2007-7033(2022)0059-002)
- Pérez-López, I. J. & Navarro-Mateos, C. (2023a). *Guía para gamificar: construye tu propia aventura*. Copideporte S. L.
- Pérez-López, I. J. & Navarro-Mateos, C. (2023b). Diez preguntas y respuestas más frecuentes sobre gamificación. *Revista APEC*, 34, 244-264.
- Pérez-López, I. J., Rivera-García, E. & Trigueros-Cervantes, C. (2019). 12+ 1. Sentimientos del alumnado universitario de educación física frente a una propuesta de gamificación: “Game of thrones: la ira de los dragones”. *Movimento*, 25. <https://doi.org/10.22456/1982-8918.88031>
- Quintero-Chávez, C. T. (2024). Integración de tecnologías de la información & la comunicación en el proceso de enseñanza-aprendizaje de entornos virtuales de aprendizaje. *Didasc@ lia: Didáctica y Educación*, 15(1), 418-448.
- Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A. y Yousufi, S. Q. (2023). Factors affecting students’ learning performance through collaborative learning and engagement. *Interactive Learning Environments*, 31(4), 2371-2391. <http://dx.doi.org/10.1080/10494820.2021.1884886>
- Rodríguez-Gómez, I., Del Valle, S. & De la Vega Marcos, R. (2018). Revisión nacional e internacional de las competencias profesionales de los docentes de Educación Física. *Retos*, 34, 393-388. <https://doi.org/10.47197/retos.v0i34.58609>
- Rozi, F., Rosmansyah, Y. & Dabarsyah, B. (2019). A systematic literature review on adaptive gamification: Components, methods, and frameworks. En *International Conference on Electrical Engineering and Informatics* (pp. 187–190). Bandung, Indonesia, IEEE.
- Sabornido, E. B., Garma, V. A., Niepes, G. L. & Cabria, F. M. N. (2022). Key challenges and barriers in gamification: a systematic review. *Asia Pacific Journal of Advanced Education and Technology*, 1(1), 13-19.
- Sánchez-Prieto, J. C., Olmos-Migueláñez, S. & García-Peñalvo, F. J. (2017). Motivación e innovación: Aceptación de tecnologías móviles en los maestros en formación. *RIED. Revista Iberoamericana de Educación a Distancia*, 20(2), 273-292. <https://doi.org/10.5944/ried.20.2.17700>
- Serrano, R. & Pontes, A. (2017). Diferencias entre expectativas y logros en las competencias del prácticum del Máster de Formación del Profesorado de Enseñanza Secundaria. *Revista Electrónica Interuniversitaria de Formación del Profesorado*, 20(1), 1-18. <https://doi.org/10.6018/reifop/20.1.235151>
- Trede, F. & McEwen, C. (2016). Scoping the deliberate professional. En Trede, F., McEwen, C. (eds.), *Educating the deliberate professional. Professional and Practice-based Learning* (pp. 3-14). Springer, Cham. [https://doi.org/10.1007/978-3-319-32958-1\\_1](https://doi.org/10.1007/978-3-319-32958-1_1)
- Valencia-Quecano, L. I. & Orellana-Viñambres, D. (2019). Barreras en la implementación de la gamificación en educación superior: revisión de literatura. *In Crescendo*, 10(3), 635-650.
- Villagrà-Arnedo, C. J., Gallego-Durán, F. J., Llorens Largo, F. & Molina-Carmona, R. (2016). Movimientos pendulares al situar al estudiante en el centro del proceso de aprendizaje. En *Actas de las XXII Jornadas de Enseñanza Universitaria de la Informática* (pp. 285-291). Universidad de Almería.
- Zichermann, G. & Cunningham, C. (2011). *Gamification by design: Implementing game mechanics in web and mobile apps*. O’Reilly Media, Inc.



# Science and children's literature: an analysis of the narratives created by GenIA

## *Ciencia y literatura infantil: un análisis de las narrativas creadas por GenIA*

**ID** **Dra. Andréa Inês Goldschmidt** is a professor at Federal University of Santa Maria (Brasil) (andrea.goldschmidt@ufsm.br) (<https://orcid.org/0000-0001-8263-7539>)

**ID** **Dr. Fernando José Fraga-Azevedo** is a professor at University of Minho (Portugal) (fraga@ie.uminho.pt) (<https://orcid.org/0000-0002-7373-705X>)

**Received:** 2025-02-13/ **Revised:** 2025-05-23 / **Accepted:** 2025-06-12 / **Published:** 2025-07-01

### Abstract

GenIA is increasingly present in our lives, and in this way also in education, being used in school environments and even by children, in the construction of children's literature. This article aims to examine the use of GenIA in the production of children's literature linked to Science. Using an exploratory qualitative methodology, six narratives generated by two AI applications (Story Spark and Gamma) for storytelling were investigated. The stories were of the adventure genre, involving scientific activities related to insects and followed the same three elaborated *prompts*. Content Analysis was followed to analyze the text and images. The results showed that GenIA used to create the stories was not able to construct narratives free of stereotypes or conceptual errors. The Chatbots did not present gender equity in their entirety, and when there was partiality, the attributions to the characters remained fixed, giving the male character a more exploratory role and the female character an assistant role in the scientific activities. Some stereotypes of scientists were reinforced by the male protagonism and the need to be intelligent, and even by the use of glasses in nature exploration activities in the images. The results indicate that teachers and parents need to be careful when guiding the use of GenIA for children.

**Keywords:** stories, sciences, stereotypes, conceptions, concepts, scientists.

### Resumen

Actualmente, GenIA está cada vez más presente en nuestras vidas y, de esta manera, también en la educación, siendo utilizada en entornos escolares e incluso por los niños, en la construcción de literatura infantil. Este artículo pretende examinar el uso de GenIA en la producción de literatura infantil vinculada a la Ciencia. Utilizando una metodología cualitativa exploratoria, se investigaron seis narrativas generadas por dos aplicaciones de IA (Story Spark y Gamma) para el uso del Storytelling. Las historias eran del género de aventuras, las cuales involucraban actividades científicas relacionadas con los insectos y seguían los mismos tres *prompts* elaborados. Se realizó un análisis de contenido para estudiar el texto y las imágenes. Los resultados mostraron que la GenIA utilizada para crear las historias no fue capaz de construir narrativas libres de estereotipos o errores conceptuales. Los chatbots no presentaron equidad de género en su totalidad; y cuando hubo parcialidad, las atribuciones a los personajes permanecieron fijas, otorgando al personaje masculino un rol más exploratorio, y al femenino un rol de asistente en actividades científicas. Algunos estereotipos de los científicos se vieron reforzados por el protagonismo masculino y la necesidad de ser inteligentes, e incluso por el uso de lentes en actividades de exploración de la naturaleza en las imágenes. Los resultados indican que los profesores y los padres deben tener cuidado al orientar el uso de GenIA para los niños.

**Palabras clave:** historias, ciencias, estereotipos, concepciones, conceptos, científicos.

## 1. Introduction

Artificial Intelligence (AI) has made significant advances in its use and communication, impacting various sectors, including education. Tools such as Chatbots and adaptive learning platforms offer personalized support to students, while data analysis allows difficulties to be identified and teaching to be optimized. As a consequence, this has been causing concern, especially in the stages covering the initial years of Basic Education, with research seeking to understand the impacts of the use of AI in the school environment, and the implications that these may also have on students and their development.

In this context, AI has been improving, subdividing into traditional or narrow AI: designed to solve problems, respond to a specific set of inputs, excel at pattern recognition, and make predictions based on pre-existing data (Page et al., 2018; Schlegel and Uenal, 2021); and generative AI (GenAI), designed to create new and original content or data based on the patterns it has learned from its training data (Dwivedi et al., 2023).

Firat and Kuleli (2024) highlight in their research that ChatGPT has been widely perceived by users as an educational tool with great transformative potential, capable of revolutionizing teaching methods, promoting personalized learning, reducing differences in access to education, stimulating critical thinking and interactive learning, facilitating the creation of pedagogical content, and improving interaction between teachers and students. However, the authors emphasize the need for additional empirical research and a cautious approach to their implementation, including the development of ethical and practical frameworks to ensure that their use is effective and responsible.

In this educational context, one of the productions that has stood out is the creation of children's stories, with chatbots specifically for that purpose and which are available in the market and are widely recommended by YouTubers through digital media. Some YouTubers have even been teaching the steps and encouraging it as a simple way to create books in a few hours, which is causing concerns in experts of literature and education by the low pedagogical quality in terms of content, and by the fact it has been produced by AI without paying attention to aesthetic aspects (Nicoceli, 2024).

When we mention chatbots, we refer to software tools designed and trained to mimic human interactions and engage in spontaneous real-time conversations with humans, using Natural Language Processing (NLP), whose goal is to understand what the end user is trying to say and formulate the appropriate response. Chatbots are therefore interactive systems that communicate with users through natural language (AbuShawar and Atwell, 2015; Allouch et al., 2021).

In education, these systems perform different tasks, including solving students' doubts, encouraging participation and assisting in dialogues in other languages (Paschoal et al., 2022; Benotti et al., 2014; Ayedoun et al., 2015).

Currently, there are several programs on the market as chatbots tools that perform very diverse tasks such as writing code, generating images, composing emails, as well as formulating scripts and stories, including children's narratives. Thus, there are specific chatbots for children's literature content, capable of creating stories, personalizing the protagonists and even illustrating; in some cases, they can even download digital books. Thus, AI has proven to be an innovative tool also for children, opening new possibilities for developing creativity, literacy and critical thinking; however, it can also have consequences if used inappropriately.

It should be noted that reading and everything related to it is one of the most important skills that children should develop in the early years of schooling, as it is the basis for all subsequent learning. Thus, children's literature should not be conceived in a reductionist way as an exclusively didactic instrument, but as a multifaceted field that brings together pedagogical, aesthetic, ludic and subjective functions.

As Cadermatori (2010) argues, literature addressed to children plays a structuring role in the development of language and in the expansion of the child's sensory and cognitive possibilities. The author emphasizes that systematic contact with literary texts, especially fictional narratives and poetic compositions, favors not only the ability to write, but also the construction of a denser linguistic and cultural repertoire, capable of sustaining processes of expression, comprehension and symbolic elaboration of reality.

Thus, well-developed children's stories, with clear and appropriate contents, help beyond entertainment, since they provide the reader with informative content, which motivates them to develop their imaginative capacity, thus contributing to the formation of the subject.

Scientific literacy is part of this training. To define it, Chassot (2003) explains that Science is also a language, and should be appropriated with a view to building a better understanding of the world we live in, expanding the possibilities of children's experiences so that they can approach and appropriate scientific knowledge. Therefore, literature can contribute in this sense, since it aims to inform and educate, playing an essential role in the formation of the subject.

Literature, understood as formative, can be articulated with different areas of teaching; and the teaching of Science, in the initial years, deserves this emphasis, because despite the need to be present at this stage of teaching, in line with Portuguese and mathematics, research has shown that it is often understood as adjuvant teaching (Rosa et al., 2007; Goldschmidt, 2012).

Given that children's stories are a resource accessible to any teacher, exploring all areas of knowledge, including Science, is something that can help foster scientific literacy.

Mondek et al. (2019, p. 187) note that «the contributions that children's literature brings to the teaching of Science are notable, as it can contribute to the formation of critical readers, the construction of citizenship and the rethinking of attitudes».

The inclusion of literature in the context of teaching different curricular components, such as Science, should not be conceived under an instrumental or reductive logic, which restricts it to the function of mere thematic support or introductory motivator of school contents. On the contrary, it is a matter of recognizing the epistemological and aesthetic complexity of literary texts as devices capable of stretching and broadening the understanding of the objects of study, enabling more integrative, sensitive and multi-referential approaches. In this sense, Pirôpo and Boccardo (2017) point out that the use of literature in the school environment requires a perspective that values its semantic density, its symbolic power and its ability to provoke changes in meaning, contributing to the construction of more critical,

imaginative and sensitive looks on the phenomena addressed in the curriculum.

Therefore, using AI as an ally in this process can be a challenge, but it can also be a viable alternative, and if it is well conducted it can generate interesting and formative alternatives and repertoires to work in science teaching more efficiently.

At the same time, the use of GenIA in the creation of stories with and for children raises important questions about the appropriateness of the content generated and the influence of technology on students' creativity and autonomy. This process should be investigated and monitored with a critical eye and clear guidelines, always seeking to benefit the integral development of children.

Azevedo et al. (2024) indicate that children interact with mobile devices, educational applications and digital entertainment platforms, which are important for their personal development. They also argue that as technology advances, Artificial Intelligence (AI) is also part of this acquisition, reaching the production of literary content, such as children's storytelling, which not only allow the creation of personalized and adaptable stories, but also open new possibilities to stimulate creativity, promote inclusive values and facilitate interactive learning. These, according to the authors, have the potential to shape narratives for children in innovative ways; however, it is essential to investigate whether these are free of bias.

Breunig and Goldschmidt (2021) also warn about the need to be careful with the types of stereotypes that can be reinforced or even constructed from children's stories; besides, the authors reinforce the role of the teacher in this process, as they demonstrated in their studies that through their perception and action, it is possible to act with the use of children's literature as a relevant tool to demystify possible fragmented views that are consolidated during the child's development.

Socio-cognitive theory (Bussey and Bandura, 1999) suggests that children assimilate gender stereotypes through gender-related information, which is then stored in long-term memory (Schneider, 2004). Thus, stories influence children by providing comprehensive examples of typically masculine or feminine contexts and typically masculine or feminine character traits (Steyer, 2014). Hamilton et al. (2006) point out that equal representation has not

yet been achieved and that the quality of these representations can influence children. Unfortunately, analyses of children's books have shown that even the most recent ones still convey a large number of traditional gender roles and lack major female characters (Jürgens and Jäger, 2010).

Thus, with respect to stereotypical characters in children's stories, it is of utmost importance that the teacher is attentive and promotes discussions and reflections in the classroom, in order to broaden the possible «biased» visions that children may construct (Breunig et al., 2023).

Other cautions are associated with the writing of the narratives created. Although chatbots are considered trained AI tools with responses that may appear human-like, there are many concerns and even opposition regarding the negative potential in relation to textual creation; because, according to research, inaccuracy in information and content quality, in the case of a study with Chatbot GPT, was highlighted by 85 % of editorial executives as the main concern when facing the use of generative AI platforms, which may occasionally generate incorrect information, produce harmful instructions or biased content (Eke, 2023; Van Dis et al., 2023; Ramos, 2023).

Given the above, we understand the importance of children's literature and its interfaces with Science and that the use of AI may be one of the ways to contribute to this process, but deserves to be investigated. Thus, the aim of this research is to critically examine the use of GenIA through specific narrative chatbots, in the production of children's literature linked to Science, in terms of promoting scientific stereotypes and concepts presented in the story.

## 2. Methodology

This research has a qualitative approach (Gil, 2017), with an exploratory nature, which according to Severino (2013), seeks to gather information about a specific object, delimiting a field of work. Regarding the nature of the research, it is a documentary research, since according to the same author, documentary research not only deals with printed documents, but also with other types of archives such as newspapers, photos, films, recordings, legal documents.

Initially, we resorted to the construction of a bank of children's stories, developed from two specific chatbots, which met the following criteria: 1. Be available on the Product Hunter platform that uses AI to create children's narratives; 2. Be freely accessible or allow a free narrative; 3. Allow the creation of narratives in different languages; 4. Accessible use by school-age children; and, 5. Jointly illustrate the children's story.

The theme was «a scientific adventure about insects» and the applications received identical prompts for literary production. Focused on text structure, characters and their characterization, and presentation of scientific concepts.

For each of the Chatbots, three narratives were created using three prompts:

- (a) «Create a children's story, for an audience of 6 to 8 years old, whose story belongs to the adventure genre, and which narrates a scientific study on the different types of insects and their characteristics»;
- b) «Create a children's story, for an audience of 6 to 8 years old, whose story belongs to the adventure genre, and which narrates a scientific study about the different types of insects and their characteristics, demystifying the existing myths about them».
- c) «Create a children's story, for an audience of 6 to 8 years old, whose story belongs to the adventure genre, and which narrates a scientific study conducted by characters related to Science about the different types of insects and their characteristics, demystifying the existing myths about them».

The narratives had their texts analyzed in their entirety, based on Bardin's (2016) content study, with the categories listed; the images produced by AI were also studied. The analysis was conducted in three stages: pre-analysis; exploration of the material and processing of the results; inference and interpretation. The categorization process involved organizing and classifying qualitative data into thematic categories. Initially, the material was explored to identify relevant units of meaning. This was followed by coding, a stage in which these meanings were grouped into categories or classes, based on criteria of similarity or theoretical relevance. This was followed

by categorization, seeking to simplify and organize the information to allow a deeper and more comprehensive analysis of the content, contributing to the identification of patterns, relationships and new interpretations within the corpus studied.

The chatbots for creating stories were:

1. Story Spark: available at <https://storyspark.ai/pt>. This is not a free website, so the demo option was used. Thus, a different account had to be used to create each story. Upon creating the account, the user logs in and is prompted to create a story. When asked for the topic of the story, the message was entered and the reading level, «developing readers» and Brazilian Portuguese language were added. No moral of the story, no character description, no special needs were added. The requested pages were 14 (the lowest number). Click on generate story. An image was automatically generated for each card. Three stories were created, with three different logins, one for each request. As it was not possible to download the book in PDF format in the free version, each card was copied using the Ctrl+PrtSc command and taken to

Paint, then pasted as an image in PowerPoint and saved as a PDF, with the book downloaded in its entirety.

2. Gamma: available at <https://gamma.app/>. After registering, the process of creating the book began, using the «create new» or «create with AI» command from the prompt, choosing the popular format. Ten cards were selected in Portuguese, with an average amount of text. Subsequently, the theme was marked and generated with color images. There are no restrictions on the number of productions. The same procedures were carried out for each of the messages. The books were downloaded to the computer.

### 3. Results and discussion

The results of the analysis of the models generated by GenIA show that they were able to create stories for children responding to specific prompts. Table 1 presents an overview of the characters and Table 2 provides a summary of the narratives, character stereotyping, and conceptual errors encountered.

**Table 1.** Results of the children's stories created by the chatbots for the characters

Chatbots	Stories	Characters	Number
Story Spark	“Insect Adventure”.	A child	1
	“Insect Adventure”	One child	1
Gamma	“Max and Ana’s Scientific Adventures.”	Max and Ana	2
	“The Incredible World of the Insects”	João and the beetle	2
	«The Mystery of the Miraculous Insects”	Bia, Lucas and Mariana	3
	«The Little Scientist and the Adventure of the Insects”.	Gustavo, Júlia and Marcos	3

Note. Research data (2025).

**Table 2.** Summary of narratives developed by AI, stereotypes and conceptual errors identified

Prompt 1: No restriction	Prompt 2: restriction from concepts	Prompt 3: restriction from characters	Stereotypes	Errors Conceptual
<b>Story Spark</b>				
It narrates the adventures of a boy who decides to explore nature near his home. He takes notes and observes some species, describing interesting facts. When he returns, he wants to share it with his family.	It narrates the adventures of a boy who decides to study insects. He observes some of them in the nature and returns happy because he has learned some curious facts.	It narrates the adventures of two children who loved to explore nature and set out an expedition in the forest. Through observations, collecting and recording, they learn about the diversity and curiosities of some species. They return happy and share with the class.	There is partial gender equity in one of the stories, but there is no exchange of activities in the narrative, nor in the images. The "explorer/discoverer" is the boy, and the girl takes notes and records. It even mentions aspects of clothing and colors,.	Story 1: The boy found a spider spinning its web. He learned the spider's ability to create such complex patterns.
<b>Gamma</b>				
It narrates the adventures of a boy with his talking beetle, exploring the garden to discover the world of insects. The child is full of energy and curiosity, he loves to explore the nature. They learn about diversity, habitats, development cycle, Pollination, predation tricks and the importance of respecting these animals.	It narrates the adventures of a group of curious friends who explore the forest near their home. Through observations, collections and records, they learn about the diversity of insects, classification, species beneficial in nature, harmful species, adaptations in nature, curiosities, species that live in colonies, communication between species and the importance of preserving the group.	It narrates the adventures of a boy and two friends, who embark on a scientific expedition in the city park to discover the world of insects. Through observations, collections and recordings, they learn about diversity, habitats, locomotion, communication, adaptation, and the importance of respecting these animals. They realized on the expedition that many people are afraid of these animals, but discovered that most of them are not dangerous. The expedition was full of fun and learning moments, turning them into young scientists.	There is partial gender equity in two of the stories and the activities developed are not gender specific. Although there is gender representation in the third story, there was more prominence in the male figure, both in the verbal construction and in the images.	Story 2: (a) Insects are one of the largest kinds of animals in the world; b) Many people believe that all spiders are poisonous, but in reality only a few species are dangerous to humans.

Note. Research data (2025).

The six texts created maintained the traditional narrative structure, with introduction, development, climax and conclusion. They presented characters who lived scientific adventures, presented some curiosities about some species and in some narratives provided information about locomotion, adaptation, communication, habitats, development cycle and emphasized the importance of insects. As requested in message 3, the information presented was a little more detailed in the texts.

As for the conceptual errors found out of the six stories, these were present in two stories, both in the texts and in the images produced by the AI,

totaling four situations. Table 2 presents these errors, and it can be seen that they occurred in both chatbots investigated. It is important to mention that, in Gamma, this error occurred precisely in narrative 2, which according to *prompt 2*, should have been a story to demystify existing myths about insects. Instead, it reinforced common sense and incorrect myths. It presented the group as «one of the largest classes of animals» instead of considering it as the largest representative class with the largest number of species on the planet. The second error addressed the misclassification of spiders into the insect taxon. Goldschmidt et al. (2020) in their research with early

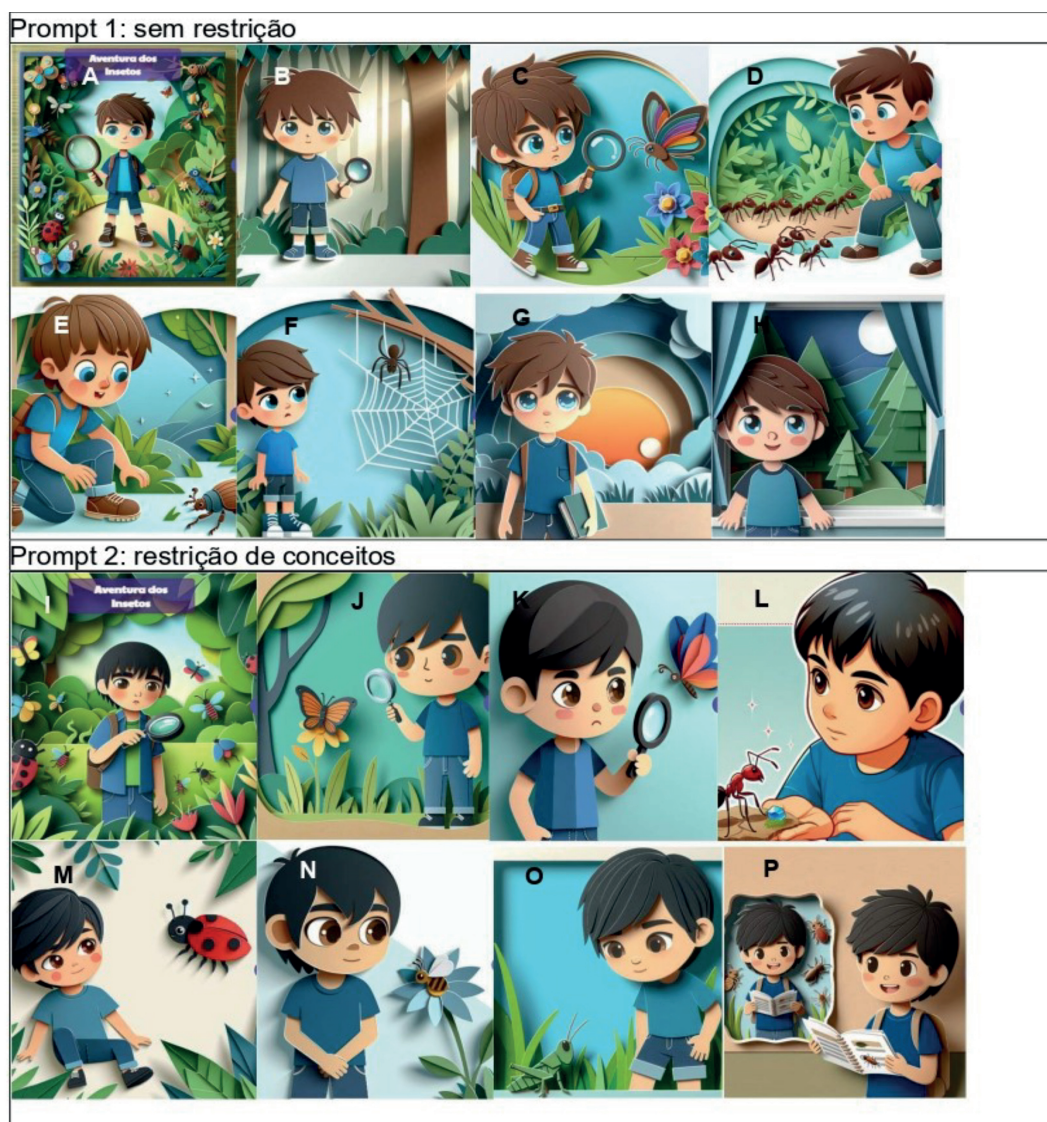
years students, identified that many children have a negative conception in relation to insects and associate that these animals are dangerous, and included as insects, scorpions and spiders, not recognizing the main characteristics of the group. The constructed narrative also reinforced this error.

Story Spark also presented a conceptual error in the creation of story 1, showing the same classification situation regarding spiders. In addition to presenting such a writing error, the same was reinforced with the use of images created by the AI, as shown in Figure F, of Table 3. Such an animal should not appear in the story, and in case it is inserted, it should be explained to the children that there is such

confusion when it is identified within this taxon, demystifying the myth.

As for the characters, it was possible to highlight in the texts and images the personification of some characteristics linked to scientific activities and gender figures, some of them sexist, through the characterization of clothing and clothing colors indicating models/colors to the genders (Tables 3 and 4). Special attention should be paid to this highlighting, as children learn gender stereotypes through exposure to the information contained in the stories, which can shape their understanding of the roles and behaviors associated with each gender (Seitz et al., 2020).

**Table 3.** *Characterization of characters by Story Spark and stereotypes identified*





Note. Research data (2025).

**Table 4.** Characterization of characters by Gamma and identified stereotypes.

<p><b>Prompt 1: sem restrição</b></p>	
<p><b>Prompt 2: restrição de conceitos</b></p>	
<p><b>Prompt 3: restrição personagem e conceitos</b></p>	

Note. Research data (2025).

It is important to highlight that regardless of the chatbot and *prompt* used, the characters created referred to child characters from 6 to 8 years old,

which is positive in the stories created by GenIA, since this personification when dealing with children of early school age indicates to the readers

that the child is capable of investigating, observing natural phenomena, exploring the environment, researching, recording and sharing knowledge. The American astronomer Carl Sagan stated in one of his interviews that everyone begins life as a scientist (Guimarães, 2007).

In fact, researchers and children have a curiosity that is always alive and present. For scientists, it is an essential trait, a professional necessity; and for children, something characteristic, innate and vital. It is necessary that this be maintained throughout life, and science education has the potential to encourage it even more.

Children, seeing themselves as investigators in children's stories, empower their action. They are able to explore the world around them, ask questions, test hypotheses and learn through observation, developing scientific skills. These discoveries often stimulate their interest and curiosity, essential characteristics in science. Literature can be a great ally, as children internalize what they see, hear and perceive through narratives. It is not about training a scientist, but about fostering the child's curiosity to learn, to explore the environment, and to investigate.

However, this opportunity given in the stories would have more value if the genres were taken care of, valuing both the equity and the attributions developed by the participants in the stories.

These points are important in children's literature because, according to Azevedo et al. (2024), they challenge established norms and minimize external criticism. According to the authors, fostering the courage and determination of the protagonists allows the community to accept individual differences, which contributes to the promotion of gender equality, providing values conveyed by the narrative, leading to a positive impact and a change in the community's attitude, resulting in the gradual elimination of gender stereotypes in the activities. Unfortunately, the chatbots used went against these ideas and did not take these precautions, as the results show.

It is worth highlighting the attention that needs to be paid, as these presented results indicate the importance of a teacher mediator in following the stories, or family tutors responsible for this activity, when children are playing with the tools. According to Seitz et al. (2020), stories often do not use such clear labels for gender-appropriate objects or behaviors; what they do is convey gender infor-

mation in a less apparent way, providing gendered information about the protagonists, such as using male or female names or highlighting typically male or female characteristics.

As seen, even in the images, where the boys appeared wearing blue clothes, and the girls in the forest sporting pink dresses and ribbon bows, or even, when in the stories, the boys were portrayed as explorers, and the girls as secondary characters, being «assistants» in scientific activities. While boys were exploring, touring, using magnifying glasses, identified in the images in Table 4 (Figures A, F and G) and Table 3 (Figures A through P, boys only; and in Q, R and S, with girls), girls were observing, taking notes and recording in their notebooks (Table 3, Figures Q, R, S and T).

In this context, it is assumed that gender stereotyped information is learned like any other type of information, and children relate it to certain objects, attributes or activities, as in the case of scientific activities, the act of manipulating using a magnifying glass, for example, and making records. It should be noted that in a scientific activity all phases are important; therefore, what is proposed is the exchange of roles. When children are in contact with texts and images without this care, they construct a bidirectional network between a person's gender and these objects, attributes and activities (Martin et al. 1990). This appearance of gender information can interfere and activate an associative network linking gender-associated properties in different content areas with gender information that may end up interfering with their conceptions and becoming fixed in relation to some stereotypes (Bauer et al., 1998).

Considering that these stories can be easily constructed by the children, by their parents or even in the classroom, this may be contributing to reinforce inappropriate stereotypes that, in terms of Science, exploring natural environments and carrying out scientific expeditions would be tasks linked to the male figure. When thinking about this relationship with Science, and the images that appear, the girl may be seen as a secondary actor in the process, without inserting herself in the same way in the scientific world.

This situation deserves to be highlighted, as it has been historically reinforced with historical accounts of women scientists throughout history, who, even when they worked in scientific research

and laboratories, and were married to scientists, did not see their scientific work encouraged or recognized. An emblematic example of the historical invisibility of women's contributions to science can be seen in the career of Marie-Anne Pierrette Paulze (1758-1836), wife and collaborator of Antoine Laurent de Lavoisier (1743-1794).

Although she played an active and substantial role in the couple's scientific activities (including translations of scientific treatises, experimental records, and technical illustrations), Marie-Anne has been systematically silenced in traditional historiographical accounts, which attribute exclusively to Lavoisier, the theoretical and experimental advances of that period. Pretto et al. (2023) denounce this omission by highlighting that, even in relation to laboratory tasks more directly linked to experimental practice, such as the preparation of materials and the recording of observations, Marie-Anne is rarely mentioned, perpetuating an androcentric logic of erasure of women in the history of Science.

By observing the images in Tables 3 and 4, one can perceive a reinforcement of the male figure linked to the scientist, which corroborates current studies on the conceptions of scientists. It is neces-

sary to raise awareness on this topic, alerting teachers to the risks involved in the use of chatbots, so that these elements do not go unnoticed, reinforcing an image of Science and scientists that is totally fragmented and stereotyped, of a genius, and most of the time, male, who only studies (Oestreich et al., 2021). Story Spark promoted this male stereotype and when it inserted the female figure, it did not promote scientific attributions equally.

Continuing with the stereotype situations, image H, presented in Table 4, deserves to be highlighted, as it refers to the use of *prompt* 3. When asked to tell the story of characters linked to Science, the children were shown walking in the forest, exploring the environment but wearing glasses, in addition to their magnifying glasses. This stereotype has also persisted in literature, giving the idea of a traditional stereotype of scientists, linked mainly to the male figure, as highly intelligent people with glasses. It is necessary to demystify these stereotypes and being aware of this situation is essential, especially in the early years.

Finally, the study sought to analyze the characterization of the characters. The results of this category can be seen in Table 5.

**Table 5.** *Characterization of characters based on representations in children's stories created by chatbots*

Subcategories	Gamma			Story Spark			ST	ST	ST	ST	T
	H 1	H 2	H3	H 1	H 2	H3	H 1	H2	H1 e H2	H3	
Studios/Smart	3	0	3	3	2	3	6	2	8	6	14
Discoverer/Discloser	1	2	5	1	0	2	2	2	4	7	11
Nature Explorer	2	2	2	1	1	2	3	3	6	4	10
Observer	2	2	2	1	2	1	3	4	7	3	10
In Love/Adoration	2	1	4	1	1	1	3	2	5	5	10
Excited/ Fascinated/	4	0	2	2	0	1	6	0	6	3	9
Excited	2	2	3	0	1	0	2	3	5	3	8
Curious	2	0	3	0	0	1	2	0	2	4	6
Teaching/Sharing	0	2	2	0	0	0	0	2	2	2	4
Adventurous/Courageous	0	1	0	1	0	1	1	1	2	1	3
Recorder	0	2	1	0	0	0	0	2	2	1	3
Creative Inventor	1	0	1	0	0	0	1	0	1	1	2
Play/fun	1	0	0	0	0	0	1	0	1	0	1
Full of energy											

ST: Sumatorio Total (el *prompt* se sumó separado, ya que este *prompt* se refería justamente a vincular el personaje a la Ciencia. Nota. Datos de la investigación (2025).

It can be observed that the characters presented common stereotypes, regardless of the message used, which made it possible to establish a more common profile, i.e., characterized mainly as «scholars, discoverers and explorers, passionate about what they do». The category allowed to identify thirteen subcategories, with no additional subcategories appearing when *prompt 3* was used, indicating that the use of the constraint to link the character to Science did not interfere with the characteristics of the adjectives. The fact that they previously mentioned that they engaged in scientific activities already granted them the same adjectives.

Among the most frequently cited characteristics, the subcategory «Studious, intelligent» stood out, indicating that they are characters who like to learn. In this subcategory, it was observed that when comparing the use of prompts without character restriction (1 and 2) with character restriction (3), there was a significant increase in their frequency. Breunig et al. (2021) state that it is common to find fragmented conceptions about scientists, which are highly influenced by movies, television and digital media in general, revealing Science itself as something unattainable, made by geniuses, which can even alienate children from science.

In a research conducted by Goldschmidt et al. (2014), the authors identified that scientists were mostly represented by men, young and serious, formed by inventors, crazy and smart, very dedicated to their experiments, which may contribute to the distancing of Science.

Although the central point was the intelligent attribute, this highlighting is opportune, because an advantage that is presented in the narratives and that should be valued, is the fact that these characters were idealized because they like to learn, but also to share their knowledge. When it comes to narratives for children, this situation is important, because it shows that these people who study and do science do not live isolated, contrary to what is often exposed in the media. This ability to teach and share knowledge helps children to understand the importance of socializing research results, and although the subcategory «Sharing» was not widely represented, it did show an increase when referring to the character related to Science.

Another subcategory that stood out was «Discoverer, Revealer», increasing significantly for

slogan 3. According to studies by Faria (2011) and Osório and Pechliye (2011), the image of the scientist portrayed by students corresponds to an intelligent being who performs experiments and discoveries. This idea of being associated with «discovering» needs further work, as Ferreira and Martins (n. d.) warn about the risks of this misconception. According to the authors, this vision reduces Science to a set of biographies of great figures or a set of chronologically organized reports on remarkable discoveries, identifying scientists as the great geniuses of Humanity, and not as ordinary people.

Breunig et al. (2020) argue that it is undeniable that many teaching materials continue to convey an image of a Science that progresses linearly to the detriment of geniuses and sensational discoveries, and they emphasize the role of teachers in acting as mediators of this fragmented information. Science cannot be understood as discoveries or findings, since there are many studies, joint systematizations, exchange of ideas, trials and errors, until the results are reached.

The other subcategories that stood out, but did not increase regardless of the message used, described the characters as people who are explorers of nature, observers, curious, passionate about what they do, excited and enthusiastic about knowledge and observations of nature. Such characteristics should be better elucidated and valued through contact with nature, as Goldschmidt et al. (2024) state, it is important to deepen discussions on the importance of the relationship between contact with natural environments from early childhood, intentionally proposing strategies in schools that encourage interest in nature. In this context, children's literature can be one of the ways to raise awareness, since, by reinforcing this naturalistic role and curiosity about nature, it will also be contributing to fostering children's interest in observing phenomena in the natural environment.

#### 4. Conclusions

The exploratory analysis on the use of GenIA to construct children's narratives showed that the AI used was not able to construct children's narratives free of stereotypes or conceptual errors. The results indicate that teachers and parents should be careful when guiding the use of GenIA for young children.

Gamma and Story Spark did not present gender equity in the stories and when there was partial representation, the character assignments remained fixed, giving the male character a more exploratory role, and the female character an assistant role in scientific activities. Some stereotypes of scientists were also reinforced, such as male protagonism, being intelligent, and even the use of glasses in scientific activities.

A positive point presented by the narratives was to show that boys can also be explorers and researchers, as long as gender equity and the distribution of tasks are respected; in addition, the stories have highlighted the importance of sharing knowledge and experiences.

The results indicate the need for follow-up by mentors, whether family members or teachers, so that this information is not erroneously consolidated, since AI algorithms can generate stories with inappropriate, prejudiced or decontextualized messages and/or images.

## Support

This work was supported by the Capes Print Program (Visiting Professor at the University of Minho), of the Graduate Program in Science Education at UFSM, and received funding from National Funds through the Foundation for Science and Technology, within the scope of the projects of the Research Center for Childhood Studies of the University of Minho, with references UIDB/00317/2020 and UIDP/00317/2020.

## Contribution of authors

Andréa Inês Goldschmidt: conceptualization, data curation, formal analysis; research: methodology; software; validation; visualization; original draft-writing; writing-revision and editing; resources.

Fernando José Fraga-Azevedo: conceptualization, data curation, formal analysis; research: methodology; software; validation; visualization; original draft-writing; writing-revising and editing; project management, supervision.

## References

- Allouch, M., Azaria, A. & Azoulay, R. (2021). Conversational Agents: Goals, Technologies, Vision and Challenges. *Sensors*, 21(24), 8448. <https://doi.org/10.3390/s21248448>
- Ayedoun, E., Hayashi, Y. & Seta, K. (2015). A Conversational Agent to Encourage Willingness to Communicate in the Context of English as a Foreign Language. *Procedia Computer Science*, 60, 1433-1442. <https://doi.org/10.1016/j.procs.2015.08.219>
- Azevedo, F., Ferreira Boo, C. & Neira-Rodríguez, M. (2024). Narrativas não sexistas para crianças e Inteligência Artificial. Estudo de candidaturas à educação inclusiva. *La Palabra*, 48, 1-18. <https://doi.org/10.19053/uptc.01218530.n48.2024.17881>
- Bardin, L. (2016). *Análise de conteúdo* (L. A. Reto & A. Pinheiro, Trads.). Edições 70.
- Bauer, P. J., Liebl, M. & Stennes, L. (1998). Pretty is to dress as brave is to suitcoat: Gender-based property-to-property inferences by 4-½-year-old children. *Merrill-Palmer Quarterly*, 44, 355-377. <https://doi.org/10.3102/00028312025001145>
- Benotti, L., Martinez, M. C. & Schapachnik, F. (2014). Engaging high school students using Chatbots. In *Conference on Innovation and Technology in Computer Science Education*, Uppsala, 21-25 de junho de 2014 (pp. 63-68). <https://doi.org/10.1145/2591708.2591728>
- Breunig, E. & Goldschmidt, A. I. (2021). Concepções sobre o lobo nos contos infantis: A visão do lobo interfere na alfabetização científica nos anos iniciais? *Revista Humanidades e Inovação*, 8(33), 156-175. <https://bit.ly/4ehJhDi>
- Breunig, E., Goldschmidt, A. I. & Richter, L. (2023). Chapeuzinho Vermelho e o Lobo-Guará: Estratégias de Ensino em Ciências para os Anos Iniciais. *Revista Insignare Scientia - RIS*, 6(3), 27-46. <https://doi.org/10.36661/2595-4520.2023v6n3.13659>
- Breunig, E. T., Oestreich, L., Paim, M. G. & Goldschmidt, A. I. (2021). Alfabetização científica nos anos iniciais: ressignificando os cientistas. *ACTIO: Docência Em Ciências*, 6(2), 1. <https://doi.org/10.3895/actio.v6n2.13405>
- Bussey, K. & Bandura, A. (1999). Social cognitive theory of gender development and differentiation. *Psychological Review*, 106(4), 676-713. <https://doi.org/10.1037//0033-295x.106.4.676>
- Cadernatori, L. (2010). *O que é literatura infantil*. Editora Brasiliense.

- Chassot, A. (2003). Alfabetização científica: uma possibilidade para a inclusão social. *Revista Brasileira de Educação*, 22, 89-100.  
<https://doi.org/10.1590/s1413-24782003000100009>
- Dwivedi, Y., Kshetri, N., Hughes, L., Slade, E., Jeyaraj, A., Kar, A., ... & Wright, R. (2023). Opinion paper: “So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges, and implications of generative conversational AI for research, practice, and policy. *International Journal of Information Management*, 71, 102642.  
<https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Eke, D. O. (2023). ChatGPT and the rise of generative AI: Threat to academic integrity? *Journal of Responsible Technology*, 13, 100060.  
<https://doi.org/10.1016/j.jrt.2023.100060>
- Faria, A. C. M. (2011). *O cinema e a concepção de Ciência por estudantes do ensino médio* (Dissertação de mestrado). Universidade de Brasília.
- Ferreira, J. M. H. & Martins, A. F. P. (n.d.). *História da Ciência – o que é?* Universidade Federal do Rio Grande do Norte. <https://bit.ly/3HMBctX>
- Firat, M. & Kuleli, S. (2024). Fronteiras educacionais com ChatGPT: uma análise de redes sociais de tweets influentes. *Alteridad*, 19(2), 224-235.  
<https://doi.org/10.17163/alt.v19n2.2024.06>
- Gil, A. C. (2017). *Como elaborar projetos de pesquisa* (6ª ed.). Atlas.
- Goldschmidt, A. I. (2012). *O ensino de Ciências nos anos iniciais: Sinalizando possibilidades de mudança.s* (Tese de doutorado). Universidade Federal de Santa Maria. <https://bit.ly/44eVILv>
- Goldschmidt, A. I., Breunig, E. T. & Santos, A. A. (2021). James Watson e Francis Crick: investigando concepções prévias com alunos concluintes do ensino médio a respeito desses cientistas. *Amazônia: Revista de Educação Em Ciências e Matemáticas*, 17(39), 129.  
<https://doi.org/10.18542/amazrecm.v17i39.10697>
- Goldschmidt, A. I., Castiglioni, D. Da S., Rangel, C., Silveira, M. Dos S. & Bernardi, G. (2020). Investigação das concepções de alunos de anos iniciais do ensino fundamental sobre os insetos. *Revista de Educação Do Vale Do Arinos - RELVA*, 7(2), 128-148.  
<https://doi.org/10.30681/relva.v7i2.5136>
- Goldschmidt, A. I., Izidorio, L. B. & Rodrigues, B. P. (2024). Contato de crianças com a natureza e a importância da formação inicial dos professores. *Revista Ensin@ UFMS*, 5(9), 262-277.  
<https://doi.org/10.55028/revens.v5i9.21568>
- Guimarães, A. P. (2007). *Cientistas e crianças*. Centro Brasileiro de Pesquisas Físicas. Ciências Hoje. Agosto. <https://bit.ly/4ncg4O0>
- Hamilton, M. C., Anderson, D., Broadus, M. & Young, K. (2006). Gender Stereotyping and Underrepresentation of Female Characters in 200 Popular Children’s Picture Books: A Twenty-first Century Update. *Sex Roles*, 55(11-12), 757-765.  
<https://doi.org/10.1007/s11199-006-9128-6>
- Jürgens, E. & Jäger, R. (2010). Auf der Suche nach männlich und weiblich - Welche Informationen finden Vorschulkinder heute im Bilderbuch? *Verhaltenstherapie & Psychosoziale Praxis*, 42(4), 1045-1059.
- Martin, C. L., Wood, C. H. & Little, J. K. (1990). The development of gender stereotype Components. *Child Development*, 61(6), 1891.  
<https://doi.org/10.2307/1130845>
- Mondek, S. A., Rocha, Z. de F. D. C. & De Lima, J. P. C. (2019). Serões de Dona Benta - Monteiro Lobato e o ensino de Ciências. *Revista de Ensino de Ciências e Matemática*, 10(1), 184-193.  
<https://doi.org/10.26843/rencima.v10i1.1365>
- Nicoceli, A. (2024, April 16). Youtubers ensinam como lucrar com uso de inteligência artificial para criar vídeos e livros infantis em minutos. *G1*.  
<https://bit.ly/4eblViz>
- Oestreich, L., Paim, M. G., Breunig, E. T. & Goldschmidt, A. I. (2021). O que é Ciência? Uma análise das concepções prévias de docentes em formação inicial. *Revista Insignare Scientia - RIS*, 4(3), 160-178.  
<https://doi.org/10.36661/2595-4520.2021v4i3.12119>
- Osório, M. V. & Pechliye, M. M. (2011). Análise das concepções de alunos de uma escola pública em São Paulo sobre a imagem dos cientistas. In *Anais do 8º Encontro Nacional de Pesquisa em Educação em Ciências* (ABRAPEC, Campinas, 2011).
- Page, J., Bain, M. & Mukhlis, F. (2018). The risks of low-level narrow artificial intelligence. In *Proceedings of the 2018 IEEE International Conference on Intelligence and Safety for Robotics* (pp. 1-6). IEEE.
- Paschoal, L. N., Conte, T. U. & Souza, S. R. S. (2022). O que revelam os estudos secundários sobre Chatbots na educação? En *Anais do 33º Simpósio Brasileiro de Informática na Educação (SBIE)* (pp. 1126-1137). Sociedade Brasileira de Computação.
- Pirópo, V. & Boccardo, L. (2017). Alfabetização científica e a literatura infantil: Desafios para o ensino da biodiversidade e conservação animal. In *Anais do XI Encontro Nacional de Pesquisa em Educação em Ciências (ENPEC)*. Universidade Federal de Santa Catarina.

- Pretto, E. D. M., Goldschmidt, A. I. & Richter, L. (2023). História da Ciência: uma análise em uma coleção de livros didáticos de Ciências – ensino fundamental – anos finais. *Amazônia: Revista de Educação Em Ciências e Matemáticas*, 19(42). <https://doi.org/10.18542/amazrecm.v19i42.14286>
- Ramos, A. S. M. (2023). Inteligência Artificial Generativa baseada em grandes modelos de linguagem - ferramentas de uso na pesquisa acadêmica. <https://doi.org/10.1590/scielopreprints.6105>
- Rosa, C., Perez, C. & Drum, C. (2007). Ensino de física nas séries iniciais: Concepções da prática docente. *Investigações em Ensino de Ciências*, 12(3), 357-368.
- Schlegel, D. & Uenal, Y. (2021). A perceived risk perspective on narrow artificial intelligence. In *Proceedings of the 25th Pacific Asia Conference on Information Systems (PACIS)* (p. 44). <https://bit.ly/4lasLa5>
- Schneider, D. (2024). *A psicologia dos estereótipos*. The Guilford Press.
- Seitz, M., Lenhart, J. & Rübsam, N. (2020). The effects of gendered information in stories on preschool children's development of gender stereotypes. *British Journal of Developmental Psychology*, 38(3), 363-390. Portico. <https://doi.org/10.1111/bjdp.12323>
- Severino, A. J. (2013). *Metodologia do trabalho científico* (livro eletrônico). Cortez.
- Steyer, I. (2014). Gender representations in children's media and their influence. *Campus-Wide Information Systems*, 31(2/3), 171-180. <https://doi.org/10.1108/cwis-11-2013-0065>
- Van Dis, E. A. M., Bollen, J., Zuidema, W., van Rooij, R. & Bockting, C. L. (2023). ChatGPT: five priorities for research. *Nature*, 614(7947), 224-226. <https://doi.org/10.1038/d41586-023-00288-7>

# Miscellaneous Section

*(Sección Miscelánea)*







Source: <https://www.shutterstock.com/es/image-photo/portrait-little-boy-vr-goggles-over-2284469307>



# Digital emotional intelligence: construction of a model and validation of a measurement instrument

## *Inteligencia emocional digital: construcción de un modelo y validación de un instrumento para su medición*

-  **Dr(c). Ana Cristina Gómez-Vallarta** is a lecturer at Universidad Popular Autónoma del Estado de Puebla (México)([anacristina.gomez@upaep.mx](mailto:anacristina.gomez@upaep.mx)) (<https://orcid.org/0000-0002-0128-2826>)
-  **Dr. Sergio Rivera Magos** is a lecturer at Universidad Autónoma de Querétaro (México) ([sergio.rivera@uaq.mx](mailto:sergio.rivera@uaq.mx)) (<https://orcid.org/0000-0003-0624-501X>)
-  **Dr. Antonio Daniel García-Rojas** is a professor at Universidad de Huelva (España) ([antonio.garcia@dedu.uhu.es](mailto:antonio.garcia@dedu.uhu.es)) (<https://orcid.org/0000-0003-2997-1065>)
-  **Dr. Ángel Hernando-Gómez** is a lecturer at Universidad de Huelva (España) ([angel.hernando@dpsi.uhu.es](mailto:angel.hernando@dpsi.uhu.es)) (<http://orcid.org/0000-0002-6414-5415>)

Received: 2025-02-28 / Revised: 2025-05-30 / Accepted: 2025-06-18 / Published: 2025-07-01

### Abstract

This article aims to establish the concept of Digital Emotional Intelligence as a key competency within digital literacy frameworks. It presents both a theoretical model of Digital Emotional Intelligence and an instrument for its assessment. The theoretical framework explores the emotional phenomena experienced on social media platforms, which are characterized by user communication and interaction. Based on a literature review, the methodology outlines the construction of the Digital Emotional Intelligence model, including the definition of its dimensions, sub-dimensions, and the corresponding indicators. From this foundation, an instrument comprising 60 items is developed to measure Digital Emotional Intelligence. This instrument is administered to two pilot groups of university students from the Universidad de Huelva in Spain and the Universidad Popular Autónoma del Estado de Puebla (UPAEP) in Mexico. The instrument is validated through expert judgment and statistical analysis, resulting in a final version consisting of 38 items across 10 dimensions. This research provides a robust conceptualization of Digital Emotional Intelligence and an empirical tool for its evaluation.

**Keywords:** emotions, intelligence, digital, educommunication, model, youths.

### Resumen

Este artículo tiene como objetivo fundamentar el concepto de Inteligencia Emocional Digital como una competencia esencial en los modelos de alfabetización digital. Asimismo, se presenta un modelo teórico de la Inteligencia Emocional Digital y un instrumento para su medición. En el marco teórico se explican los fenómenos emocionales que se viven en las redes sociales, las cuales se distinguen por la comunicación e interacción de los usuarios. Con base en una revisión de literatura, en la metodología se detalla la construcción del modelo de Inteligencia Emocional Digital con la definición de sus dimensiones, subdimensiones y los indicadores que lo integran. A partir de lo anterior, se desarrolla un instrumento para medir la Inteligencia Emocional Digital con 60 ítems que se aplica a dos grupos pilotos de jóvenes universitarios en la Universidad de Huelva, España, y la Universidad Popular Autónoma del Estado de Puebla (UPAEP) en México. El instrumento es validado mediante un juicio de expertos y análisis estadísticos, resultando en una versión final de 38 ítems distribuidos en diez dimensiones. Esta investigación aporta una conceptualización sólida de la Inteligencia Emocional Digital y una herramienta empírica para su evaluación.

**Palabras clave:** emociones, inteligencia, digital, educomunicación, modelo, jóvenes.

## 1. Introduction and state-of-the-art

From 50 years to date, research has been interested in studying emotions, fact known as the «affective turn» of various disciplines interested in studying the emotional aspect (Lara & Domínguez, 2013). Studies on the virtual environment have also demonstrated its impact on emotions. It has been shown that the digital environment modifies the intensity of emotions, the way of manifesting them, as well as their consequences, due to the characteristics of the virtual (Cohen & Myrick, 2023). Now, many researchers have been interested in the impact that these phenomena have on young people and although all the benefits that digital technologies have brought to their lives are clear, concern has also arisen about other negative manifestations that are affecting their well-being. We are indeed experiencing an increase in cyberbullying, states of anxiety, proliferation of fake news, social polarization among young people and some researchers have shown its association with the use of digital platforms (Serrano-Puche, 2021; Twenge et al., 2022). On the other hand, digital literacy scholars have recently included socioemotional competencies as an integral part of their models and the DQ Institute (2019) introduces the concept of Digital Emotional Intelligence (DEI). Knowledge and management of emotions, as well as empathy and management of relationship are essential for personal well-being in different scenarios, such as family, work, academic and social, and we cannot ignore the digital realm, which is already an essential part of our lives. Hence, the importance of emphasizing the development of DEI. This research aims to delve into this emerging concept in the scientific world, and based on the literature review of the most recognized models of Emotional Intelligence it proposes a DEI model. In addition, the model is operationalized in an instrument developed in a self-report questionnaire that allows measuring DEI and generating awareness in young people about their level of development.

All decisions in our lives are full of emotionality (Ferrés, 2014). The great advances in neuroscience have made it possible to understand the impact of emotions in our lives (Romano, 2012). Since the 1990s, the concept of Emotional Intelligence has gained great importance as a key aspect for the success of the person in different areas. It has been

shown that the development of IQ is not enough to be a successful person, but it is necessary to know and manage emotions (Danvila & Sastre, 2010). This statement is also true for the digital environment where emotions play a fundamental role. Our relationship with digital devices also has an emotional connotation (Ellis & Tucker, 2021). The Internet is a space for interaction, bonding and interpersonal relationships, especially for young people, who develop much of their identity through their interactions with the digital world. The virtual environment allows new ways of expressing emotions, and digital mediations detonate emotionality with an intensity and scope different from offline life, due to the characteristics of digitalization: a communication mediated by screens, devoid of corporeality and with its own language (Serrano-Puche, 2016). Benski and Fisher (2014) say that digital environments are sociotechnical systems comprising technical devices, people, behaviors, rules and social contexts. Serrano-Puche (2016) points out that the Internet is an affective technology, which not only gives channel to our emotions, but also shapes and amplifies them. Because of the above, Ellis and Tucker (2021) stress that rather than attending to the technological characteristics of digital platforms or devices, research should focus on the social and psychological processes that underlie them. Cohen and Myrick (2023) argue that technological possibilities shape the way users manifest and regulate their emotions.

In recent years there has been great interest among researchers to address digital phenomena triggered by different emotions, especially those that negatively impact users. Among the phenomena identified is *digital disinhibition*, which occurs where there is a screen mediating our interactions, i.e., the user feels freer to express himself, because he feels there will be less consequences than if he did it face-to-face. Skurka and Nabi (2023) emphasize that in face-to-face interactions we subject ourselves to prevailing social norms of politeness and regulate our nonverbal behavior much more. Crockett (2017) points out that the indignation that an Internet user may feel due to the different content to which he is exposed is amplified and expressed with more intensity, since he does not identify the users with whom he interacts, in addition to the fact that they do not identify him. This disinhibition is more explicit by the *anonymity* offered by the screens, as the user do

not perceive possible consequences of his actions, in addition to feeling less empathy as the user do not recognize his interlocutors. On the other hand, as Palacios Pérez et al. (2022) point out, the Internet makes possible, under anonymity, the opportunity to reinvent oneself, to «disincarnate» and generate an identity of one's own, as Valencia-Ortiz et al. (2023) also point out.

Regarding *the intensity of emotions*, it has been found that the manifestation of emotions tends to be more intense in digital environments. Serrano-Puche (2017) points out that the offline environment presents a more leisurely pace, where emotions are not quantified and are manifested with more quality and less intensity, while in the online environment emotions are transmitted more intensely and are quantified through *likes*, comments and times a content is shared. Emotions also play a role in the *selection of news*, as they are an essential component in the search for and sharing of news. Depending on the emotional state of the user, news of one kind or another is sought (de los Santos & Nabi, 2019) and depending on the emotions they trigger, they are shared or not (Berger, 2014). On the other hand, the algorithm presents content according to our search history and our ideological preferences, which causes us to reinforce our beliefs and increase our rejection of what is different so that we become enclosed in «echo chambers» and «information bubbles». This phenomenon has an impact on social polarization.

On the other hand, social networks allow people's lives to be scrutinized and examined by multiple users, leading to *social comparison*, which often gives rise to jealousy, sadness or envy. *The FoMO (Fear of Missing Out) syndrome* is understood as the fear of missing out, i.e., the fear of being excluded in the fun of peers (Quagliari et al., 2022). This syndrome has been related to an excessive use of social networks, since one wants to be aware all the time of what others are doing. It has also been associated with symptoms such as social isolation, anxiety and depression. The abuse of *apps* has also led to *phubbing*, a phenomenon described as the behavior of ignoring others for using the cell phone (Medina-Morales & Villalón-Hernández, 2023). *Nomophobia* - a term derived from the phrase «*No mobile phobia*» - is the panic of not having a cell phone nearby or losing Internet connection. It is a consequence of the need to be constantly connected. This phenomenon,

in extreme cases, often causes anguish and anxiety. *Anxiety* arises when an uncertain existential threat is perceived.

Studies have established a relationship between social network use and anxiety, but note that there are many factors that mediate between them (Nabi et al., 2023). However, Haidt (2024) has conducted systematic research since 2010 and found a causal relationship between the emergence of smartphones and increased anxiety among young people.

Another phenomenon investigated in the virtual environment is *depression*, which is also mediated by multiple factors. It has been shown that there is a positive relationship, albeit small, between excessive use of social networks and depression (Rains & Tokunaga, 2023), but a cause-effect relationship has not yet been clarified. *Internet addiction* (Martín Critikián and Medina Núñez, 2021) has also been addressed by researchers. However, it has not been included in the Diagnostic and Statistical Manual of Mental Disorders (DSM) due to lack of standardized criteria. However, Young (2004) defines it as «an impulse control disorder that does not involve an intoxicant» (p. 404, cited in Rains and Tokunaga, 2023). There are several features to understand Internet addiction (Valencia-Ortiz et al., 2023). We will mention two: tolerance and abstinence. Tolerance implies that people need more connection time to feel satisfied. Abstinence is the anxiety suffered when not connected to the Internet.

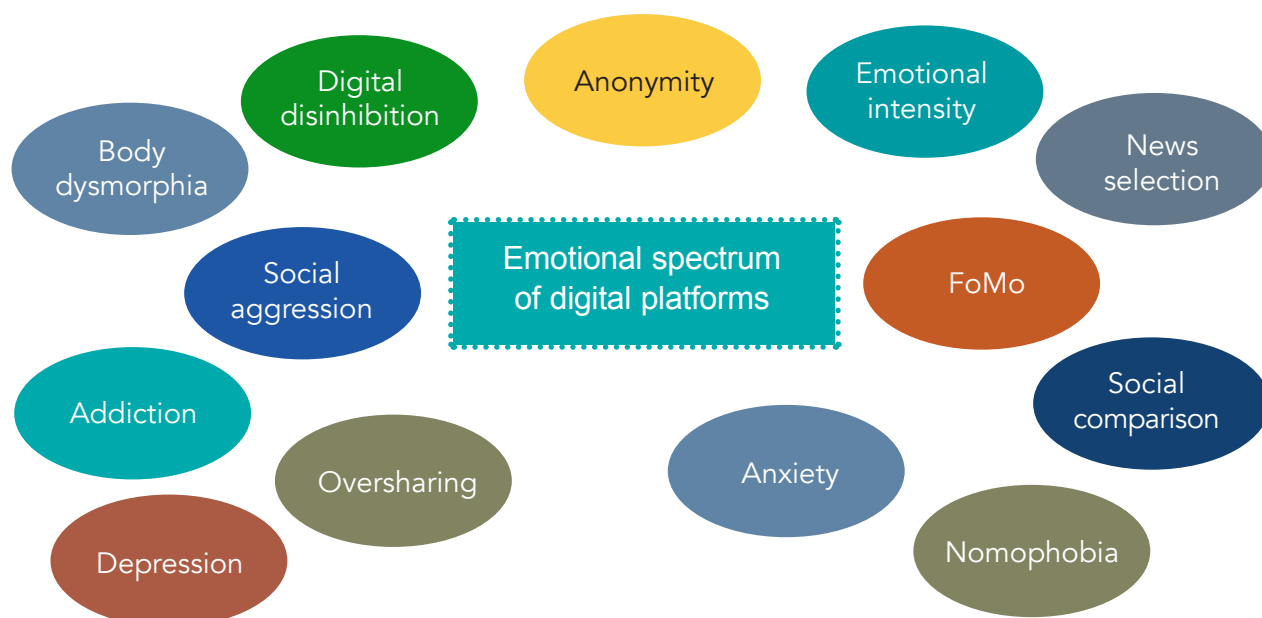
Another problematic use of the Internet is *oversharing*, which refers to excessive information sharing or frequent personal posting (Brammer et al., 2022). In addition to the personal security risk, this tendency can lead to harassment or social rejection. Another maladaptive practice is *poor self-regulation*, which is understood as a state in which awareness of control is diminished (Rains & Tokunaga, 2023). There is little control and boundaries over one's own actions, which generates disorder and failure to achieve goals. Mari et al. (2023) state that emotional dysregulation causes a high risk of developing symptoms of internet addiction. Another disorder studied is *body dysmorphia*, defined as an «obsessive-compulsive fixation on perceived appearance defects» (Rajanala et al., 2018). Young people are constantly exposed to body models that provoke comparison with their body and impact on a decrease in their self-esteem, with the consequent rejection

of their physique. Another aspect that impacts this disorder is the use of filters to modify body appearance in order to generate a better image and social acceptance.

*Online social aggression* is defined as those messages of hostility and hatred towards individuals

or social groups through digital technologies, which gets worse by the speed and reach that it can have, in addition to the conservation of content on the network, which allows the aggression to repeat over time (Fox, 2023). A spectrum of the aforementioned emotions is shown in Figure 1 below.

**Figure 1.** Emotional spectrum of digital platforms



For all these reasons, it is very important that all people can develop the digital skills that will enable them to function fluently and efficiently in these environments, which will also allow them to access many job and learning opportunities. As stated by Barrientos-Báez et al. (2021), the population's access to digital literacy will help build a more just and democratic society. Socioemotional competencies have been incorporated in more recent years into digital literacy models. Silber-Varod et al. (2019) note that from 1990 to date, only 17% of studies conducted on digital literacy competencies incorporate socioemotional competencies. Initially, digital competencies were reduced to the mastery of technological aspects and information management, but now emotional competencies are included as an essential part of these models (Martínez-Bravo et al., 2022; Silber-Varod et al., 2019).

The DQ Institute (2019) is one of the pioneers in naming this socioemotional competence as Digital Emotional Intelligence (DEI), a very novel term that had not been addressed in other research and defines

it as «the ability to recognize, navigate and express emotions in intrapersonal and interpersonal digital interactions». The DQ Institute's (2019) concept of DEI is based on the Emotional Intelligence model proposed by Goleman (2013) which establishes four main dimensions for Emotional Intelligence: emotional self-awareness, emotional self-management, social awareness, and the ability to manage relationships.

## 2. Methodology

### 2.1 Development of a DEI model

In order to elaborate an original DEI model, four of the most renowned models on Emotional Intelligence were analyzed: the ESCI by Daniel Goleman and Richard Boyatzis (Hay Group, 2011), the EQ-i model by Bar-On (Lopez-Zafra et al., 2014), the trait model by Petrides and Furnham (Petrides et al., 2016) and the updated EI-capability model by Mayer and Salovey (Rodrigo-Ruiz et al., 2019).

The next step was to compare the coincidences of the four models and to list all the dimensions proposed by the four models that can be applied to the digital environment, leaving aside those focused on the organizational environment. In this exercise, ten subdimensions were detected, which were grouped into the four major dimensions proposed by

Goleman (2013) (emotional self-awareness, emotional self-management, social awareness and the ability to manage relationships) since it was judged that these four dimensions are the ones that best integrate them, thus leaving a model of four dimensions and ten subdimensions shown in Figure 2.

**Figure 2.** Digital Emotional Intelligence Model of digital platforms

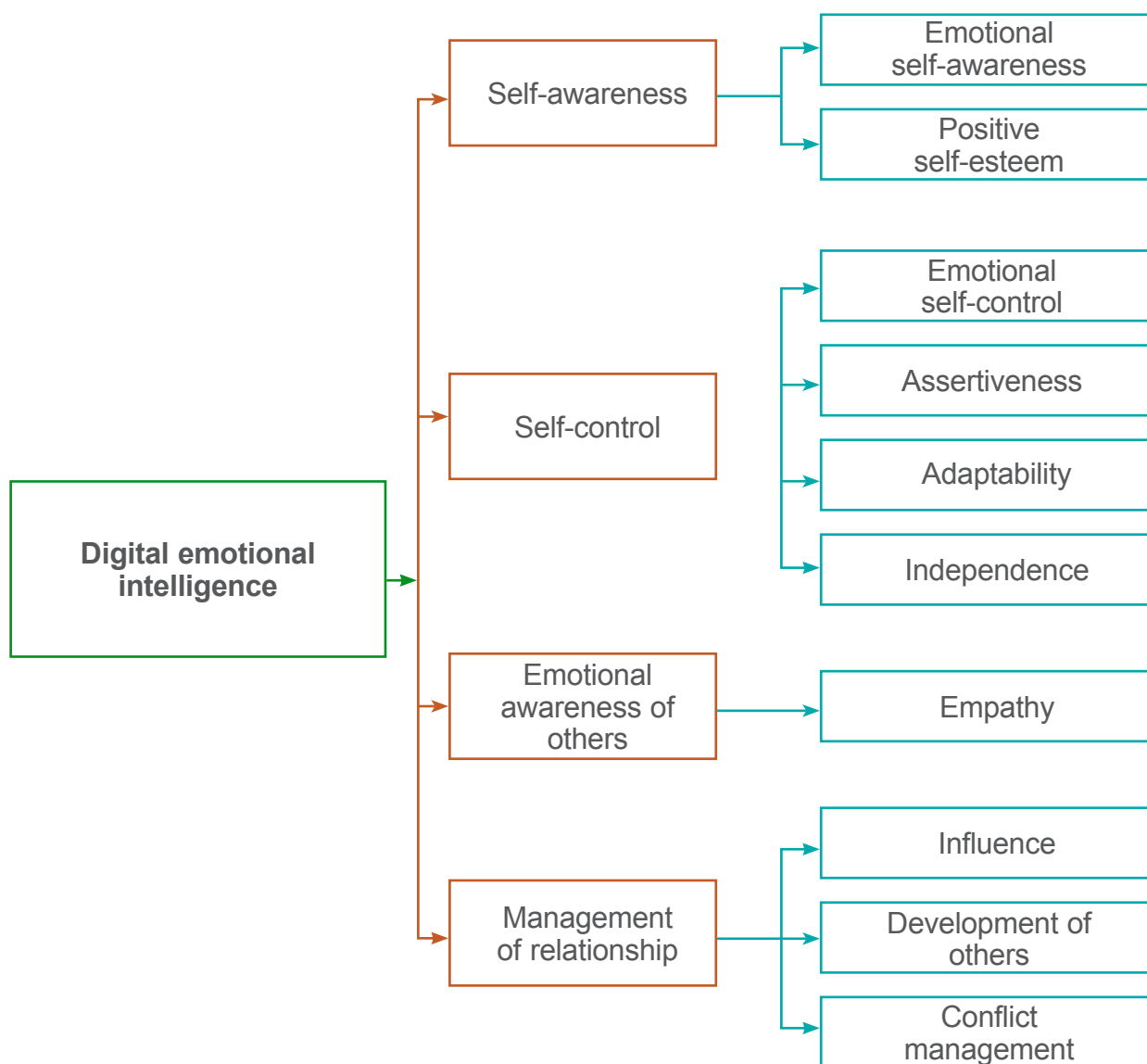


Table 1 shows the operational dimension of each subdimension and the development of its indicators.

**Table 1.** Dimensions, competencies and indicators of the Digital Emotional Intelligence Model

Dimension	Subdimension	Operational Dimension	Indicators
Self-awareness	Emotional self-awareness	Recognition of the emotions produced by digital platforms and the effect they have on personal life.	Is conscious of one's own emotions. Identifies one's own emotions. Is aware of how emotions affects the body.
	Positive self-evaluation (or self-concept for Bar-On)	Realistic and positive self-perception, understanding and acceptance of oneself that is projected with authenticity and confidence on digital platforms.	Accepts his or her own person (physically and in terms of personality). Faithful presentation of oneself. Knows he/she is valued in the environments where he/she operates. Possesses security and confidence.
Self-control	Emotional self-control	Efficient management of emotions produced by digital platforms, keeping in control the negative ones and cultivating the positive ones that contribute to personal well-being and the achievement of objectives. Reflection and content analysis before sharing, commenting or <i>liking</i> . Control of time spent on digital platforms to avoid neglecting personal commitments and relationships. Emotional independence in the use of digital devices and platforms.	Enhances positive emotions and minimizes negative ones. Avoids the impulse to attack. Avoids the impulse to share unverified posts through reflection. Proper use of time on the Internet. Is not emotionally dependent on connectivity, mobile or digital platforms. Controls negative emotions produced by social comparison and positive bias.
	Assertiveness	Ability to express on digital platforms one's feelings, beliefs and/or thoughts in a non-aggressive way, while defending one's own rights and respecting those of others.	Expresses with equanimity and arguments. He/she does not use anonymity to attack. Establishes a different opinion without aggression.
	Adaptability	Flexibility to handle and accept the diversity of positions and people in digital environments and openness to dialogue and adapt ideas in these contexts.	Is comfortable with diversity and difference. Listens and dialogues in the face of different positions. Is aware that different opinions can enrich him/her. Modifies his/her position if given sufficient arguments.
	Independence	Emotional freedom to express thoughts and actions in the digital realm.	Expresses his/her opinion, even if people do not agree with him/her. Does not limit himself/herself by expressing his/her beliefs and opinions. Does not depend on social approval to speak his/her mind.
Emotional awareness of others	Empathy	Ability to understand the feelings of others in digital environments and express understanding and support through digital tools.	Understands and feels the emotions of others. Expresses understanding and support for others. Has compassion for people affected by problems of various kinds. Does not join hate speeches because he/she is able to put himself/herself in the place of the other.

Dimension	Subdimension	Operational Dimension	Indicators
Relationship management	Influence	Ability to exercise leadership and have a positive impact on others through digital platforms.	Has influence in the digital environment in which he/she operates. Is recognized as a digital leader in his/her field. Influences the decision making of his/her followers.
	Development of others (coach and mentor)	Ability to push others in digital environments through support and feedback.	Shows solidarity with the activities of friends and acquaintances. Offers his/her help and knowledge if someone in his/her social networks asks him/her for help. Likes to help not only in the digital environment, but in real life.
	Conflict management	Ability to identify problems, define them, generate alternatives and implement effective solutions in digital communities.	Likes to listen to understand the cause of conflicts. Promotes harmony and dialogue. Proposes solutions that suit everyone.

Once the dimensions and subdimensions of the concept of DEI were established, we worked on its definition, resulting in: Digital Emotional Intelligence is the digital competence that integrates: awareness of the emotions produced by digital platforms and their effect on daily life; the ability to manage them for achieving personal well-being and that of others; the ability to feel and show empathy towards the emotions of others perceived and manifested online; and the ability to build links and leadership in the digital environment, generating more supportive, dialogic and constructive networks.

## 2.2 Development and validation of a DEI measurement instrument

Based on the four dimensions and the ten subdimensions or emotional competencies, a self-report questionnaire was developed with 70 items whose responses offered a Likert scale ranging from *always*, *frequently*, *sometimes*, *rarely* and *never*. In addition, demographic questions were included.

The questionnaire was reviewed by experts, three from Spain and three from Mexico, who made some suggestions for improvement and considered that the ten dimensions derived from the DEI construct were correct and adequately integrated by the four models mentioned. After addressing their comments, the survey was divided into two sections. In the first, they were asked their age, gender, four-month period, grade and population of origin and questions were added about their digital habits through six questions: digital devices they use, type

of connection at home, most frequent connection network in the cell phone, daily connection time, most frequent activities they perform when connecting to the Internet and social networks to which they connect the most. In the second part, the questionnaire was reduced to 60 items.

The questionnaire was developed in *Google Forms* and was projected with a QR on the screens of the classrooms where it was applied to two pilot groups: one at the Faculty of Social Education of the University of Huelva (public university in Andalusia, Spain), with 37 participants and another at the Faculty of Psychology of the UPAEP (private university in Puebla, Mexico) with 32 participants. The questionnaire was anonymous and its objective and the use of the data for academic purposes were explained to the participants. The average age of the participants in both universities was 20.7 years. The participation of women was 79.7 % and 20.3 % of men. The 53.6 % were Spanish students and 46.4 % were Mexican. Regarding the time they reported spending on the Internet, 72.4 % reported spending from 0 to 5 hours and 26 % from 6 hours or more. 1.4% did not answer. As for the social networks they use the most, they first pointed out Instagram, followed by TikTok, YouTube, Twitch, video games and lastly Facebook. The time they spend on the Internet is mainly used for social networks, then to communicate with family and friends, in third place for entertainment, followed by study and learning activities and finally for information. Regarding the digital devices they use, 98.6 % have a cell phone, 93.25 % have a computer, 53.2 % have a tablet, 31.1

% have a digital watch, 37.6 % have a digital console and 2.7 have Smart TV. Once the questionnaires were applied, the *Google Forms* database was downloaded and worked on in Excel to transfer it to SPSS. There, the reliability analysis was performed for each dimension with their respective items.

### 3. Results

The final result of validating the ten subdimensions with Cronbach's Alpha is shown in Table 2.

**Table 2.** Reliability analysis by subdimension

	Cronbach's alpha before	Items deleted	Cronbach's alpha after
Emotional self-awareness	0.553	3	0.754
Positive self-evaluation	0.309	7, 8, 9, 11,12,13	0.693
Emotional Self-Control	0.586	14,15,16,17, 20,22	0.822
Assertiveness	0.226	30, 31,32,33	0.475
Adaptability	0.534	37	0.667
Independence	0.162	38, 41, 42	-0.618
Empathy	0.838		0.838
Influence	0.697	50	0.778
Development of others	0.859		0.859
Conflict management	0.814		0.814

*Se*

When discarding the items -suggested by the SPSS program- in each subdimension to obtain a better Cronbach's Alpha, 38 items were finally obtained. All the subdimensions had values above 0.667, except assertiveness (0.308) and independence, which yielded a negative value (-0.618). However, they were maintained because during the expert judgment they were dimensions that were considered valid. Subsequently, a reliability analysis was made of all the questions integrated in each of the four dimensions, leaving Cronbach's Alpha as follows: self-knowledge 0.691, self-management 0.717, awareness of others 0.838 and relationship management 0.852. As seen, the reliability value is good in all four dimensions, especially in the last two, awareness of others and management of relationships, so it is concluded that the questions measure what they are intended to measure. Reliability analysis was again performed, this time integrating the 38 items. The

result for the total Cronbach's Alpha was 0.822. It can be seen that the reliability of the whole instrument is high, after having passed the expert judgment and the statistical tests of Cronbach's Alpha.

As for the results of the survey, the overall average of DEI was 3.19, which can be considered fair. The ranges established to qualify the level of DEI development were as follows: from 1 to 2.4, low; from 2.5 to 3.4, regular; from 3.5 to 5, high. A comparison was also made between gender demographic variables. The average total DEI score for women was 3.20, slightly higher than that of men, who scored 3.17. Likewise, a comparison of DEI by country of origin was made, and Mexican students obtained an average total DEI of 3.22, slightly higher than Spanish students, who scored 3.17. In addition, a comparison was made by dimension and subdimension of both variables, gender and country of origin, which can be seen in Table 3.

**Table 3.** *DEI Comparative by gender and country of origin*

Dimensions	Women	Men	Spain	Mexico	Subdimensions	Women	Men	Spain	Mexico
Self-awareness	3.25	3.32	3.18	3.35	Self-knowledge	3.55	3.79	3.51	3.91
					Positive self-evaluation	3.07	3.16	3.04	3.10
Self-control	2.96	2.99	2.92	3.02	Self-control	3.05	3.10	3.04	3.09
					Assertiveness	2.87	2.92	2.86	2.90
					Adaptability	2.99	2.93	2.90	3.07
					Independence	2.81	2.83	2.71	2.93
Emotional awareness of others	4.35	4.13	4.40	4.19	Empathy	4.35	4.13	4.40	4.19
Management of relationship	3.18	2.95	3.17	3.10	Influence	1.97	1.79	1.86	2.02
					Development of others	3.76	3.33	3.74	3.60
					Conflict management	3.43	3.48		

#### 4. Discussion

The literature review demonstrates the close connection between emotions and technology, the incidence that the virtual world has on the expression and manifestation of emotions, as well as their consequences due to the qualities of the digital world. The literature also reflects the negative and worrying incidence of digital platforms on the well-being of young people. This stage of the research was very valuable to identify digital emotional phenomena and propose a view of them. On the other hand, it is corroborated that the emotional aspect in the development of digital competencies has not been promoted in the same way as other competencies, so the concept of DEI becomes relevant for its substantiation and dissemination.

Regarding the construction of the model, the dimensions chosen to integrate the concept of DEI have a solid theoretical basis, based on the four main models of Emotional Intelligence offered by renowned authors such as Salovey and Mayer, Goleman, Bar-On and Petrides and Furham. In the process of analyzing these models, it was observed that they coincided in several dimensions and sub-dimensions, although they were named differently or grouped differently. It was analyzed which of the proposed dimensions and subdimensions could be applied to the digital domain, and the items used in existing tests for measuring emotional intelligence were also reviewed. Based on this, the most relevant

items were selected, adapting them to the digital context. In addition, during the drafting of the items, emotional manifestations specific to the digital environment were added.

Among the results of the pilot survey applied, it can be observed that the female population has a slightly higher total DEI (3.20) than the male population (3.17). As also shown in the results, men outperform women in the dimension of self-awareness and self-control, while women outperform men in the dimensions of emotional awareness and management of relationship. In four subdimensions - adaptability, empathy, influence and development of others - women show better competence; men, on the other hand, scored better in the following six: self-awareness, positive self-esteem, self-control, assertiveness, independence and conflict management. This coincides with what is established in the literature, such as the studies by Karua and Saini (2020) and Mari et al. (2023), which indicate that emotional intelligence is managed differently according to gender. Another result is that young people show a regular level of DEI development, with a score of 3.19, with potential to enhance it further. When comparing the countries, Mexican students obtained a slightly higher score than Spanish students. It can be observed that Spanish students scored better in the dimensions of emotional awareness of others and management of relationship, while Mexicans performed better in the dimensions of self-awareness and self-control. Mexican students stood out in eight

subdimensions: self-awareness, positive self-esteem, self-control, assertiveness, adaptability, independence, influence and conflict management. On the other hand, Spanish students showed better competence in the subdimensions of empathy and development of others.

Regarding demographic variables, the following differences and similarities were found between the two populations: more than 50 % of Spaniards have a cell phone, computer and tablet, while more than 50 % of Mexicans only have a cell phone and computer. However, Smart watch is more popular in Mexico (40.6 %) than in Spain (21.6 %). Both populations have 100% Wi-Fi connection at home. In terms of time spent online, more than 50% in both countries report spending between 3 and 5 hours online. However, in Spain only 2.7 % report being connected for more than 8 hours, while in Mexico, 9.4 % report being connected for more than 8 hours. Both populations report using networks for the same activities in the same order of importance as mentioned above, and the same phenomenon is repeated in terms of social network use.

One of the main limitations of this research is that the population used for the pilot test was composed only of students from the Faculty of Education at the University of Huelva and the Faculty of Psychology at the UPAEP. Consequently, the results should be interpreted within the framework of the specific characteristics of this sample. Likewise, a predominance of women over men was observed, which limits the generalization of the findings. Therefore, it is recommended that future studies apply the instrument in more diverse populations, adapting it to their particular contexts and sociodemographic conditions.

## 5. Conclusions

The research reaffirms the importance of working on the development of DEI, because as we have seen, the Internet is an affective technology, and the digital environment influences and modifies the transmission of emotions, especially the space of social networks, where young people interact the most as they communicate with their peers, reaffirm their identity and are socially validated. Just as all the benefits of social networks, there are negative signs about their use that demand digital

literacy, especially in the emotional sphere, which is where young people are being affected the most. The concept of DEI is not explicitly developed in the current literature, which makes its dissemination and substantiation relevant, especially in view of the previously mentioned phenomena. This research compiles various theoretical contributions on technology, emotions and emotional intelligence models in order to support the concept of DEI. Likewise, a model of DEI is proposed, detailing its dimensions, subdimensions and indicators, with the aim of generating an instrument that allows its objective measurement, thus moving from theoretical discussion to practical application.

The instrument developed in this research presents a good level of validity and allows us to diagnose the development degree of DEI in young people in its different dimensions. This will contribute to generate a greater awareness in them about the emotions caused by the digital environment, as well as a better understanding and empathy towards the emotions of others. In addition, it will allow them to work on improving their emotional management and interpersonal relationships, which will favor their emotional well-being and the construction of a more dialogic, supportive and open digital environment.

On the other hand, the instrument can be used by education, pedagogy and psychology professionals to learn about the DEI profile of their students and accompany them in their academic and personal development, as well as to provide guidance to parents. It can also be a useful tool in the curricular design of institutions, as it will allow them to effectively address the digital environment in the classroom, with special attention to the emotional component.

For public policy makers, DEI as a competency is central to establish training frameworks in educational institutions that favor the development of this skill. In conclusion, this article contributes to the foundation of the concept of DEI, proposes a model with its components and presents an instrument for its measurement, with potential impact in various areas that promote its development.

## Author contributions

**Ana Cristina Gómez-Vallarta:** conceptualization, data curation, formal analysis, funding acquisition, research, methodology, project management, resources, software, supervision, validation, visualization, writing - original draft, writing - revision and editing.

**Sergio Rivera Magos:** conceptualization, methodology, project management, supervision, validation, visualization, writing - revision and editing.

**Antonio Daniel García-Rojas:** methodology, project management, supervision, validation, writing - revision and editing.

**Ángel Hernando-Gómez:** methodology, validation, writing - revision and editing.

## References


- Barrientos-Báez, A., García, Á. P. & Caldevilla-Domínguez, D. (2021). Technological digital literacy: volunteer training. *Investigaciones Sobre Lectura*, 2021(15), 95-129. <https://doi.org/10.24310/isl.vi15.12560>
- Benski, T. & Fisher, E. (2014). *Internet and Emotions*. Routledge.
- Berger, J. (2014). *Contagioso. Cómo conseguir que tus productos e ideas tengan éxito*. L. Social Dynamics Group, Ed.
- Brammer, S. E., Punyanunt-Carter, N. M. & Duffee, R. S. (2022). Oversharing on social networking sites: A contemporary communication phenomenon. *Computers in Human Behavior Reports*, 8. <https://doi.org/10.1016/j.chbr.2022.100236>
- Cohen, E. L. & Myrick, J. G. (2023). Emotions and technological affordances. En R. L. Nabi & J. Gall Myrick (eds.) *Emotions in the digital world: Exploring affective experience and expression in online interaction* (pp. 32-52). Oxford University Press. <https://doi.org/10.1093/oso/9780197520536.003.0003>
- Crockett, M. J. (2017). Moral outrage in the digital age. *Nature Human Behaviour*, 1(11), 769-771. Nature Publishing Group. <https://doi.org/10.1038/s41562-017-0213-3>
- Danvila, I. & Sastre, M. A. (2010). Inteligencia Emocional: una revisión del concepto y líneas de investigación. *Cuadernos de Estudios Empresariales*, 20, 107-126. <https://bit.ly/4mVxnTa>
- de los Santos, T. M. & Nabi, R. L. (2019). Emotionally charged: exploring the role of emotion in online news information seeking and processing. *Journal of Broadcasting and Electronic Media*, 63(1), 39-58. <https://doi.org/10.1080/08838151.2019.1566861>
- DQ Institute. (2019). *DQ Global Standards Report 2019*. <https://bit.ly/45KxkUc>
- Ellis, D. & Tucker, I. (2021). Emotions in the digital age. En *Emotions in the digital age*. Routledge.
- Ferrés, J. (2014). *Las pantallas y el cerebro emocional*. Gedisa.
- Fox, J. (2023). Online social aggression: Harassment and discrimination. En R. L. Nabi & J. Gall Myrick (eds.) *Emotions in the digital world: Exploring affective experience and expression in online interaction* (pp. 193-214). Oxford University Press <https://doi.org/10.1093/oso/9780197520536.003.0011>
- Goleman, D. (2013). *Liderazgo. El poder de la Inteligencia Emocional*. Ediciones B.
- Haidt, J. (2024). *La generación ansiosa*. Deusto.
- Hay Group. (2011). *Emotional and social competency inventory (ESCI) A user guide for accredited practitioners*. [www.haygroup.com](http://www.haygroup.com)
- Karua, H. & Saini, S. (2020). Relationship between social media usage and emotional intelligence among adolescents. *Indian Journal of Health and Well-Being*, 11(10-12), 581-584.
- Lara, A. & Domínguez, G. E. (2013). El Giro Afectivo. *Athenea Digital*, 13(3), 101-120. <https://doi.org/10.5565/rev/athenead/v13n3.1060>
- Lopez-Zafra, E., Pulido-Martos, M. & Berrios-Martos, M. P. (2014). Adaptación y validación al español del EQ-i (Short Form) en universitarios. *Boletín de Psicología*, 110(febrero), 21-36. <https://bit.ly/43Tx3vw>
- Mari, E., Biondi, S., Varchetta, M., Cricenti, C., Pizzo, A., Frascetti, A., Barchielli, B., Roma, P., Vilar, M. M., Sala, F. G., Giannini, A. M. & Quaglieri, A. (2023). Gender differences in internet addiction: A study on variables related to its possible development. *Computers in Human Behavior Reports*, 9. <https://doi.org/10.1016/j.chbr.2022.100247>
- Martín Critikián, D. & Medina Núñez, M. (2021). Redes sociales y la adicción al like de la generación z. *Revista de Comunicación y Salud*, 11, 55-76. <https://doi.org/10.35669/rcys.2021.11.e281>
- Martínez-Bravo, M. C., Sádaba Chalezquer, C. & Serrano-Puche, J. (2022). Dimensions of Digital Literacy in the 21st Century Competency Frameworks. *Sustainability (Switzerland)*, 14(3). <https://doi.org/10.3390/su14031867>
- Medina-Morales, G. del C. & Villalón-Hernández, R. (2023). Estudio de la prevalencia del phubbing durante clases ocasionado por el uso de apps. *Alteridad*, 18(1), 59-69.

- <https://doi.org/10.17163/alt.v18n1.2023.05>
- Nabi, R. L., Wolf ers, L. & King, J. (2023). Social Media Use and Patterns of Emotional Experience: A Consideration of Anxiety, Depression, and Hope. En R. L. Nabi y J. G. Myrick (eds.), *Emotions in the Digital World: Exploring Affective Experience and Expression in Online Interactions* (pp. 155-173). Oxford University Press.  
<https://doi.org/10.1093/oso/9780197520536.003.0009>
- Palacios Pérez, H. B., Parra Abarca, J. & Baldivia Noyola, P. (2022). Psicología digital: reflexiones sobre estudio el comportamiento humano en la era de las tecnologías de la información. *Ciencia Latina Revista Científica Multidisciplinar*, 6(6), 9254-9268. [https://doi.org/10.37811/cl\\_rcm.v6i6.4068](https://doi.org/10.37811/cl_rcm.v6i6.4068)
- Petrides, K. V., Mikolajczak, M., Mavroveli, S., Sanchez-Ruiz, M. J., Furnham, A. & Pérez-González, J. C. (2016). Developments in Trait Emotional Intelligence Research. *Emotion Review*, 8(4), 335-341. <https://doi.org/10.1177/1754073916650493>
- Quaglieri, A., Biondi, S., Roma, P., Varchetta, M., Frascchetti, A., Burrari, J., Lausi, G., Martí-Vilar, M., González-Sala, F., Di Domenico, A., Giannini, A. M. & Mari, E. (2022). From emotional (Dys) regulation to internet addiction: A mediation model of problematic social media use among italian young adults. *Journal of Clinical Medicine*, 11(1). <https://doi.org/10.3390/jcm11010188>
- Rains, S. A. & Tokunaga, R. S. (2023). The role of emotion in maladaptive internet use: Internet addiction, problematic internet use, and deficient self-regulation. En R. L. Nabi y J. Gall Myrick (eds.) *Emotions in the digital world: Exploring affective experience and expression in online interaction* (pp. 174-192). Oxford University Press.  
<https://doi.org/10.1093/oso/9780197520536.003.0010>
- Rajanala, S., Maymone, M. B. C. & Vashi, N. A. (2018). Selfies-living in the era of filtered photographs. *JAMA Facial Plastic Surgery*, 20(6), 443-444. American Medical Association.  
<https://doi.org/10.1001/jamafacial.2018.0486>
- Rodrigo-Ruiz, D., Cejudo, J. & Pérez-González, J. (2019). Compendio y Análisis de Medidas de Evaluación de la Inteligencia Emocional Capacidad. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*, 51(2), 99-115.  
<https://doi.org/10.21865/ridep51.2.08>
- Romano, J. (2012). *Neuropirámide, base del neuromarketing* (1a ed.). LID.
- Serrano-Puche, J. (2016). Internet y emociones: nuevas tendencias en un campo de investigación emergente. *Revista Comunicación Científica de Educomunicación*, 46(XXIV), 19-26.  
<https://doi.org/http://dx.doi.org/10.3916/C46-2016-02>
- Serrano-Puche, J. (2017). Metaanálisis del consumo digital en el ecosistema mediático contemporáneo: factores distintivos e implicaciones emocionales. *Revista Mediterránea de Comunicación*, 8(1), 75. <https://doi.org/10.14198/medcom2017.8.1.6>
- Serrano-Puche, J. (2021). Digital disinformation and emotions: exploring the social risks of affective polarization. *International Review of Sociology*, 31(2), 231-245.  
<https://doi.org/10.1080/03906701.2021.1947953>
- Silber-Varod, V., Eshet-Alkalai, Y. & Geri, N. (2019). Tracing research trends of 21st-century learning skills. *British Journal of Educational Technology*, 50(6), 3099-3118). Blackwell Publishing Ltd. <https://doi.org/10.1111/bjet.12753>
- Skurka, C. & Nabi, R. L. (2023). Perspectives on emotion in the digital age. En R. L. Nabi y J. Gall Myrick (eds.) *Emotions in the digital world: Exploring affective experience and expression in online interaction* (pp. 7-31). Oxford University Press.  
<https://doi.org/10.1093/oso/9780197520536.003.0002>
- Twenge, J. M., Haidt, J., Lozano, J. & Cummins, K. M. (2022). Specification curve analysis shows that social media use is linked to poor mental health, especially among girls. *Acta Psychologica*, 224. <https://doi.org/10.1016/j.actpsy.2022.103512>
- Valencia-Ortiz, R., Garay-Ruiz, U. & Cabero-Almenara, J. (2023). Uso problemático de las redes sociales: el caso de estudiantes mexicanos. *Alteridad*, 18(1), 23-33.  
<https://doi.org/10.17163/alt.v18n1.2023.02>



## Feedback and ICT tools used by university professors

### *Retroalimentación y herramientas TIC utilizadas por profesores universitarios*

 **Dr. Gustavo Toledo-Lara** is a lecturer at the Faculty of Education of Universidad Camilo José Cela (España) ([gtoledo@ucjc.edu](mailto:gtoledo@ucjc.edu)) (<https://orcid.org/0000-0002-5104-9555>)

**Received:** 2024-07-18 / **Revised:** 2024-10-15 / **Accepted:** 2025-01-30 / **Published:** 2025-07-01

### Abstract

Feedback is the act that aims to transmit to students a set of considerations and evaluations on the development of academic activities. There are several types of feedback according to the pedagogical intentionality of this and in a virtual learning context, teachers have to use technological tools to transmit feedback. This research aims to: 1) describe the type of feedback that teachers develop, and 2) explore the technological tools they use and recommend. A descriptive-explanatory quantitative research was designed, applying an instrument to 28 teachers which consisted of 25 items distributed in 4 dimensions: 1) information about the participants, 2) the feedback developed by the teachers, 3) technological tools used to transmit feedback and 4) the tools recommended to transmit feedback. Among the results, the following stand out: a) the predominant type of feedback is that of failures and successes for the achievement of learning objectives b) e-mail and discussion forum are the main tools used and recommended, c) the more technological training, the more teachers will diversify the technological tools. The conclusions confirm the hypotheses put forward: teachers give feedback to transmit failures and successes, basically use the discussion forum and e-mail, and tend to recommend the same technological tools while claiming to need more technological training.

**Keywords:** feedback, educational technology, electronic learning, academic teaching personnel, higher education institutions, information technology.

### Resumen

la retroalimentación es aquel acto que tiene por objeto transmitir a los estudiantes un conjunto de consideraciones y valoraciones sobre el desarrollo de las actividades académicas. Existen varios tipos según la intencionalidad pedagógica de esta y en un contexto virtual de aprendizaje los docentes han de utilizar herramientas tecnológicas para transmitirla. Esta investigación tiene por objetivo: 1) describir el tipo de retroalimentación que desarrollan los docentes, y 2) explorar las herramientas tecnológicas que usan y recomiendan. Se diseñó una investigación cuantitativa de tipo descriptivo-explicativo, aplicando un instrumento a 28 profesores el cual se conformó por 25 ítems distribuidos en 4 dimensiones: 1) información sobre los participantes, 2) la retroalimentación desarrollada por los profesores, 3) herramientas tecnológicas utilizadas al transmitir la retroalimentación y 4) las herramientas recomendadas para transmitir la retroalimentación. Entre los resultados se destacan: a) el tipo predominante es la de fallos y aciertos para el logro de los objetivos de aprendizaje b) el correo electrónico y el foro de discusión son las principales herramientas que se usan y recomiendan, c) a mayor formación tecnológica, los profesores diversificarán las herramientas tecnológicas. Las conclusiones confirman las hipótesis planteadas: los docentes retroalimentan para transmitir fallos y aciertos, utilizan básicamente el foro de discusión y el correo, y suelen recomendar las mismas herramientas tecnológicas mientras afirman necesitar más formación tecnológica.

**Palabras clave:** retroalimentación, tecnología educativa, aprendizaje en línea, personal académico docente, universidad, tecnología de la comunicación.

## 1. Introduction

Teaching at the university acquires a new meaning when it is carried out in a virtual learning context under what is commonly known as virtual education. Thus, this virtual context has a set of elements that accompany the pedagogical process in which, among other aspects, there is what is called feedback. In this sense, several types are identified depending on the pedagogical intentionality, since not all forms of feedback are the same, nor do they pursue the same objectives. On the other hand, since it is a virtual learning context, it is not enough for teachers to be experts in their disciplines or fields of study, but they must also have a training process that allows them to recognize and use various technological tools that can enrich the experience of transmitting feedback to their students, since the fact of managing a virtual campus or a virtual classroom, for example, does not usually guarantee a variety in the use of technological tools with pedagogical intentionality.

In short, on the one hand it is a matter of investigating the pedagogical connotation that accompanies the intentionality when transmitting feedback and its types by a group of university teachers, and on the other hand, it is necessary to identify those technological tools that are used and recommended when sharing it with students. Since, a process of digital transformation as an institutional objective assumed by the university institution will imply, in its case, the promotion of a digital culture that by means of the Information and Communication Technologies, allows both enriching the teaching experience, improving the pedagogical process of the students and promoting the vision that virtuality does not necessarily imply the feeling of remoteness or distance between the active actors of the pedagogical process.

### 1.1 Feedback and its pedagogical meaning

At the university level, the follow-up carried out by the teacher towards his students involves recognizing the importance of the formative evaluative process, i.e., the teacher must accompany the student during the process. The action exercised by the teacher to transmit his evaluations regarding the performance of his students is called feedback (Trejo,

2021), which is a fact associated with the achievement of learning and is part of formative evaluation (Mollo and Deroncelle, 2022), being catalogued as the main action in the transmission of evaluations regarding a given achievement. The meaning of this action has deep pedagogical roots, since it is the teacher who initiates the communication in order for the student to perceive those elements, that in his case may be strengths or challenges to overcome.

Regardless of the fact that the result of a given academic activity is not the expected one (Valdivia, 2014), the message to be transmitted when developing such action has to originate from the idea that, indeed, it has to exercise a self-regulating power of the student's own learning (Parra Martínez et al., 2022), from the type of feedback that the teacher assumes as a pedagogical practice. Therefore, such action must be linked to the pedagogical processes so that the feedback exercise itself is a learning resource, in this case for higher education.

A review of the scientific literature confirms its importance in multiple areas of university teaching. Thus, it allows students to recognize their level of performance and the aspects that need improvement (Valdivia, 2014), encourages the development of critical thinking (León-Warthon, 2021), allows students to activate internal processes for the self-regulation of their own learning (García et al., 2021), fosters non-linear interpersonal communication between teacher and student (Sepúlveda-Romero, 2019), has to be comprehensible, relevant, objective and constructive (Espinoza Freire, 2021) and can also encourage the emergence of preventive actions focused on a process of continuous improvement (Veytia Bucheli and Rodríguez Serrano, 2021). All of the above is framed in the role of the teacher and his position in the pedagogical exercise of his training function, which means that the action of transmitting evaluations and considerations to the student focuses on the teaching function.

Several types of feedback are identified, which will respond to the pedagogical intentionality of whoever exercises it. Its typification does not represent absolute concepts, however, it presents indicators that allow to outline a certain type from the dominant element of this one. Thus, and according to Espinoza Freire (2021), four types are identified: the first corresponds to one based on the communication of achievements and limitations by the

student in the development of an academic activity. This type includes the communication of evaluation criteria and the indication of actions established to try to solve possible difficulties. This is called «feedback oriented to the results of the academic activity».

The second type has to do with procedures that are developed at the time of performing the academic activity: the level of understanding, the learning strategies that are conducted in the pedagogical process, the resources used, and the critical and reflective process carried out by the student (Sepúlveda-Romero, 2019). This is called «process-oriented feedback».

A third type corresponds to transmitting to the students skills that have intervened so that these serve as guidance when performing academic activities to promote autonomous thinking, self-regulation of learning and self-evaluation of the process (García et al., 2021). This is known as «self-learning oriented feedback».

The fourth type is more linked to the person, i.e., information is transmitted about the student's own personal competencies so that he/she can identify his/her own achievements and strengths and how these help him/her in the development of his/her studies and in carrying out an academic activity (León-Warthon, 2021). This includes personal exchange of experiences that have determined the learning process of both the teacher and the student, the value of involvement in studies and responsibility. This type of feedback is called «person-oriented feedback».

Although it is true that throughout the scientific review, the value of such action in the development of the students' learning process is confirmed, it is necessary to develop studies that evidence the practices deployed by university teachers. It is a matter of exposing findings on current trends in the way teachers configure their practice and what they usually transmit to their students. This would make it possible to identify, for example, to

what extent teachers orient their teaching towards processes, results, self-learning or personal development, considering that these approaches imply a reflective dialogue «about learning challenges and opportunities» (León-Warthon, 2021, p. 564), as well as «a systematic, systemic, participatory and reflective process» (García et al., 2021, p. 47).

## 1.2 Artificial Intelligence (AI) and learning analytics

The modifications inherent to the university show that the presence of technologies has allowed the rediscovery of new logics of understanding, in this case from the field of action between university teachers and students. In this sense, the global dynamics has imposed the need to manage certain technological tools that will allow a better personalization of learning, always counting on the active pedagogical actors. Now, with regard to AI, it is necessary to remember that it consists of a computer system that can imitate human reasoning with respect to the processing of external data, which can be transformed into information (Toledo Lara, 2024).

This means that we are dealing with a powerful tool that can process a high volume of data in a very short time, which can be translated into improved attention to the student and, therefore, in the personalization of such attention (Menacho et al., 2024). For example: it can be used for the adaptation of learning experiences based on their needs, favoring the generation of accurate and timely feedback (González, 2023). Also for the design of intelligent tutoring systems (López et al., 2024) without losing sight of learning as the epicenter (Moreno-Olivos, 2021), in addition to the fact that it will help identify students' problems and those elements that may affect or interfere with their academic progress (Valencia and Figueroa, 2014).

Thus, four types can be identified in virtual education at the moment, which have been synthesized as follows according to Contreras Bravo et al. (2021): the first is known as «e-learning» and includes non-face-to-face and asynchronous learning. The next is called «b-learning», focused on the combination of face-to-face and virtual learning. Next, the «m-learning» that revolves around online learning through mobile devices. Finally the «g-learning» that has to do with the development of e-learning, but with the presence of the gamification element or component linked from a didactic perspective applied for this purpose.

This typification allows to identify the areas in which the action to be applied from the learning analytics in virtual education can be located and, as a result of the linkage and the use of various tools, it can be used in the analysis of the pedagogical process

developed. Therefore, the professor will be able to profile and personalize the way in which he transmits his considerations to his students as an opportunity to show the evaluations regarding the learning evidences. All of the above is not exempt from challenges to overcome, for example, it is necessary to work from technoethics as an essential root for a rational, honest and balanced use of this set of tools (Norman- Acevedo, 2023) since students must be insisted on from the critical and analytical (De Souza & Rocha, 2025), given the risks posed by the misuse of technological tools regarding the transit through university studies. In addition, the ideological biases present in the algorithms require a trained criterion to be able to determine to what extent the answer generated by this type of tools is technologically the most accurate.

As stated by Lonn et al. (2015) and Li et al. (2020), analytics is used in higher education in order to handle large volumes of data, which must be transformed into information related to academic performance and, if necessary, to establish both a diagnosis and the trends that can be identified at a given moment of curriculum development. Thus, two ways of application of analytics are identified: the so-called learning analytics that allows visualizing the flow of interaction between users and the elements that are present in virtual learning environments and the other known as academic analytics which works with the prediction of the academic performance of a group of students in a classroom.

Therefore, learning analytics focuses on the collection, analysis and interpretation of data about students and their contexts, in order to deepen the understanding of the educational experience and improve the factors that influence their development and the learning environment (Contreras-Bravo et al., 2021, Wong et al., 2019). All this also involves identifying who are the people who generate the data to be analyzed, the management of Big Data when processing data from different moments (past, present and trying to predict the future behavior of students), without failing to recognize that the above will favor the interpretation of the data transformed into information, to subsequently establish lines of action based on the results. Hence, it is *machine learning*, *data mining*, or *natural language processing* (González, 2023; Rivero Panaqué & Beltrán Castañón, 2024).

The new didactic panorama that is shown to university teaching demands to take the step from technological literacy to digital culture. This means that the use of technological tools by professors should be assumed as a strategic and privileged opportunity for improving the teaching, therefore, resistance to change under the subterfuge of tradition (Cajamarca-Correa et al., 2024), should be far from the activity of the university.

### 1.3 *Feedback and virtual learning environment from the University*

In distance education and in a virtual learning environment, the evaluative process has had a particular observation, since it is not always associated with a real sense because it is usually compared with the evaluative process that is developed in a face-to-face modality. According to Bañuelos Márquez and Montero Montiel (2017), educational quality does not depend on the modality but on the quality of the processes associated with the learning experience. On the other hand, the studies developed by García et al. (2021) state that in the virtual modality there is a tendency to use an evaluation procedure associated with a traditional style and with few variations, for example: written exams, short works with a structure more typical of a modality that does not correspond to the virtual, among others.

For the purposes of this research, it is understood that a virtual learning environment is that educational environment, which is constituted as a form of distance education and is developed through the use of Information and Communication Technologies (hereinafter, ICT) (Sepúlveda-Romero, 2019). In this sense, the teaching that takes place in the virtual learning environment must have a specific teaching methodology that tries to create a formative environment of interaction and interactivity adapted to the virtual context (Tanevich et al., 2021). Therefore, the attitude of teachers towards the use of technologies (Sánchez Prieto et al., 2017) can serve to infer the possible impact on the pedagogical process already seen from the teaching perspective.

A critical view is put forward by García Peñalvo (2021) when he states that «technology advances at a different pace than its acceptance and legal adequacy» (p. 3). This confirms the idea that an eventual use of ICT, unplanned and lacking pedagogical intentio-

nality, cannot be assumed as a practice corresponding to an online teaching, basically because those ICT are used with a more instrumentalist sense than as a tool that serves to digitize the processes, besides ICT alone will not operate any change without the critical and formative process that comes with its use (Toledo Lara, 2021).

The above allows inferring the need to transcend the centralized vision in the teaching willingness before the use of some tools, to give way to a deep process of digital transformation within the university with the objective that in the case of feedback, the use of technological tools is not a limitation to achieve what Sepúlveda-Romero (2019, p. 95) calls as «humanization of the act of feedback in virtual education», since ICT will favor the interactive processes of learning (Mollo & Deroncele, 2022).

University planning and teacher training must be developed under pedagogical criteria compatible with the changes that are generated at the university level. In this sense, it is necessary to talk about what García-Peñalvo (2018) calls «university technological ecosystem» which is understood as the interaction and integration of various programs and software components that allow building a digital sense of university animation, in order to progress in this case, in the use that is made of ICT from the conviction that these are no longer mere tools that are used in case of pedagogical emergencies, but can receive a treatment and a pedagogical intentionality that can favor the work of technological competence and thus, be in harmony with the information society.

All of the above must be observed from the perspective of the digital transformation of the University in order to prevent the use of technology from being limited to introducing technological novelties while continuing with the same practices (García-Peñalvo & Corell, 2020). Regarding the tools that can be used to transmit it, there is agreement among the authors consulted on the fact that having such tools, does not automatically ensure that students can learn (Ferrada-Bustamante et al., 2021). Therefore, in addition to the university teacher's willingness to know tools in terms of transmitting their comments or evaluations, it is also necessary to have the institutional willingness (Avendaño-Castro et al., 2021).

The scientific literature refers to technological tools contextualized in virtual learning environ-

ments, which have been applied when transmitting to students feedback on their contributions and on the way in which they carry out academic activities. Thus, the «formative pills» (Crespo Miguel et al., 2020), the podcast (Andrade and Páez, 2021), e-mail, debate and discussion forum, shared boards and the use of educational platforms (Avendaño-Castro et al., 2021; Montiel, 2020; Sepúlveda-Romero, 2019; Veytia Bucheli & Rodríguez Serrano), video (Segovia-Chamorro & Guerra-Zúñiga, 2020) are recognized. Not all technological tools are used indistinctly to transmit it by teachers, i.e., there are tools whose use is more inclined to respond to queries or clarifications such as email, while there are other tools whose use is more favorable when transmitting different types of comments such as the discussion forum.

After the findings obtained from the review of the scientific literature, it is necessary to try to answer the following questions: 1) Is it true that professors give feedback to their students, so that they can identify both failures and successes in order to achieve the learning objectives? 2) Do professors usually use e-mail and the discussion forum as the main tools when transmitting it to their students? 3) When professors feel that they need more technological training, do they agree on the technological tools they use and recommend when transmitting their comments or evaluations? In view of these questions, the following hypotheses were raised in this research:

*H1:* Professors perform feedback so that students can identify failures and successes for achieving learning objectives.

*H2:* Professors who teach in virtual education use e-mail and the discussion forum as the main tools.

*H3:* Professors who claim to need more technological training, tend to use and recommend the same tools they use to transmit their comments and assessments.

## 2. Methodology

Design and procedure: this is a quantitative research with descriptive-explanatory type (Lafuente & Marín, 2008; Huber et al., 2018), conducted confidentially and voluntarily for research purposes of this study.

Participants: the sample was composed of 28 professors of the Official Degree in Early Childhood Education Teacher, blended mode, in a private university located in Madrid. Of these 28 teachers, 78.6 % have a PhD (n=22), and 21.4 % have a Master's degree (n=6). On the other hand, 60.7 % (n=17) are in the range of 36-46 years, 25 % (n=7) in the range of 47-58 years, 10.7 % (n=3) between 25 and 35 years and 3.6 % (n=1) are in the range of 59-69 years. Regarding accreditation, 50 % (n=14) have at least one accreditation while the remaining 50 % (n=14) are not accredited at the time of responding to the survey. Among these 28 professors, 42.9% (n=12) have between 5-10 years of teaching experience in university education, and 42.9% (n=12) have 10-15 years of experience. Other data are those professors with 20-30 years of experience (10.7% n=3) and 3.6% (n=1) with 15-20 years of experience.

Instrument: a specific instrument was designed for this study, adapting it from research conducted by Espinoza Freire (2021); Narváez and Verdezoto (2021); Garcés Bustamante et al. (2020); Sepúlveda-Romero (2019); Veytia Bucheli and Rodríguez Serrano, (2021); Montiel (2020); Segovia-Chamorro and Guerra-Zúñiga (2020); and Andrade and Páez (2021), with the validation of two experts. The final instrument consisted of a questionnaire made up of 25 items distributed in 4 dimensions: 1) information about the survey participant (4 items), 2) the feedback that teachers develop with their students (11 items), 3) the technological tools that teachers use to provide feedback (5 items) and 4) the tools that these teachers recommend to share feedback to students (5 items). Dimensions 2 and 3 were adjusted to the Lickert scale (Rositas, 2014) with 5 items (1=never and 5=always), while dimension 4 was adjusted to the same Lickert scale but modifying the nomenclature (1=not at all recommended and 5=very recommended).

Data analysis: the SPSS Statistics program (version 26, IBM International Business Machines Corporation) was used for data analysis, taking the data generated for the mean (M), standard deviation (SD) and Pearson's r for the correlation of the variables (Hernández et al., 2018).

### 3. Results

When reviewing the results related to the profile of the participants, it is observed that at the global level, it is a university professor with a doctoral degree (M=2.79; SD=0.418), accredited (M=0.50; SD=0.509) whose age range is between 36-47 years (M=2.21; SD= 0.686), and who has approximately between 5 and 15 years of experience in university teaching (M=1.82; SD=0.945). The results obtained on the feedback given by the teachers consulted indicate that all of them do it (100 %) and of this percentage, 60.7 % (M=4.57; SD= 0.573) indicate that they always give feedback on the learning results (Resapren) (M=4.25; SD=0.928). Thus, it is observed that it is a constant practice; however, the rest of the items that make up dimension 2 present results that are mostly in the mean of each one of them, but the concentration of the responses in some cases allows inferring a certain dispersion (see Table 1).

Thus, among the items, the teachers' perception that it is useful for their students (Utilest) (M=4.46; SD=0.922) and that it is done so that the student can identify the failures and successes for the achievement of his learning objectives (Objapren) (M=4.39; SD=0.682), in addition to the fact that these professors share their personal opinion from the positive assessments to increase the motivation of their students (Motiv) (M=4.29; SD=0.897) and for these same students to acquire greater autonomy with respect to their studies (Autonom) (M=4.07; SD=0.900).

One of the items in which the greatest variability in the response is observed is that which corresponds to its performance of what is requested as part of the teaching duties. While 100% of the professors consulted claim to do it, 42.9% indicate that they do it as part of what is requested for their teaching duties, although the proportions in this response are consistent with a notable variability (Homework) (M=3.71; SD=1.436). It is also perceived that they sometimes need technological training to improve the way they transmit their comments and assessments (Form\_tec) (M=2.61; SD=1.100), although they advocate using technological tools to share it (No\_tic) (M=2.18; SD=1.124) and generally transmit it in writing (Written) (M=3.57; SD=0, 879) and mostly discard using a video to share it (Video) (M=1.79; SD=0.917).

**Table 1.** Item, label, Mean and SD of dimension 2: the feedback that the professor gives to his/her students

Item	Label	M	DE
I give it to all my students.	Alllest	4.57	0.573
I feel it is useful for my students.	Utilest	4.46	0.922
I perform it on learning outcomes.	Resapren	4.25	0.928
I perform it so that the student himself/herself identifies the failures and successes for the achievement of the learning objectives.	Objapren	4.39	0.82
I carry it out so that the student acquires greater autonomy with respect to his studies.	Autonomy	4.07	0.900
I carry it out so that each student receives my opinion on a personal level, sharing positive evaluations with the interest of increasing their motivation.	Motiv	4.29	0.897
I perform it because I am asked to do so as part of my teaching duties.	Duties	3.71	1.436
When I do it, I prefer to communicate in writing.	Written	3.57	0.879
I make a video to share it with my students.	Video	1.79	0.917
I feel I may need technology training to improve the way I convey my feedback.	Form_tec	2.61	1.100
I feel that feedback is important, but I would prefer not to use technological tools to share it.	No_ICT	2.18	1.124

Regarding dimension 3 on the technological tools used by the professors surveyed, the results indicate that 96.4 % generally use e-mail to share the feedback (U\_mail) (M=3.50; SD=0.923), and in second place they use the forum (U\_forum) (M=2.50; SD=1.106). In this case (see Table 2), the tendency is to use e-mail, less frequently the discussion forum, and very sporadically vary the tools used among which are video (U\_video) (M=2.00; SD=1.155) and audio file (U\_audio) (M=1.82; SD=1.156). With respect to social networks (U\_RRSS) (M=1.36; SD=0.621) they

have practically never been used them to share comments or ratings. At a general level, there is a certain tendency to combine e-mail and discussion forum as the most common tools. However, in the case of the discussion forum, although a M=2.50 corresponding in this case to «almost never/sometimes» is identified, the dispersion suggests that there is not a very definite concentration, such as to categorically assure that there is a great coincidence in the preference for its use, even though it is in a second position with respect to e-mail.

**Table 2.** Item, label, Mean and SD of dimension 3: technological tools used by teachers to transmit feedback

Item	Label	M	DE
I use e-mail.	U_mail	3.50	0.923
I use the discussion forum.	U_forum	2.0	1.106
I use a video.	U_video	2.00	1.155
I use an audio file.	U_audio	1.82	1.156
I use one or more social networks.	U_RRSS	1.36	0.621

Dimension 4 analyzes the results on the tools that the university teachers consulted recommend for transmitting their comments or evaluations. When evaluating the statistics corresponding to this dimension (see Table 3), a majority percentage is observed with respect to recommending the use of e-mail (R\_mail) (M=3.93; SD=0.813), i.e., 96.4% of the professors basically recommend this tool. However, there is no tendency to recommend only one tool in particular, i.e., professors are inclined to recommend several technological tools. Thus, for example, they recommend the discussion forum (R\_forum)

(M=3.32; SD=1.335), the video (R\_video) (M=3.25; SD=1.266) and the audio file (R\_audio) (M=3.00; SD=1, 361). On the other hand, regarding the use of social networks, practically all of them consider that it is not recommended or not recommended at all (R\_RRSS) (M=2.07; SD=2.07; SD=0.900). Although no single categorically preferred tool is identified, it can be inferred that the university teachers consulted are inclined to recommend several tools, although in practice they are basically inclined to use e-mail and the discussion forum.

**Table 3.** *Item, label, mean and SD of dimension 4: Tools recommended for sharing feedback to students*

Item	Label	M	DE
E-mail.	R_mail	3.93	0.813
Discussion forum.	R_forum	3.32	1.335
Video.	R_video	3.25	1.266
Audio file.	R_audio	3.00	1.361
Social networks.	R_RRSS	2.07	0.900

On the other hand, a statistically significant, moderate (Hernandez et al., 2018) and directly proportional linear correlation was found between using the discussion forum and that this is perceived as useful for students and that the students can identify failures and successes for the achievement of learning objectives, every time it is transmitted to all. This means that the statistical correlation suggests that the use of the forum is more associated with the pedagogical and formative sense of the message transmitted. In contrast, the use of e-mail does not show a statistically significant association. Therefore, although this tool is notably common among the university professors surveyed, the messages transmitted by mail tend predominantly to have a resolute and consultative nature.

Another noteworthy fact is the significant linear correlation observed between transmitting feedback as part of teaching duties and students receiving it in order to increase their motivation by sharing positive evaluations. In this case it is a moderate and directly proportional correlation, with which it can be inferred that those professors who perform it and transmit it to their students, assume that in addition to being a duty, it will serve to increase the motivation of their students from the positive evaluations of their personal opinion. Therefore, the greater the fulfillment of the teaching duty, the more these professors will perceive that student motivation increases.

With respect to the use and recommendation of certain tools for transmitting comments and evaluations, a moderate/strong and directly proportional correlation between the use of a certain tool and its recommendation is confirmed at a global level. This is a pattern that is repeated fairly uniformly, for example a moderate and direct correlation is observed between the use of email and its recommendation, and a strong and direct correlation between the use of the discussion forum and its recommendation.

However, the observed results also reflect a strong and directly proportional correlation between needing technological training to improve the way in which comments are transmitted and using social networks and recommending them. Therefore, the more technological training teachers need, the better training they will have to be able to recommend or use social networks to transmit considerations to their students.

In summary, the use of a given tool will establish the degree to which it is recommended, and in the study observed, the ones that have the greatest implication both in terms of frequency of use and the pedagogical connotation they may have are two: the discussion forum and e-mail. A statistically significant, moderate and directly proportional linear correlation is also observed between these two tools.

#### 4. Discussion and conclusions

The studies conducted by Garcés Bustamante et al. (2020) confirm the fact that the feedback transmitted to university students is useful, since it fosters the improvement of learning and «systematic self-regulation» (p. 39). In this sense, the results obtained support this affirmation since it corroborates the fact that the professors carry out this practice with the belief that it is useful, in addition to the fact that it will serve for the students to visualize the achievements obtained, as a result of the pedagogical process contextualized in the university environment and in this case in a virtual learning context.

Its pedagogical sense is basically focused, according to Narváez and Verdezoto (2021), on transmitting to the student that assessment that the teacher makes in order to contribute to the development of a set of receptive skills in the student, in addition to fostering motivation for achievement and autonomy in studies. It is confirmed that professors assume as their own duty, to carry it out and accor-

ding to Espinoza Freire (2021) the center of interest should be in «the cognitive and procedural processes, more than in the attitudinal» (p. 393).

When dealing with studies in a virtual learning context, the accompaniment that can be offered to students becomes a determining factor, since the student may experience a sense of loneliness when encountering an online platform (Sepúlveda-Romero, 2019). Therefore, and as confirmed by Parra Martínez et al. (2022), feedback in the form of comments can favor in addition to the acquisition of knowledge, a substantive improvement in learning and affective factors (Narvárez and Verdezoto (2021) without failing to recognize that a system must be available in the virtual modality as a formative process (Montiel, 2020). It is possible to confirm the hypothesis that professors perform it basically so that students can identify failures and successes for the achievement of learning objectives, which Espinoza Freire (2021, p. 393) calls «feedback focused on the results of the task».

As confirmed by the studies of Montiel (2020), the forum is presented as one of the most used tools when establishing communication in a virtual learning environment. For their part, Veytia Bucheli and Rodríguez (2021) attribute to the discussion forum a sense of interactive and bidirectional communication based on the mediation of the teacher, so that in these two studies the pedagogical sense of the forum is confirmed in terms of its use with didactic intentionality.

However, in the results obtained in this research, it is identified that professors are more inclined to use e-mail as observed in the studies of Veytia Bucheli and Rodríguez (2021), but with a more consultative and doubt-resolving use, while the discussion forum is focused from a pedagogical perspective, i.e., from accompaniment and mediation. This coincides with the results of Avendaño-Castro et al. (2021) regarding the irrelevant use of social networks. This confirms the hypothesis that professors who teach in virtual education use e-mail and the discussion forum as the main tools to transmit their comments and evaluations.

The research conducted by Montiel (2020) states that the technological knowledge of professors will have a positive impact on the use of technological tools, i.e., the more technological training, the greater the variation in the tools used and recommended when transmitting their evaluations. In this

case, there is a notable correspondence between the use and recommendation of e-mail and discussion forum as the main tools, without failing to recognize the value of, for example, an audio or video file to improve the monitoring and accompaniment of students by professors (Andrade and Páez, 2020; Segovia-Chamorro and Guerra-Zúñiga, 2020).

In this sense, by preferentially using and recommending e-mail and the discussion forum, the multidirectional aspect found in both tools is being valued. However, the use of video as a tool for transmitting evaluations and considerations is also being positioned as a recommendation by teachers, as highlighted in the study by Segovia-Chamorro and Guerra-Zúñiga (2020). In this sense, and as future lines of research, several ideas can be identified: 1) the impact of feedback on students under a virtual learning environment, 2) the digital transformation of the University as an institutional policy, 3) teacher training plans and pedagogies of pluripedagogical perspective, 4) studies on the accompaniment of teachers from mentoring, 5) the digitization of teaching practices and 6) the design of e-activities using AI and the improvement of university pedagogical processes.

The implication of the results obtained in this research for the university teaching sphere, allows inferring that it is not enough for teachers to be specialists in their areas or fields of study, so they need to advance in terms of digital culture, leaving behind the initial digital literacy. In other words, the only way to take advantage of technological tools for the improvement of the pedagogical experience at the university is to have the willingness to discover, learn, unlearn and create. In this sense, it becomes more than imperative the need not only to promote curricular and didactic university training, but it must be done from the current context and with an authentic institutional policy that ensures the follow-up, monitoring and continuity of what is expected to be learned in teacher training for and towards the university. The weight of tradition, the teaching references of the past and the resistance to anything related to technology results in the continued use of a certain digital platform as a repository of files and activities, without the greatest didactic use.

In addition, the terms used in some training plans aimed at this educational sector can lead to disinterest and an attitude of forced compliance in certain activities with elements that are not very useful

or not very understandable and applicable to everyday teaching. In short, it is important that professors do not lose the willingness to continue learning in order to improve our training, for the benefit of students and our own personal and professional fulfillment.

Feedback must always ensure that the student can understand the meaning of what he/she is learning. At the same time, the professor can rely on a set of technological tools that, ultimately, will allow him/her to live new experiences. All this from a teaching practice with true vocation, understood as a privileged starting point to, if necessary, take the first step towards a great change at the university.

## References

- Andrade, R. & Páez, M. (2021). El podcast como herramienta de retroalimentación en la evaluación de actividades virtuales. *Mendive. Revista de Educación*, 19(1), 16-29. <https://bit.ly/3FxyZgo>
- Avendaño-Castro, W. R., Hernández-Suárez, C. & Prada-Núñez, R. (2021). El docente universitario ante la emergencia educativa. Adaptación a las TIC en los procesos de enseñanza. *Educación y Humanismo*, 23(41), 27-46. <https://doi.org/10.17081/eduhum.23.41.4354>
- Bañuelos, A. & Montero, G. (2017). La evaluación de la educación a distancia. Propuesta de una guía para la autoevaluación. *Hamut' ay*, 4(1), 31-44. <https://bit.ly/3SXs2x0>
- Cajamarca-Correa, M., Cangas-Cadena, A., Sánchez-Simbaña, S. & Pérez-Guillermo, A. (2024). Nuevas tendencias en el uso de recursos y herramientas de la Tecnología Educativa para la Educación Universitaria. *Journal of Economic and Social Science Research*, 4(3), 127-150. <https://doi.org/10.55813/gaea/jessr/v4/n3/124>
- Contreras-Bravo, L., Tarazona-Bermúdez, G. & Rodríguez-Molano, J. (2021). Tecnología y analítica del aprendizaje: una revisión a la literatura. *Revista científica*, (41), 150-168. <https://doi.org/10.14483/23448350.17547>
- Crespo Miguel, M. & Sánchez-Saus Laserna, M. (2020). Píldoras formativas para la mejora educativa universitaria: el caso del Trabajo de Fin de Grado en el Grado de Lingüística y Lenguas Aplicadas de la Universidad de Cádiz. *Education in the Knowledge Society (EKS)*, (21), 1-10. <https://doi.org/10.14201/eks.22370>
- De Souza, O., & Rocha, B. (2025). Ontología del presente del ser maestro y ciberformación en docencia universitaria. *Alteridad*, 20(1), 99-112. <https://doi.org/10.17163/alt.v20n1.2025.08>
- Espinoza Freire, E. (2021). Importancia de la retroalimentación formativa en el proceso de enseñanza-aprendizaje. *Revista Universidad y Sociedad*, 13(4), 389-397. <https://bit.ly/4mSYZbQ>
- Ferrada-Bustamante, V., González-Oro, N., Ibarra-Caroca, M., Ried-Donaire, A., Vergara-Correa, D. & Castillo-Retamal, F. (2021). Formación docente en TIC y su evidencia en tiempos de COVID-19. *Revista saberes educativos*, (6), 144-168. <https://doi.org/10.5354/2452-5014.2021.60715>
- Garcés Bustamante, J., Labra Godoy, P. & Vega Guerrero, L. (2020). Retroalimentación: una estrategia reflexiva sobre el proceso de Aprendizaje en cursos renovados de Educación Superior. *Cuadernos de Investigación Educativa*, 11 (1), 37-59. <https://dx.doi.org/10.18861/cied.2020.11.1.2942>
- García-Peñalvo, F. J. (2018). Ecosistemas tecnológicos universitarios. En J. Gómez (ed.), *UNIVERSITIC 2017. Análisis de las TIC en las Universidades Españolas* (pp. 164-170). Crue Universidades Españolas. <https://bit.ly/44XpSEZ>
- García Peñalvo, F. J. (2021). Transformación digital en las universidades: Implicaciones de la pandemia de la COVID-19. *Education in the knowledge society: EKS*, (22), 1-6. <https://doi.org/10.14201/eks.25465|e25465>
- García Peñalvo, F. J. & Corell, A. (2020). La COVID-19: ¿enzima de la transformación digital de la docencia o reflejo de una crisis metodológica y competencial en la educación superior? *Campus Virtuales*, 9(2), 83-98. <https://bit.ly/3SuzSht>
- García, J., Farfán, J., Fuertes, L. & Montellanos, A. (2021). Evaluación formativa: un reto para el docente en la educación a distancia. *Delectus*, 4(2), 45-54. <https://doi.org/10.36996/delectus.v4i2.130>
- González, C. (2023). El impacto de la inteligencia artificial en la educación: transformación de la forma de enseñar y de aprender. *Revista Currículum*, 36, 51-60. <https://doi.org/10.25145/j.qurricul.2023.36.03>
- Hernández, J., Espinosa, F., Rodríguez, J., Chacón, J., Toloza, C., Arenas, M., Carrillo, S. & Bermúdez, V. (2018). Sobre el uso adecuado del coeficiente de correlación de Pearson: definición, propiedades y suposiciones. *Archivos venezolanos de Farmacología y Terapéutica*, 37(5), 587-595. <https://bit.ly/3HgkoeW>
- Huber, G., Gürtler, L. & Gento, S. (2018). La aportación de la estadística exploratoria al análisis de datos cualitativos. *Perspectiva Educativa*, 57(1), 50-69.




- <https://dx.doi.org/10.4151/07189729-vol.57-iss.1-art.611>
- Lafuente, C. & Marín, A. (2008). Metodologías de la investigación en las ciencias sociales: Fases, fuentes y selección de técnicas. *Revista Escuela de Administración de Negocios*, (64), 5-18. <https://bit.ly/43jqDXE>
- León-Warthon, M. (2021). Evaluación formativa: el papel de retroalimentación en el desarrollo del pensamiento crítico. *Maestro y Sociedad*, 18(2), 563-571. <https://bit.ly/43lw4VZ>
- Li, S., Chen, G., Xing, W., Zheng, J. & Xie, C. (2020). Longitudinal clustering of students' self-regulated learning behaviors in engineering design. *Computers & Education*, 153, 103899. <https://doi.org/10.1016/j.compedu.2020.103899>
- Lonn, S., Aguilar, S. & Teasley, S. (2015). Investigating student motivation in the context of a learning analytics intervention during a summer bridge program. *Computers in Human Behavior*, 47, 90-97. <https://doi.org/10.1016/j.chb.2014.07.013>
- López, Y., López, R., Lasluisa, L., Vaca, J. & Huachi, M. (2024). La Inteligencia Artificial y la Educación en el Siglo XXI: Un análisis de sus oportunidades y desafíos. *Polo del Conocimiento*, 9(8), 275-287. <https://doi.org/10.23857/pc.v9i8.7693>
- Menacho, R., Pizarro, L., Osorio, J., Osorio, J. & León, B. (2024). Inteligencia artificial como herramienta en el aprendizaje autónomo de los estudiantes de educación superior. *Revista InveCom*, 4(2), 1-10. <https://doi.org/10.5281/zenodo.10693945>
- Mollo, M. & Deroncele, A. (2022). Modelo de retroalimentación formativa integrada. *Universidad y Sociedad*, 14(1), 391-401. <https://bit.ly/4dZ9RRv>
- Montiel, C. (2020). Conocimiento, práctica y uso de las TIC para el ambiente educacional en red. *Revista Paraguaya de Educación A Distancia (Reped)*, 1(2), 42-52. <https://n9.cl/0ltpp>
- Moreno-Olivos, T. (2021). Cambiar la evaluación: un imperativo en tiempos de incertidumbre. *Alteridad. Revista de educación*, 16(2), 223-234. <https://doi.org/10.17163/alt.v16n2.2021.05>
- Narváez, C. & Verdezoto, M. (2021). Percepción estudiantil de la importancia de la retroalimentación. *Revista Vínculos ESPE*, 6(2), 45-55. <https://doi.org/10.24133/vinculosespe.v6i2.1833>
- Norman-Acevedo, E. (2023). La inteligencia artificial en la educación: una herramienta valiosa para los tutores virtuales universitarios y profesores universitarios. *Panorama*, 17(32), 1-9. <https://bit.ly/4kHwBr8>
- Parra Martínez, B., Orejarena, H. & Acosta, H. (2022). Retroalimentación docente universitaria: una práctica de autorregulación del aprendizaje. *Inclusión y Desarrollo*, 9(1), 24-36. <https://bit.ly/4dASvKc>
- Rivero Panaqué, C. & Beltrán Castañón, C. (2024). La inteligencia artificial en la educación del siglo XXI: avances, desafíos y oportunidades Presentación. *Educación*, 33(64), 5-7. <http://dx.doi.org/10.18800/educacion.202401.p001>
- Rositas Martínez, J. (2014). Los tamaños de las muestras en encuestas de las ciencias sociales y su repercusión en la generación del conocimiento. *Innovaciones de negocios*, 11(22), 235-268. <https://bit.ly/3FpdbZb>
- Sánchez Prieto, J., Olmos Migueláñez, S. & García-Peñalvo, F. (2017). ¿Utilizarán los futuros docentes las tecnologías móviles? Validación de una propuesta de modelo TAM extendido. *Revista de Educación a Distancia (RED)*, (52), 1-31. <https://bit.ly/4kpre0a>
- Segovia-Chamorro, J. & Guerra-Zúñiga, M. (2020). Percepción estudiantil del uso del video como herramienta de retroalimentación a distancia: estudio piloto. *FEM: Revista de la Fundación Educación Médica*, 23(1), 35-37. <https://bit.ly/3HjObD8>
- Sepúlveda-Romero, M. E. (2019). Humanización del acto de la retroalimentación en la educación virtual. *Virtu@lmente*, 7(1), 95-115. <https://doi.org/10.21158/2357514x.v7.n1.2019.2326>
- Tanevitch, A., Abal, A., Pérez, P., González, A. & Procopio, M. (2021). Decisiones metodológicas para la continuidad pedagógica en pandemia COVID-19. *Revista Iberoamericana de Tecnología en Educación y Educación en Tecnología*, (28), 184-191. <https://bit.ly/43iflwo>
- Toledo Lara, G. (2021). Pedagogías emergentes: una aproximación exploratoria. *Revista APOSTA*, 91, 98-113. <https://bit.ly/3Hz3vvC>
- Toledo Lara, G. (2024). Inteligencia artificial: entre la innovación y el cambio de paradigma en la universidad. *RECIE. Revista Caribeña De Investigación Educativa*, 8(2), 27-46. <https://doi.org/10.32541/recie.v8i2.718>
- Trejo, J. (2021). La retroalimentación oral o escrita para mejorar la producción escrita en la universidad. *Educación*, 27(1), 79-83. <https://doi.org/10.33539/educacion.2021.v27n1.2366>
- Valdivia, S. (2014). Retroalimentación efectiva en la enseñanza universitaria. *En Blanco y Negro*, 5(2), 20-24. <https://bit.ly/45k68M3>

- Valencia, A. & Figueroa, R. (2023). Incidencia de la Inteligencia Artificial en la educación. *Educatio Siglo XXI*, 41(3), 235-264. <https://doi.org/10.6018/educatio.555681>
- Veytia Bucheli, M., & Rodríguez Serrano, K. (2021). La retroalimentación efectiva en estudiantes desde la perspectiva de los docentes. *Transdigital*, 2(4), 1-22 <https://doi.org/10.56162/transdigital63>
- Wong, J., Khalil, M., Baars, M., de Koning, B. & Paas, F. (2019). Exploring sequences of learner activities in relation to self-regulated learning in a massive open online course. *Computers & Education*, 140, 103595. <https://doi.org/10.1016/j.compedu.2019.103595>



# Formative assessment strategies. Basic education teachers' perception

## *Estrategias de evaluación formativa. Percepción del profesorado de educación básica*

-  **Maite Zubillaga-Olague** is a research professor in Training at Universidad Autónoma de Madrid (España) (maite.zubillaga@uam.es) (<https://orcid.org/0000-0003-0924-1583>)
-  **Dra. Laura Cañadas** is a permanent lecturer at Universidad Autónoma de Madrid (España) (laura.cannadas@uam.es) (<https://orcid.org/0000-0003-4179-9018>)
-  **Dr. Jesús Manso** is a full time professor at Universidad Autónoma de Madrid (España) (jesus.manso@uam.es) (<https://orcid.org/0000-0003-1557-3242>)

**Received:** 2025-03-26 / **Revised:** 2025-06-08 / **Accepted:** 2025-06-11 / **Published:** 2025-07-01

### Abstract

Formative assessment is a key component of the teaching-learning process, as it allows us to adjust teaching practice according to the needs of students and to promote meaningful learning. Its research takes on special relevance due to the strong pedagogical influence it exerts on the optimization of educational quality. For this reason, it is necessary to know the teachers' perception of the degree of application of certain strategies. Thus, this research seeks: (i) to know the perception of basic education teachers on the frequency with which they develop different strategies linked to formative assessment in the classroom; and (ii) to analyze whether there are differences in the frequency of use of these strategies according to gender, educational stage in which they teach, years of teaching experience, training received in assessment, number of training activities carried out and knowledge of the term formative assessment. A cross-sectional, comparative, quantitative research was carried out with 713 basic education teachers. The items on the use of strategies linked to formative assessment from the #EvalFormEPESO questionnaire were used. Differences between the variables studied were analyzed using Student's t-tests and ANOVA. The results show that the use of the strategies analyzed is above the mean values of the scale. Moreover, statistically significant differences appear depending on the variables studied, which show that these are influential in the degree of use of these strategies. The conclusion is that there is a need to strengthen teacher training and promote inclusive practices for a coherent and equitable application of formative assessment in basic education.

**Keywords:** formative assessment, strategies, primary school, secondary education, basic education, teachers.

### Resumen

La evaluación formativa es un componente clave del proceso de enseñanza-aprendizaje, ya que permite ajustar la práctica docente en función de las necesidades del alumnado y fomentar aprendizajes significativos. Su investigación adquiere especial relevancia por la fuerte influencia pedagógica que ejerce en la optimización de la calidad educativa. Por ello, es necesario conocer la percepción que tiene el profesorado sobre el grado de aplicación de determinadas estrategias. Así, esta investigación busca: (i) conocer la percepción del profesorado de educación básica sobre la frecuencia con la que desarrollan diferentes estrategias vinculadas a la evaluación formativa en el aula; y (ii) analizar si existen diferencias en la frecuencia de uso de estas estrategias en función del género, etapa educativa, en la que desarrollan su docencia, años de experiencia docente, formación recibida en evaluación, número de actividades formativas realizadas y conocimiento del término evaluación formativa. Se desarrolló una investigación cuantitativa, comparativa y de corte transversal con 713 docentes de educación básica. Se usaron los ítems sobre el empleo de estrategias vinculadas a la evaluación formativa del cuestionario #EvalFormEPESO. Las diferencias existentes entre las variables estudiadas se analizaron con las pruebas T- de Student y ANOVA. Los resultados muestran que el empleo de las estrategias analizadas está por encima de los valores medios de la escala. Además, aparecen diferencias estadísticamente significativas en función de las variables estudiadas lo que muestra que estas son influyentes en el grado de empleo de dichas estrategias. Se concluye en la necesidad de fortalecer la formación docente y fomentar prácticas integradoras para una aplicación coherente y equitativa de la evaluación formativa en educación básica.

**Palabras clave:** evaluación formativa, estrategias, educación primaria, educación secundaria, educación básica, profesorado.

**Suggested citation (APA):** Zubillaga-Olague, M., Cañadas L. & Manso, J. (2025). Formative assessment strategies. Basic education teachers' perception. *Alteridad*, 20(2), 250-262. <https://doi.org/10.17163/alt.v20n2.2025.08>

## 1. Introduction

The Spanish educational system has faced several changes in recent years, among which is the rupture with traditional assessment processes focused on student grades (Sanmartí, 2023; Santos-Calero et al., 2024; Santos-Guerra, 2003). Thus, alternatives are sought on assessment as a tool for improving the teaching-learning process that allows students to learn more and teachers to optimize their teaching (Álvarez-Méndez, 2011; Anijovich, 2017; Berisha et al., 2024; Santos-Guerra, 2003). Numerous studies have shown the benefits of integrating formative assessment processes in the classroom, highlighting their ability to promote the comprehensive development of students (Casanova, 2021; Sanmartí, 2023). The use of formative assessment processes should be carried out through systematic and rigorous practices that facilitate the achievement of these benefits (Álvarez-Méndez, 2011; Cai et al., 2022). Thus, five key strategies have been proposed in the literature to implement formative assessment processes (William and Leahy, 2015): (1) sharing and understanding the learning objectives and assessment criteria with students; (2) conducting class discussions, questions and tasks that allow evidence learning; (3) giving feedback to students that allows them advance in their learning; (4) involve students in the assessment of their own learning; and (5) involve students in the process of assessing the learning of their peers. The first three are the ones that according to previous research teachers use most frequently (Chazi-Nacimba et al., 2024; Kaur, 2022; Kruiper et al., 2022), although their use in education is still scarce or not carried out correctly (Álvarez-Méndez, 2011; Andersson and Palm, 2018; Chazi-Nacimba et al., 2024; Dayal, 2021; Enu, 2021; Jawad, 2020; Yan et al., 2022).

Regarding the first strategy, although teachers tend to communicate and make explicit what they are going to work on and what are the expected achievements (Chazi-Nacimba et al., 2024; Grob et al., 2019; Zubillaga-Olague & Cañadas, 2021), they generally focus on numbering the objectives to be achieved without ensuring whether they have been understood by the students (Van der Linden et al., 2023). In the case of teachers of Secondary Education (ESO), this strategy is even related with sharing with students the percentage given to the

different tasks to be performed (Sanmartí, 2023). An even less common practice is the involvement of students in the construction of objectives and assessment criteria (Cañadas, 2023; Sanmartí, 2023). Regarding the second strategy, the formative activities and questions developed should be aligned with the objectives and assessment criteria (Kaur, 2022) and encourage critical thinking and student participation (Van der Linden et al., 2023). However, when this strategy is used, teachers generally formulate questions with traditional approaches (Casanova, 2021; Goertzen et al., 2023; Sanmartí, 2023; Yan et al., 2022). Finally, regarding the third of the strategies, feedback, teachers should provide feedback on student performance, providing specific details on what to do next to help them identify the steps needed to improve (Anijovich, 2017; Kruiper et al., 2022; Moreno, 2023).

However, these practices normally present as check marks (e.g., crosses, ticks) or comments (e.g., good job, well done, keep it up), with few teachers indicating aspects to improve and how to do so. This fact gets worse as the educational level increases due to the relevance acquired by the assessment of the degree of acquisition of academic content, investing most of the time in its assessment and leaving aside feedback (Krupier et al., 2022; Moreno, 2023). This is complemented by the obligation to establish grades, which means that although these come with a brief comment, they are not given importance since the grade acquires greater value for students and their families (Grob et al., 2019; Sanmartí, 2023). In Primary Education (PE), although there is an attempt to use qualitative grades to mitigate the impact of this process, few teachers report knowing practices that allow them to provide effective feedback (Casanova, 2021).

The use of formative assessment processes may not only vary according to the stage of teaching. Other elements such as gender, academic year, years of teaching experience and the training activities may be influencing how these strategies are applied (Alkharusi, 2011; Cañadas & Santos-Pastor, 2021; Yan et al., 2022). In addition, the literature identifies several specific causes that condition the implementation of these processes in the classroom. These are related, on the one hand, to contextual factors such as external and center policies (e.g., educational reforms or the cultural burden associated with

exams as a method of assessment) or work-related conditions (e.g., lack of time, high ratio) (Dayal, 2021; Sanmartí, 2023; Zubillaga-Olague et al., 2025a; Zubillaga-Olague et al., 2025b) and, on the other hand, with those derived from personal factors such as lack of training and literacy in assessment, an aspect that influences the perceived self-efficacy to apply these processes (Santos-Calero et al., 2024; Yan et al., 2022; Zubillaga-Olague et al., 2025b).

Regarding the latter, personal factors, the training received by teachers should provide them with the knowledge, skills and abilities necessary to design appropriate formative assessment tasks, promote changes in their beliefs and adapt their teaching to the needs of students (Molina and López-Pastor, 2019). Teachers can receive training in assessment through the contents that are part of initial and in-service training. Cai et al. (2022) and Andersson and Palm (2018) consider that teachers are more likely to develop these practices when they know what is involved in the term formative assessment and the strategies linked to it. However, in many cases, initial training does not include specific subjects on assessment training. When this happens, the responsibility for acquiring this knowledge falls on teachers and schools through ongoing training (Andersson & Palm, 2018; Chazi-Nacimba et al., 2024; Enu, 2021). However, such training depends on the autonomy of the center and the willingness of teachers to take these activities, which does not guarantee that the necessary strategies are acquired to implement quality formative assessment in the classroom (Sanmartí, 2023). Therefore, it is necessary to know the most and least used assessment strategies, as well as the variables that may be influencing their implementation. To this end, the following research objectives are proposed: (i) to know the perception of elementary teachers on the frequency they develop different strategies linked to formative assessment in the classroom; and (ii) to analyze whether there are differences in the frequency of use of these strategies according to gender, educational stage in which they teach, years of teaching experience, training received in assessment, number of training activities carried out and knowledge of the term formative assessment.

## 2. Method

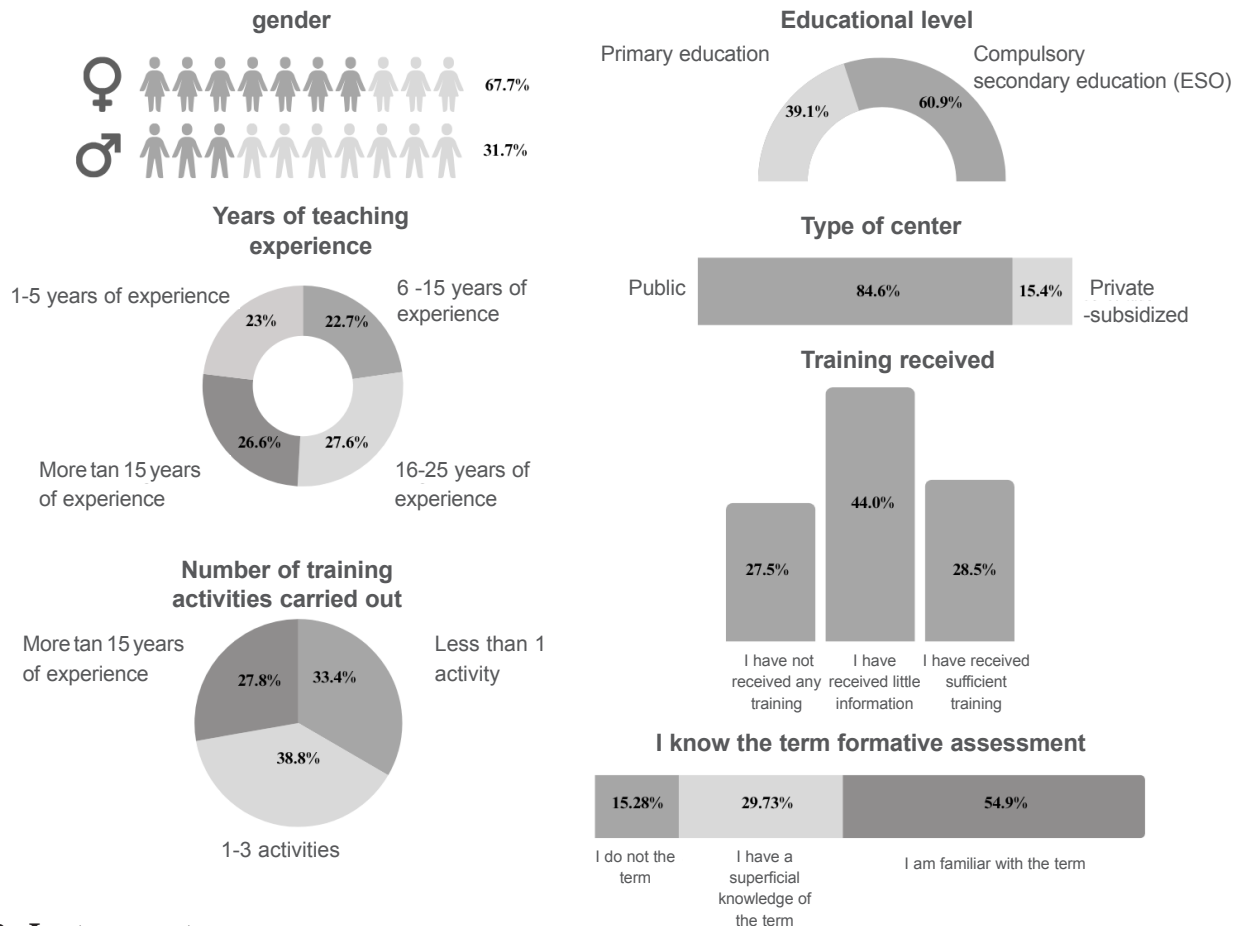
### 2.1 Study design

Quantitative, comparative, cross-sectional research was conducted.

### 2.2 Participants

A total of 713 Spanish PE (39.1%) and ESO (60.9%) teachers with a mean of 11.32 (SD  $\pm$  11.00) years of teaching experience participated in this study. Incident, random and non-probabilistic sampling was used to select the participants. The characteristics of the participants can be seen in Figure 1. To configure the variables related to the knowledge of the term «formative evaluation» and training received, the responses to the questions «Do you know the term «formative evaluation?» and «Have you received training in formative evaluation?» were grouped. With respect to the first question, the responses were classified into three different categories, represented as follows: (1) I know the term well; (2) I know the term superficially, which grouped the responses «I know the term, although I have doubts about what it refers to» and «I have heard it, but I do not know very well what it refers to», due to its similarity, and (3) I do not know the term. Regarding the training, the responses were organized into three different categories: (1) I have not received training, which includes cases in which no training of any kind has been received; (2) I have received little training, which brings together the responses «yes, I have received some training» and «yes, I have received little training», which represents cases in which, although training has been received, it is considered insufficient, as distinguished from no training at all and, finally, (3) I have received sufficient training, which integrates the responses «yes, I have received enough training» «yes, I have received some training» and, «yes, I have received a lot of training». This classification is based on the premise that the responses «some», «enough» and «sufficient» reflect a perception of adequate training.

**Figura 1.** Relationship of the items to the five key strategies



### 2.3 Instruments

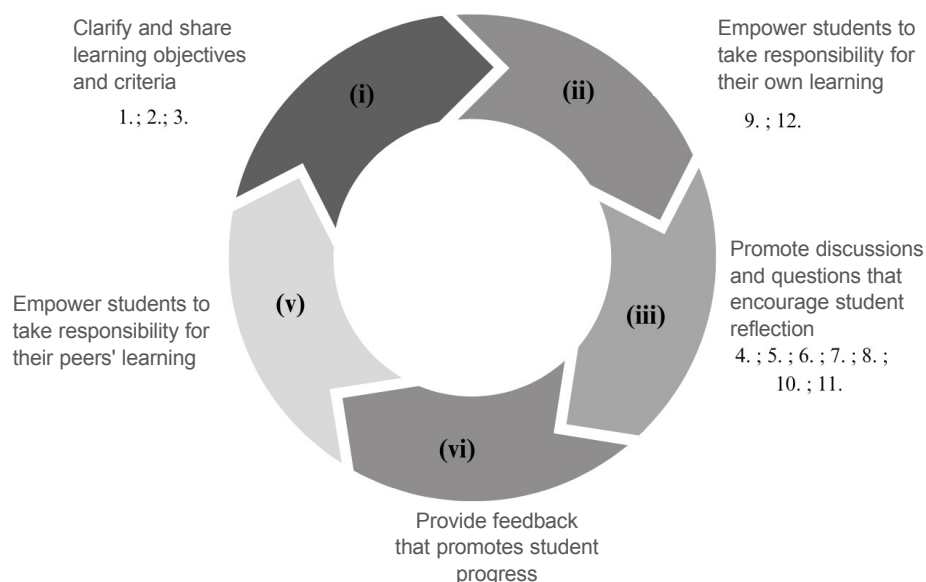
To collect information, an ad hoc questionnaire was used on “Formative Assessment Processes in Basic Education #EvalFormEPESO.” It is composed of 50 items divided into six dimensions with closed-ended Likert-type responses, offering six levels of response (1 - never to 6 - always). The scale underwent content validation by a panel of judges (6 experts in the field of formative assessment). In addition, the reliability of the questionnaire was

tested, obtaining an  $\alpha = .873$  for the overall scale. For this research, the items corresponding to dimension five - Feedback, monitoring and improvement of the student teaching-learning process (Table 1) were taken into account exclusively because of their direct relationship with the first three strategies of formative evaluation processes presented in the literature (Wiliam and Leahy, 2015). Figure 2 illustrates the relationship of the items with the formative assessment strategies.

**Table 1.** Dimensions analyzed and items included for each dimension

Items analyzed	
1.	I share with my students the evaluation objectives at the beginning of the course.
2.	I offer my student the opportunity to negotiate elements of the subject evaluation system or assignments.
3.	I share with my students the evaluation criteria at the beginning or during the course.
4.	After each period or formative task I reflect with my students individually on their progress.
5.	I inform my students of what they have done well after conducting an assessment.
6.	I make sure that my students know which aspects (areas, contents, behaviors, etc.) they need to work on to improve their learning process.
7.	I offer my students observations and evaluations (orally or in writing and individually or collectively) on the tasks so that they can repeat them with the aim of improving them.
8.	I review my students' assignments daily and provide feedback (not accompanied by a grade) when they work on an assignment or activity.
9.	I help my students to find the correct answer through other questions or strategies that guide them to the solution when it is not adequate.
10.	I provide feedback to students to enable them to develop learning strategies to apply and improve in future assignments.
11.	I provide guidelines to help students evaluate their work and the work of others.
12.	I practice collective reflection dynamics with my students on the work done and its progress.

**Figure 2.** Relationship of the items to the five key strategies



## 2.4 Procedure

All Spanish educational centers that had this information available on their websites were included. After the questionnaire was validated, it was transcribed to the platform and sent via email to the educational centers. The email requested the participation of all teaching staff at the center to complete the questionnaire. In accordance with the ethical principles of research (2010), an information sheet and informed consent form were attached to the email. Furthermore, this research was approved by

the Ethics Committee of the Autonomous University of Madrid (CEI-126-2604)

## 2.5 Statistical analysis

Analyses were carried out using the SPSS statistical program (Windows, v.26.00). The level of statistical significance was set at  $\leq .05$ . All variables are presented as Mean (M) and Standard Deviation (SD). To address the second objective, the test for differences according to gender and educational stage was used. The ANOVA test was used to analyze

differences according to: (i) years of teaching experience; (ii) training received; (iii) number of training activities carried out and; (iv) knowledge of the term formative evaluation; applying the test to check for inter-group differences.

### 3. Results

Table 2 shows the descriptions of the evaluation strategies analyzed and the existing differences in these variables according to the teacher's gender. All the items show mean values higher than the

mean value of the scale, with the item «I make sure that my students know which aspects (areas, contents, behaviors, etc.) they need to work on to improve their learning process» ( $5.27 \pm 0.95$ ) being the most highly rated and «I offer students the opportunity to negotiate elements of the subject evaluation system or assignments» ( $3.07 \pm 1.36$ ) being the least rated. Regarding the gender variable, statistically significant differences appear in six of the 12 items (see items 6, 7, 8, 9, 10 and 11 in Table 2), with women reporting higher mean values in all cases.

**Table 2.** Evaluation strategies analyzed. Differences according to gender

N	Total	Gender		P
		Woman	Man	
		713	483	
	M±SD	M±SD	M±SD	
1. I share with my students the evaluation objectives at the beginning of the course.	4.96±1.26	4.97±1.25	4.95±1.26	.830
2. I offer my student the opportunity to negotiate elements of the subject evaluation system or assignments.	3.07±1.36	3.08±1.35	3.05±1.38	.787
3. I share with my students the evaluation criteria at the beginning or during the course.	5.04±1.35	5.00±1.39	5.12±1.29	.265
4. After each period or training task I reflect with my students individually on their progress.	4.35±1.34	4.36±1.35	4.31±1.32	.670
5. I inform my students of what they have done well after performing an assessment.	5.14±1.06	5.16±1.07	5.11±1.04	.517
6. I make sure that my students know which aspects (areas, contents, behaviors, etc.) they need to work on to improve their learning process.	5.27±0.95	5.35±0.90	5.08±1.03	<b>.000**</b>
7. I offer my students observations and evaluations (orally or in writing and individually or collectively) on the tasks so that they can repeat them with the aim of improving them.	5.09±1.05	5.18±0.99	4.88±.16	<b>.000**</b>
8. I review my students' assignments daily and provide feedback (not accompanied by a grade) when they work on an assignment or activity.	4.45±1.29	4.54±1.28	4.25±1.30	<b>.005**</b>
9. I help my students to find the correct answer through other questions or strategies that guide them to the solution when it is not adequate.	4.75±1.32	4.84±1.12	4.58±1.14	<b>.003**</b>
10. I provide feedback to students to help them develop learning strategies to apply and improve in future assignments.	4.80±1.08	4.87±1.05	4.67±1.24	<b>.021*</b>
11. I provide guidelines to help students evaluate their work and the work of others.	4.17±1.33	4.25±1.30	4.00±1.38	<b>.022*</b>
12. I practice collective reflection dynamics with my students on the work done and its progress.	4.07±1.39	4.13±1.38	3.92±1.41	.062

Note. Statistically significant differences in bold: (\*p ≤ .05; \*\*p ≤ .01).

**Table 3.** Assessment strategies analyzed. Differences according to educational stage and teaching experience

N	Stage of education			Teaching experience				P	
	Primary Education	ESO	P	1-5 años	6-15 años	16-25 años	Más de 25 años		
		434		164	162	197	190		
	M±DT	M±DT	M±DT	M±DT	M±DT	M±DT			
1.	I share with my students the evaluation objectives at the beginning of the course	years	6-15	<b>.000**</b>	4.71±1.39 <sup>a</sup>	5.01±1.28	5.10±1.15 <sup>a</sup>	5.01±1.21	.026*
2.	I offer my students the opportunity to negotiate elements of the subject evaluation system or assignments.	years	16-25	.230	3.10±1.41	3.01±1.37	3.11±1.38	3.07±1.29	.905
3.	I share with my students the evaluation criteria at the beginning or during the course.	years		<b>.000**</b>	4.95±1.39	5.13±1.33	5.07±1.35	5.03±1.35	.659
4.	After each period or formative task I reflect with my students individually on their progress.	From	4.35±1.36	.970	4.12±1.35 <sup>a</sup>	4.41±1.34	4.50±1.30 <sup>a</sup>	4.33±1.34	.050*
5.	I inform my students of what they have done well after conducting an assessment.	25	5.18±1.04	.291	4.98±1.19	5.16±1.00	5.27±0.88	5.13±1.12	.064
6.	I make sure that my students know which aspects (areas, contents, behaviors, etc.) they need to work on to improve their learning process.	years	P	.750	5.10±1.06 <sup>a</sup>	5.32±0.91	5.37±0.83 <sup>a</sup>	5.25±0.95	.043*
7.	I offer my students observations and evaluations (orally or writing and individually or collectively) on the tasks so that they can repeat them with the aim of improving them.	5.10±0.99	5.08±1.09	.732	4.91±1.18 <sup>a</sup>	5.21±0.95	5.24±0.91 <sup>a</sup>	4.97±1.14	.004**
8.	I review my students' assignments daily and provide feedback (not accompanied by a grade) when they work on an assignment or activity.	4.71±1.15	4.28±1.35	<b>.000**</b>	4.28±1.29	4.47±1.31	4.50±1.25	4.51±1.32	.309
9.	I help my students to find the correct answer through other questions or strategies that guide them to find the solution when it is not adequate.	4.80±1.09	4.72±1.17	.343	4.68±1.18	4.83±1.13	4.85±1.11	4.63±1.13	.175
10.	I provide feedback to students to help them develop learning strategies to apply and improve in future assignments.	4.84±0.98	4.78±1.14	.429	4.65±1.14 <sup>a</sup>	4.99±1.01 <sup>a</sup>	4.84±1.06	4.73±1.09	.026*
11.	I provide guidelines to help students evaluate their work and the work of others.	4.40±1.19	4.02±1.40	<b>.000**</b>	4.01±1.34	4.16±1.39	4.34±1.21	4.14±1.38	.121
12.	I practice collective reflection dynamics with my students on the work done and its progress.	4.31±1.29	3.91±1.44	<b>.000**</b>	3.76±1.46 <sup>a</sup>	4.06±1.44	4.33±1.25 <sup>a</sup>	4.06±1.40	.002**

<sup>a</sup> 1st difference group.  
<sup>b</sup> 2nd difference group.  
<sup>c</sup> 3rd difference group

Note. In bold the statistically significant differences: (\*p ≤ .05; \*\*p ≤ .01).

Table 3 shows the differences according to the educational level at which the teachers teach and the years of teaching experience. In the case of educational level, there are statistically significant differences in five of the 12 items studied. In the case of items 1 and 3 (see Table 3), both linked to the first formative evaluation strategy (sharing objectives and evaluation criteria with the students), it is the ESO teachers who report higher mean values. In items 8, 11 and 12 (see Table 3), PE teachers report the highest mean values. In relation to teaching experience, there are statistically significant differences in six items. Specifically, in items 1, 4, 6, 7 (see Table 3) there are inter-group differences between teachers with 1-5 years of teaching experience and those with 16-25 years of experience, the latter showing the highest mean values. In item 10, statistically significant differences appear between teachers with 1-5 years of teaching experience and those with 6-15 years of experience, the latter showing the highest mean values. Finally, item 12 shows inter-group differences between teachers with less than five years of experience and those with 16-25 years of teaching experience, the latter showing higher mean values.

Table 4 shows the differences in the perception of use of the evaluation of strategies analyzed as a function of the training received, the training activities carried out by the teaching staff and the degree of knowledge of the term «formative evaluation». In relation to the differences according to the training received in the evaluation, these appear in four of the 12 items. In items 1 and 12 there are differences between the group that claims to have received sufficient training and the other two groups analyzed. In item 2 there are differences between the teachers who say they have not received training and the other two groups. In item 11, differences appear

between all the groups studied. In all cases, teachers who say they have received sufficient training show the highest mean values, followed by the group with little training and by the group who say they have not received training.

Regarding the differences according to the training activities carried out, these appear in five of the 12 items studied. Specifically, differences appear in items 1 and 2 between those who say they have done less than one training activity and those who say they have done more than three; in item 7 between teachers between 1 and 3 training activities and those who say they have done more than 3; in item 11 between the group with less than one training activity and the other two groups analyzed; and in item 12 between teachers with more than three training activities and the other two groups analyzed. In all cases, the teachers with more training activities are those who report higher mean values.

In the case of the degree of knowledge of the term «formative evaluation», statistically significant differences appear in four of the 12 items studied. Items 1 and 2 show differences between the group that claims to know the term well and the group that claims to know it superficially. In item 11, the group of teachers who say they do not know the term is the one that shows statistically significant differences with the other two groups analyzed. Finally, item 12 shows differences between the teachers who say they know the term well and the other two groups. In all cases, the group that claims to know the term «formative assessment» reports the highest mean values, followed by the teachers who claim to know the term superficially, except item 1, in which it is the teachers who claim not to know the term, followed by the teachers who claim to know it well.

**Table 4.** Evaluation of strategies analyzed. Differences according to the training received, the number of training of activities carried out and the knowledge of the term "formative assessment"

	Training received at the evaluation				Activities of the training activities carried out			Knowledge of the term: formative evaluation				
	I have not received it	I have received some	Yes, I have received it	p	Less than 1 y 3 activities	Between 1 y 3 activities	More than 3	p	No I do not know it	I know it term at in a way	I know it well the term	p
N	at the	314	203		238	277	198		109	212	392	
	M±DT	M±DT	M±DT		M±DT	M±DT	M±DT		M±DT	M±DT	M±DT	
1. I share with my students the evaluation objectives at the beginning of the course.	4.96±1.26	4.97±1.25	5.20±1.16 <sup>ab</sup>	<b>.003**</b>	4.76±1.36 <sup>a</sup>	4.99±1.22	5.18±1.16 <sup>a</sup>	<b>.002**</b>	4.92±1.29	4.76±1.36 <sup>a</sup>	5.09±1.19 <sup>a</sup>	<b>.010*</b>
2. I offer my student the opportunity to negotiate elements of the subject evaluation system or assignments.	3.07±1.36	3.08±1.35	3.31±1.38 <sup>b</sup>	<b>.000**</b>	2.84±1.34 <sup>a</sup>	3.08±1.29	3.34±1.43 <sup>a</sup>	<b>.001**</b>	2.89±1.44	2.91±1.27 <sup>a</sup>	3.21±1.38 <sup>a</sup>	<b>.009**</b>
3. I share with my students the evaluation criteria at the beginning or during the course.	5.04±1.35	5.08±1.29	5.16±1.23	.075	4.90±1.50	5.08±1.30	5.16±1.24	.111	5.01±1.42	4.95±1.42	5.10±1.39	.430
4. After each period or training task I reflect with my students individually on their progress.	4.35±1.34	4.25±1.38	4.53±1.22	.051	4.27±1.38	4.29±1.33	4.53±1.27	.085	4.31±1.27	4.31±1.32	4.38±1.36	.820
5. I inform my students of what they have done well after performing an assessment.	5.14±1.06	5.12±1.08	5.15±1.02	.842	5.17±1.05	5.10±1.11	5.17±0.97	.716	5.14±0.98	5.08±1.12	5.18±1.03	.567
6. I make sure that my students know which aspects (areas, contents, behaviors, etc.) they need to work on to improve their learning process.	5.29±0.95	5.20±0.99	5.33±0.88	.280	5.29±0.96	5.18±1.04	5.36±0.80	.099	5.24±0.94	5.20±1.02	5.31±0.93	.375
7. I offer my students observations and evaluations (orally or in writing and individually or collectively) on the tasks so that they can repeat them with the aim of improving them.	5.10±1.09	5.05±1.09	5.13±0.96	.683	5.10±1.08	4.98±1.12 <sup>a</sup>	5.23±0.91 <sup>a</sup>	<b>.040*</b>	5.05±1.11	5.04±1.11	5.13±1.02	.570
8. I review my students' assignments daily and provide feedback (not accompanied by a grade) when they work on an assignment or activity.	4.43±1.36	4.44±1.28	4.47±1.23	.953	4.39±1.33	4.47±1.30	4.48±1.24	.719	4.29±1.36	4.39±1.32	4.52±1.25	.212
9. I help my students to find the correct answer through other questions or strategies that guide them to the solution when it is not adequate.	4.74±1.16	4.68±1.19	4.85±0.99	.262	4.76±1.14	4.73±1.14	4.76±1.13	.909	4.74±1.14	4.74±1.13	4.76±1.14	.987
10. I provide feedback to students to help them develop learning strategies to apply and improve in future assignments.	4.77±1.13	4.78±1.86	4.87±1.03	.593	4.77±1.09	4.75±1.09	4.90±1.05	.293	4.76±1.15	4.73±1.13	4.85±1.04	.349
11. I provide guidelines to help students evaluate their work and the work of others.	3.85±1.45 <sup>ab</sup>	4.18±1.29 <sup>ac</sup>	4.47±1.19 <sup>bc</sup>	<b>.000**</b>	3.90±1.43 <sup>ab</sup>	4.22±1.30 <sup>a</sup>	4.42±1.20 <sup>b</sup>	<b>.000**</b>	3.66±1.45 <sup>ab</sup>	4.09±1.35 <sup>a</sup>	4.35±1.24 <sup>b</sup>	<b>.000**</b>
12. I practice collective reflection dynamics with my students on the work done and its progress.	3.76±1.46 <sup>a</sup>	4.02±1.44 <sup>b</sup>	4.44±1.15 <sup>ab</sup>	<b>.000**</b>	3.86±1.46 <sup>a</sup>	4.00±1.38 <sup>b</sup>	4.40±1.29 <sup>ab</sup>	<b>.000**</b>	3.70±1.52 <sup>a</sup>	3.89±1.40 <sup>b</sup>	4.27±1.32 <sup>ab</sup>	<b>.000**</b>

<sup>a</sup> 1st difference group.  
<sup>b</sup> 2nd difference group.  
<sup>c</sup> 3rd difference group

Note. Statistically significant differences are in bold: (\*p ≤ .05; \*\*p ≤ .01).

#### 4. Discussion

Regarding the first objective of this research, to know the perception of elementary teachers on the frequency they develop different strategies linked to formative evaluation in the classroom, the results show that the most frequently applied strategies are

those related to the feedback process, in line with the findings of Zubillaga-Olague et al. (2025b). In particular, it is important to provide students with clear information on the aspects they need to improve, along with specific guidelines that allow them to review their performance and advance in their learning. However, beyond the frequency of implemen-

tation of these strategies, it is necessary to analyze the purpose for which they are applied. In this framework, several authors (Adbullah-Alotaibi, 2019; Zubillaga-Olague et al., 2025a) warn that although the regulatory potential of assessment is recognized, there is still confusion in teaching practice between the use of feedback for training purposes and its application as a mechanism to certify, periodically, the achievement of what has been learned.

On the other hand, among the least valued strategies is the one that seeks to hand over responsibilities to students. This shows that although there is a high perception on the use of most strategies associated with formative assessment when it comes to strategies that require ceding decisions and tasks to students, there is still reluctance (Berisha et al., 2022; Chazi-Nacimba et al., 2024; Dayal, 2021). In this sense, Grob et al. (2029) determine that teachers face several difficulties in sharing responsibilities with their students, among which stand out the perception of a lack of training of students to reflect on their own learning, the need to guarantee a fair and objective evaluation, as well as the limitations of time and resources to implement this type of practices in a systematic way. These findings allow us to draw a clear picture of the assessment practices that currently prevail in the classroom, helping to identify both the aspects that teachers perceive as more consolidated, as well as those that still require attention.

Regarding the second objective, to analyze whether there are differences in the frequency of use of these strategies according to different factors, approximately 50% of the items analyzed show statistically significant differences. Regarding gender, it is women who stand out for making sure that students are aware of the aspects to be improved, offering students observations and evaluations of the tasks performed, and providing feedback that encourages self-regulation. This could be a consequence of the historical tradition related to female predominance in the teaching profession, which could reflect a correlation between gender, training and disposition towards more pedagogical practices (Alkharusi, 2011). They are also the ones who report asking, to a greater extent, questions that help students find the correct solution. However, asking many questions does not mean that they are of high quality; therefore, it would be necessary to deepen on their purpose (Casanova, 2021). Studies such as that of

Cahzi-Nacimba et al. (2021) have shown that the questions asked by teachers often tend to be limited to routine checks used to review and verify students' understanding, without delving into their ability to reflect or apply what they have learned (Kaur, 2022).

Regarding the educational level, the results show differentiated trends. According to Adbullah-Alotaibi (2019) and Yan et al. (2018), the characteristics of the educational stage, the training, and the level of maturity and motivation of the students may influence the willingness of teachers to develop formative assessment strategies. For example, with regard to sharing assessment objectives with students, this is a practice developed more frequently in ESO. This could be explained by the perception of greater cognitive maturity of students at this stage, which facilitates the understanding of the objectives and their impact on learning (Grob et al., 2019). It is also at this educational stage that the evaluation criteria are most assiduously shared with students, allowing them to know what is expected of them throughout the training period and to be able to self-regulate their learning (Kruiper et al., 2022). However, it would be important to analyze how this practice is developed in the classroom, since, on many occasions, only the value or percentage weight assigned to each task in the final grade is made explicit (Sanmartí, 2023). There are also differences according to this variable in the nature of the feedback provided. As in our study, in those of Goertzen et al. (2023) and Kaur (2022) it is in PE where the preference is for giving feedback without grades.

As these authors point out, this may seek to mitigate the pressure of grades and carry out a more formative evaluation. On the contrary, ESO teachers tend to accompany feedback with grades due to the greater pressure from the educational system, families and students, linked to the cultural burden related to assessment (Sanmartí, 2023) and to the relevance of academic performance as the educational level increases (Enu, 2021; Kruiper et al., 2021). It is also the PE teachers who say that they propose, to a greater extent, guidelines for students to implement collective reflection dynamics to evaluate the work done. This may be due to the fact that, at this stage, the use of collaborative work and group work is more common, which leads to adapting the evaluation to these processes (Kaur, 2022) or to the fact that students remain with the same teacher for long

periods of time, which may encourage these practices (Goertzen et al., 2023).

In relation to differences according to teaching experience, in agreement with our results, Jawad (2020) and Zubillaga-Olague et al. (2025a; 2025b) show that teachers with a long career tend to show greater perceived self-efficacy to promote formative assessment practices and, therefore, are more likely to apply it in their classrooms. In this study, teachers with 6 and 25 years of experience are the ones who report sharing learning objectives with students more frequently and reflecting with their students individually on the formative tasks performed, compared to those with almost no experience. Also, this group of teachers stands out for offering students observations and evaluations on the tasks performed, for making sure that students are aware of the aspects to be improved and for offering feedback that encourages self-regulation, thanks to the knowledge acquired about what works in specific contexts. Practice, accumulated experience and trial and error allow optimizing the implementation of these strategies, and can provide teachers with more knowledge of the students and more tools to give individualized feedback effectively. However, it would be important to analyze how these practices are developed in the classroom and the purpose of the feedback, since it is often focused more on the final result than on the process, which limits its potential for comprehensive development and continuous improvement (Enu, 2021; Goertzen et al., 2023; Yan et al., 2022). In addition, the type of feedback provided should also be considered since no specific indications on how to improve are usually given (Berisha et al., 2024; Kruiper et al., 2022). It is also this group of teachers that stands out for providing individualized feedback. This may be due to the fact that experience accumulated over the years provides them with pedagogical tools and strategies to adapt their methods to the characteristics of the students (Yan et al., 2022).

In terms of training, according to Berisha et al. (2024) and Enu (2021), one of the most common changes made by teachers after participating in professional development activities or programs on assessment is to start clarifying and communicating learning objectives to students at the beginning of each activity or session. Similarly, trained teachers are more aware of the feedback characteristics they

need to provide to their students and, in turn, have a wider range of resources and strategies that facilitate their application in the classroom (Andersson and Palm, 2018; Berisha et al., 2024). Finally, teachers with more training, more experience, and more knowledge of the term «formative assessment» stand out for activating metacognitive strategies more frequently. Greater teaching experience and more specific training in assessment can lead to greater confidence in the ability to manage groups and, therefore, more possibilities to apply strategies that involve the students (Grob et al., 2019). Whereas, less training in these processes may hinder the implementation of strategies that require shared reflection and the establishment of guidelines for self-regulation of learning (Andersson and Palm, 2018).

## 5. Conclusions

This study has shown that elementary teachers indicate a high frequency of using the formative evaluation strategies included in this research. However, there are still areas of improvement, especially in terms of sharing evaluation responsibilities with students. In addition, the variables analyzed in the study are shown to influence the frequency of use of these strategies in the classroom. Particularly, teachers with more experience, those who have received training, as well as those who actively participate in training activities and have a greater knowledge of the concept of formative assessment, perceive that they apply these strategies more frequently in their daily work. This study offers valuable insight into the aspects that require attention to advance the implementation of these strategies and the areas where training should be focused in these processes. The results can serve as a reference for designing more effective teacher training programs aligned with the real needs of teachers.

Among the strengths of this research is the large sample of teachers, as well as the innovation of the research itself, investigating aspects that have not been previously analyzed in depth in basic education contexts. On the other hand, it presents certain limitations inherent to quantitative research, as it is not possible to analyze the reasons that lead teachers to adopt certain practices or to identify the quality of the training received. Also, since the results are based on teachers' self-reported perceptions, the results

could be exposed to response bias. To achieve a deeper and more realistic understanding of the application of these strategies in the classroom and the impact of training on their development, future studies could consider incorporating research methodologies such as observation or interviews. Likewise, among future lines of research, it is necessary to expand research on this topic. On the one hand, analyzing the influence of other sociodemographic variables on the development of these strategies and; on the other hand, expanding the sample within the Spanish context and other international contexts, as well as including the perception of other educational agents such as students.

### Author contributions

Maite Zubillaga-Olague: conceptualization, data curation, formal analysis, funding acquisition, research, methodology, visualization, original draft-writing, writing-revision and editing.

Laura Cañadas: research, supervision, validation, writing-revision and editing.

Jesús Manso: writing-revision and editing.

### References





- Alkharusi, H. (2011). Teachers' classroom assessment skills: influence of gender, subject area, grade level, teaching experience and in-service assessment training. *Journal of Turkish Science Education*, 8(2), 39-48.
- Álvarez-Méndez, J. M. (2011). *Evaluar para conocer, examinar para excluir*. Morata.
- American Psychological Association (2010). *Publication manual of the American Psychological Association*, 6th Ed. American Psychological Association
- Andersson, C. & Palm, T. (2018). Reasons for teachers' successful development of a formative assessment practice thought professional development- a motivation perspective. *Assessment in Education: Principles, Policy & Practice*, 25(6), 576-597. <https://doi.org/10.1080/0969594X.2018.1430685>
- Anijovich, R. (2017). *La evaluación como oportunidad*. Paidós.
- Berisha, F., Vula, E., Gisewhite, R. & McDuffie, H. (2024). The effectiveness and challenges of implementing a formative assessment professional development program. *Teacher Development. An international Journal of Teachers Professional development*, 28(1), 19-43. <https://doi.org/10.1080/13664530.2023.2210533>
- Cai, Y., Yang, M. & Yao, J. (2022). More is not always better: the nonlinear relationship between formative assessment strategies and reading achievement. *Assessment in education, principles, policy & practice*, 29(6), 711-728. <https://doi.org/10.1080/0969594X.2022.2158304>
- Cañadas, L. (2023). Contribution of formative assessment for developing teaching competences in teacher education. *European Journal of Teacher Education*, 46(3), 516-532. <https://doi.org/10.1080/02619768.2021.1950684>
- Cañadas, L. & Santos-Pastor, M. L. (2021). La evaluación formativa desde la perspectiva de docentes novales en las clases de Educación Física en Primaria y Secundaria, *Revista Electrónica Educare*, 25(3), 1-20. <http://doi.org/10.15359/ree.25-3.25>
- Casanova, M<sup>a</sup> A. (2021). La historia interminable: una nueva ley y otra vez a vueltas con la evaluación. *Avances en Supervisión Educativa. Revista de la Asociación de Inspectores de Educación de España*, 36(1), 1-6. <https://doi.org/10.23824/ase.v0i36.737>
- Chazi-Nacimba, F. G., Bastidas-Guerrero, J. D., Del Rocio Hurtado-Mora, M. & Chugchilán-Fauta, M<sup>a</sup> R. (2024). Formative assessment strategies in higher education: impact on the right to education and knowledge retention. *International Journal of Religion*, 11(5), 6662-6675. <https://doi.org/10.61707/6tt06882>
- Dayal, C. (2021). How teachers use formative assessment strategies during teaching: evidence from the classroom. *Australian Journal of Teacher Education*, 56(7), 1-22. <http://dx.doi.org/10.14221/ajte.2021v46n7.1>
- Enu, J. (2021). Factors affecting teacher educators' adoption of formative assessment strategies in the mathematics classroom. *Journal of Education and Learning (EduLearn)*, 15(4), 483-489. <https://doi.org/10.11591/edulearn.v15i4.20341>
- Goertzen, L., Schils, T. & Heeneman, S. (2023). Co-designing formative assessment practices: a collaboration between elementary school teachers and researchers to conceptualize and implement formative assessment as a unified practice. *Teaching and Teacher Education*, 134. <https://doi.org/10.1016/j.tate.2023.104306>
- Grob, R., Holmeier, M. & Labudde, P. (2019). Analyzing formal formative assessment activities in the context of inquiry at primary and upper secondary school in Switzerland. *International Journal of Science Education*, 1-21. <https://doi.org/10.1080/09500693.2019.1663453>

- Jawad, A.H. (2020). Examination of Iraqi teachers' attitudes, intentions, and practices regarding formative assessment. *International Journal of Language Testing*, 10(2), 145-166.
- Kaur, K. (2022). Formative assessment in English language teaching: exploring the enactment practices of teacher within three primary schools in Singapore. *Asia Pacific Journal of Education*, 41(4), 695-710.  
<https://doi.org/10.1080/02188791.2021.1997707>
- Kruiper, S. M., Martijn, J. M., Leenknecht, & Slof, B. (2022). Using scaffolding strategies to improve formative assessment practice in higher education. *Assessment & Evaluation in Higher Education*, 47(3), 458-476.  
<https://doi.org/10.1080/02602938.2021.1927981>
- Molina, M. & López-Pastor, V. (2019). ¿Evaluó cómo me evaluaron en la facultad? Transferencia de la evaluación formativa & compartida vivida durante la formación inicial del profesorado a la práctica como docente. *Revista Iberoamericana de Evaluación Educativa*, 12(1), 85-101.  
<https://doi.org/10.15366/riee2019.12.1.005>
- Moreno, T. (2023). La retroalimentación de la evaluación formativa en educación superior. *Revista Universidad y Sociedad*, 15(2), 685-694.
- Sanmartí, N. (2023). El reto de la participación del alumnado en la evaluación. *Participación educativa*, 77-89.
- Santos-Calero, E., Zubillaga-Olague, M. & Cañadas, L. (2024). Procesos de coevaluación en la formación inicial del profesorado de Educación Física. *Alteridad*, 19(1), 22-33.  
<https://doi.org/10.17163/alt.v19n1.2024.02>
- Santos-Guerra, M. A. (2003). Dime cómo evalúas y te diré qué tipo de profesional eres. *Enfoques Educativos*, 5(1), 69-80. <https://bit.ly/4dYmps5>
- Van der Linden, J., Van der Vleuten, C., Nieuwenhuis, L. & Van Schlit-Mol, T. (2023). Formative use of assessment to foster self-regulated learning: the alignment of teacher conceptions and classroom assessment practices. *Journal of Formative Design in learning*, 7, 195-207.  
<https://doi.org/10.1007/s41686-023-00082-8>
- William, D. & Leahy, S. (2015). *Embedding formative assessment: Practical techniques for K-12 classrooms*. Learning Sciences International.
- Yan, Z., Chiu, M. M. & Cheng, E. C. (2022). Predicting Teachers formative assessment practices: teacher personal and contextual factors. *Teaching and Teacher education*, 114(5), 1-13.  
<https://doi.org/10.1016/j.tate.2022.103718>
- Zubillaga-Olague, M. & Cañadas, L. (2021). Finalidades de los procesos de evaluación y calificación en Educación Física. *Espiral. Cuadernos del Profesorado*, 14(29), 124-135.  
<https://doi.org/10.25115/ecp.v14i29.4398>
- Zubillaga-Olague, M., Cañadas, L. & Manso, J. (2025a). ¿Qué es la evaluación formativa? Conceptualización y grado del conocimiento del profesorado de educación básica. *Revista Española de Pedagogía*, 83(290), 241-257.  
<https://doi.org/10.22550/2174-0909.4154>
- Zubillaga Olague, M., Cañadas, L. & Manso, J. (2025b). Procesos de evaluación formativa en Educación Básica. Una revisión sistemática. *Revista de Educación*, 1.  
<https://doi.org/10.4438/1988-592X-RE-2025-408-678>



## Emancipatory perspective in the evaluative orientations in the Physical Education Curriculum of Chile

### *Perspectiva emancipadora en las orientaciones evaluativas en el currículum de Educación Física en Chile*

-  **Dr. Samuel Pérez-Norambuena** is a lecturer at Universidad del Bío-Bío (Chile) ([sperez@ubiobio.cl](mailto:sperez@ubiobio.cl)) (<https://orcid.org/0000-0002-1710-328X>)
-  **Dra. Marcela Mora-Donoso** is a lecturer at Universidad del Bío-Bío (Chile) ([mamora@ubiobio.cl](mailto:mamora@ubiobio.cl)) (<https://orcid.org/0000-0002-8263-6816>)
-  **Dr. Sebastián Peña-Troncoso** is a lecturer at Universidad Austral de Chile (Chile) ([sebastian.pena@uach.cl](mailto:sebastian.pena@uach.cl)) and visiting professor at Universidad SEK (<https://orcid.org/0000-0002-5438-0868>)
-  **Dr. Francisco Gallardo-Fuentes** is a lecturer at Universidad de los Lagos (Chile) ([fgallardo@ulagos.cl](mailto:fgallardo@ulagos.cl)) (<https://orcid.org/0000-0002-3985-157X>)

**Received:** 2024-11-18 / **Revised:** 2024-12-16 / **Accepted:** 2025-06-06 / **Published:** 2025-07-01

### Abstract

Assessment in Physical Education (PE) continues to be a topic of debate within the discipline, mainly due to the different currents and paradigms around this process. The way in which these approaches are approached will influence the way in which the evaluation processes are systematized. At present, the discipline's hegemony remains focused on evaluations focused on sports performance and physical condition. In this context, this article aims to analyze the presence of the emancipatory perspective in the evaluative orientations of the official curriculum of the subject of Physical Education (PE) in Chile. The research was developed under a qualitative approach, using documentary analysis as a technique for collecting information through various texts issued by the Ministry of Education of Chile (MINEDUC). The findings show a central tension in the PE curriculum: while the learning objectives by level are mostly associated with a technical approach that perpetuates a traditional logic focused on the measurement of observable aspects, the evaluative orientations propose greater student participation and encourage the use of various assessment instruments. This incongruity distances PE from its pedagogical function and its social meaning.

**Keywords:** assessment, curriculum, physical education, emancipatory, social justice.

### Resumen

La evaluación en Educación Física (EF) continúa siendo un tema de debate dentro de la disciplina, principalmente debido a las distintas corrientes y paradigmas existentes en torno a este proceso. La manera en que se aborden estos enfoques influirá en la forma de sistematizar los procesos evaluativos. En la actualidad, la hegemonía de la disciplina permanece centrada en evaluaciones centradas en el rendimiento deportivo y la condición física. En este contexto, este artículo tiene como objetivo analizar la presencia de la perspectiva emancipadora en las orientaciones evaluativas del currículum oficial de la asignatura de Educación Física (EF) en Chile. La investigación se desarrolló bajo un enfoque cualitativo, utilizando el análisis documental como técnica de recolección de información a través de diversos textos emitidos por el Ministerio de Educación de Chile (MINEDUC). Los hallazgos evidencian una tensión central en el currículum de EF: mientras que los objetivos de aprendizaje por nivel están mayoritariamente asociados a un enfoque técnico que perpetúan una lógica tradicional centrada en la medición de aspectos observables, las orientaciones evaluativas proponen una mayor participación del estudiantado y fomentan el uso de diversos instrumentos de evaluación. En conclusión, esta incongruencia aleja a la EF de su función pedagógica y de su sentido social.

**Palabras clave:** evaluación, currículum, educación física, emancipadora, justicia social.

**Suggested citation (APA):** Pérez-Norambuena, S., Mora-Donoso, M., Peña-Troncoso, S. & Gallardo-Fuentes, F. (2025). Emancipatory perspective in the evaluative orientations in the Physical Education Curriculum of Chile. *Alteridad*, 20(2), 263-276. <https://doi.org/10.17163/alt.v20n2.2025.09>

## 1. Introduction

Traditional pedagogical proposals, focused on teachers, have relegated students to the background, both in the learning and teaching process, as well as in evaluation (Silva & López-Pastor, 2015). On the other hand, proposals far from the technical paradigm have taken small steps, promoting learning spaces, where the pedagogical focus has been shifted to the student, giving him/her a prominent role, which should significantly influence two curricular elements: didactic strategy and evaluation (López-Pastor, 2009).

Assessment in Physical Education (PE) has been, in recent years, a topic that generates reflection, debate and also concern, largely due to the persistence of a logic centered on technical rationality, which makes it difficult to move towards more comprehensive, formative and meaningful models (Peña & Toro, 2022). From this perspective, and relating it to constructivist and humanist formative perspectives, we can state that it is necessary and urgent to understand that evaluating is a matter that goes beyond a measurement of a result and a grade (Brown, 2020) and should not be limited to transmit-verify-register, but also focus on learning (Frossard et al., 2021). Like McArthur (2019) we understand that it is necessary that the evaluative process be seen and perceived as a variable that has numerous scopes, beyond instrumental, personal and social learning since it can emotionally impact people's lives when it is used as a coercive means, and as a space of power and privilege (Leathwood, 2005). However, evaluation can also be considered as a space for co-construction of learning, since it allows different possibilities to foster values associated with emancipation, social justice, equity, respect and collaboration (McArthur, 2019). If we manage to understand these processes with an ethical, political and moral commitment, we will allow learners to be aware of their own learning processes.

However, evaluation in PE has historically been characterized by its technical rationality whose predominant discourse has been that of performance with pedagogical practices that proclaim, in evaluation, the search for motor and physical results that can be evidenced from the observation and execution of students in training, in addition to the development of physical abilities and technical

execution of sports (Beltrán et al., 2020). Generally, standardized instruments are used, field tests with scales where motor skills stand out (Córdoba et al., 2018) and which are applied to all students equally, based on session structures focused on training or simply on entertainment (Pidhajnyj, 2024), leaving aside the incorporation of the pedagogical function in evaluative practices (Blázquez, 2017), and what is even worse, not generating spaces for dialogue in the didactic process, allowing a reductionist vision of evaluation (Cárcamo et al., 2022). In Chile it has been observed that the learning and teaching process is still assumed in a unidirectional way, where the teacher is the one who proposes models, develops procedures, forms and evaluation instruments (Gallardo et al., 2017) and even goes so far as to omit or relegate to the background the dialogue that is the fundamental axis of learning (López, 2019).

These evaluative approaches in the discipline are directly related to the types of school curricula present, which have been characterized by traditionalist technical approaches that seek the final objective and results that must be observable, measurable and quantifiable (Mujica et al., 2022). In recent years and in line with the student-centered approaches, curricular conceptualizations based on critical theory have been impregnated, seeking emancipatory social change and the reduction of inequality and social injustice (Giroux, 1997) that pursue new ways of understanding PE and its social and cultural scope.

In this context, this paper seeks, based on the critical analysis of documents, to analyze the presence of the emancipatory perspective in the evaluative orientations of the official curriculum of the subject of PE in Chile, in order to understand the challenge faced by the school with respect to social justice and the reduction of social inequalities from its formative perspective (Reinaga & Alcívar, 2024).

### 1.1 Pedagogy and Critical Physical Education

To speak of critical pedagogy according to (Giroux, 2003), is to speak of a construction mediated by subjectivity, and, in addition to the knowledge of the discipline, political and cultural interests influence, as Freire (2005) maintains, when he states that the student must be recognized as a historical-cultural subject and the acquisition of knowledge is one of

the consequences of social interaction, highlighting customs, culture and context (McLaren, 1984, p. 267).

The critical theory came to unveil in both education and PE our naive look on the educational phenomenon, which was granted until then powers for development, progress, mobility and social equality, however, these were questioned and challenged (Coleman et al., 1966; Bourdieu & Passeron, 1969; Casassus, 2003). On the strictly pedagogical field, it had the delicacy to discomfort and show the distortions of the educational act, and the need for modification of traditional pedagogical models (Atienza et al., 2018) which have contributed to invisibilize social issues, since it has been pursued mainly to place the focus on the pedagogical technical, and to neglect social issues and educational purposes (Feldman & Diuk, 2021).

Critical PE considers the propagation of projects and experiences close to critical perspectives (López-Pastor, 2012) pursues the intimate desire, explicit of a more just and equitable society, which is committed to social change, from the close relationship between education and society (Mc Arthur, 2018). To achieve this, it seeks to approach through criticism to notions that have been off the disciplinary radar such as power, hegemony, justice, domi-

nant culture, among other topics. This includes other ways of understanding education and the social subject, seeking to form a critical subject, beyond the technical and reproductive (Barbosa de Lima, 2023).

If we talk about critical research in PE, we must go back to critical works on traditional practices (Bracht, 1992; Evans 1998), emancipatory action research (Tinning, 1988), gender and equity (Griffin, 1985). The trajectory has been characterized by contributions from poststructuralist perspectives for the approach to the challenges of PE (Carlos Martins, 2023), the approach to classes (Wright, 2000) and PE and sport (Azzarito et al., 2014). However, this strong development of transformative and critical perspectives in PE has been questioned from Latin America as it presents a strong Eurocentric component that limits critical principles and social transformation (Moreno & Almeida, 2021).

Based on the disciplinary crisis associated with PE, cultural materialism and the healthy approach, we have sought to systematize some critical approaches to PE in Latin America, which basically question the technical rationality and its orientation towards health that has characterized it. The following table presents some critical approaches that have sought to rethink PE in our region and to glimpse its purpose.

**Table 1.** *Critical Approaches to PE in South America*

Approach	Authors	Problematizing look
Body Culture	Neira and Masella (2023); Pérez and Linzmayer, (2013); Escobar, (2021).	Discuss PE from a critical and multicultural perspective with respect to the school curriculum and the pedagogical political project of each school. It presents arguments for an intervention in the area.
Gender stereotypes and PE	Chihuailaf et al. (2024); Chihuailaf et al. (2022).	Challenging sexist practices in PE and sport.
Human movement and modernity	Souza (2017).	Understanding modernity within its new social dynamics. The body in this social space.
Criticism of the scientific view of PE	Eusse et al. (2017).	Critique of the dominant scientific paradigm of modernity and its approach to the field of humanities.
Criticism of Eurocentrism in critical PE	Moreno-Doña et al. (2018); Páez et al. (2019).	Questioning of critical principles and social transformation emanating from the Eurocentric vision.
Activist pedagogy	Rezer and Cunha (2019)	Questioning the modern view of the domination of nature and its implications for the discipline.
Learning and Service	Carter and Gallardo, (2021); Pérez et al. (2021)	Relationship of students with society that allows experiential learning that pursues social benefit.
Physical education and values	Pérez (2023); Pérez et al. (2023).	Relates PE to inclusive, moral and social values.
Interculturality	Carter-Thuillier et al. (2021); Carter-Thuillier et al. (2022).	Cultural potential of the PE and experiences that seek the development of spaces that call for multiculturalism.
Human Motricity	Toro (2007); Toro et al. (2021).	Human motricity as the central axis of the discipline "Physical Education".

## 1.2 Emancipatory evaluative processes for social justice

The evaluative processes from an emancipatory perspective for social justice are ascribed to critical pedagogy, which proposes to analyze and understand the nature and dynamics of the relationships that develop in the classroom. Its objective is to foster an education that invites problematization, allowing individuals to reflect critically on the way they perceive the world, both in their context and in their interaction with it (Murillo & Hidalgo, 2015). In this epistemological aspect of evaluation, teachers favor communicative action materializing through analysis, understanding and development of evaluative practices in real contexts, recognizing their complexity and aiming at an emancipatory intervention (Martínez, 2020).

As Ramírez (2008) points out, knowledge is a source of liberation where social participation, horizontal communication, humanization and contextualization of educational processes, and transformation of social reality come together (p. 109). Thus, it is essential to establish evaluation processes that allow building relationships and links based on the characteristics and differences that shape both the personal and social identity of educators and students. In education, teaching only occurs in interaction with learning (Freire & Faúndez, 2013). A good teacher continuously learns with each course he or she guides, but this learning is rarely considered an explicit goal of the educational process. Similarly, what a student contributes or teaches, both to his/her peers and to the teacher, is often absent in the planning and management of the course, despite its relevance in teacher education. In addition, student evaluations of the course and the teacher are usually anonymous and their results are not very transparent, focusing more on control and distrust than on constructive feedback.

From this point of view, and although evaluation has an enormous potential to promote profound educational and social changes, in practice it has not yet managed to break with the predominant technical logic. Rather than generating a real transformation, it often remains in an appearance of calm or in the illusion of participation and 'democratization' of the evaluation process (Peña & Toro, 2022). However, no real change has been generated that is visualized in

the learning and in the decisions associated with the grading process.

Hence, it is necessary to establish new didactic strategies that allow understanding educational evaluation as a dialogic and reciprocal process. Cooperative practices are examples of methodologies to materialize emancipatory evaluative processes. These approaches emphasize dialogue, the recognition of diverse knowledge and the co-creation of narratives (Fasanello et al., 2018), given that in that communicative act signals are placed in play that account for common purposes among those who dialogue and recognize each other in the difference.

Other postulates of the evaluation of the emancipatory perspective are provided by Borjás (2014, p. 38), who proposes some notions that link critical pedagogy and the evaluation of learning:

- a) Participation: recognized as an inherent right of every person, it is conceived as a constant contribution to the collective effort and a key element to build inclusive and meaningful social projects.
- b) Communication: fundamental to human existence, it acts as the vehicle that enables the development of values and culture. Its impact becomes significant when it facilitates reflection, self-discovery and mutual understanding.
- c) Contextualization: focuses on the need to carry out evaluations based on the students' reality. It seeks to motivate them, explore their capabilities, and stimulate their learning within their own life context, maximizing their potential and application of knowledge.
- d) Meaningfulness: in education, this quality translates into the ability to connect the content with the student's reality. This is achieved through open, critical and collaborative teaching, where the educational community promotes learning that is relevant and transformative for the individual's life.
- e) Humanization: this approach focuses on the personal recognition of each participant and the use of dialogue as a fundamental tool. In this way, an integral formation is fostered, nurtured by pertinent, constructive and pedagogical feedback.
- f) Transformation: a truly transformative evaluation not only measures learning, but also gene-

rates a sense of achievement and satisfaction in those being evaluated, becoming a driver of positive change.

Evaluation, as an integral part of the educational process, must incorporate and reflect these dimensions, understood as essential pillars for a transformative teaching practice. The democratic educator has the unavoidable duty to strengthen, through evaluation, the critical capacity of students, promoting their curiosity, their sense of questioning and their spirit of insubordination to established structures and knowledge. Freire (2004) indicated that critical student learning requires an equally critical teaching, imbued with aesthetics and ethics. Therefore, educational practice must be an integral testimony of decency and commitment, reflecting the deepest values of humanity. Reducing this practice to a technical development not only limits its scope, but also strips the process of its formative essence, undervaluing that which makes it truly human.

Finally, it is key to highlight the contribution of Hidalgo and Murillo (2016), who propose an evaluation model focused on social justice. Their approach highlights three essential dimensions: social justice understood as redistribution, recognition and participation; an education oriented to equity, democracy and critical thinking; and alternative forms of evaluation that promote inclusion, authenticity, cultural sensitivity, active participation and democratic dialogue. This model invites us to rethink evaluation as a transformative tool at the service of a more just and humane education. And, on the other hand, the approach of Peña and Toro (2022) who promote an evaluation based on reciprocity, whose process is based on the knowledge of sharing and dialoguing ways of organizing knowledge based on three fundamental pillars: autonomy, trust and responsibility.

This reciprocal view of evaluation can be considered as a process that generates change, with the potential to promote social transformation, focused on generating spaces of reciprocal recognition among those who participate in the learning and teaching process, giving confidence and voice to each individual, in an atmosphere of respect throughout the didactic process, as well as the intersubjective processes that can be built from evaluative spaces in collective terms. In other words, we conceive evaluation as a space that can promote a truly democratic

practice, where power is no longer concentrated solely in the teacher. It is about transforming evaluative practices so that they become an opportunity to resignify power relations and move towards greater social justice in the classroom (McArthur, 2019). Contributing to the creation of learning environments that allow approaching knowledge from multiple perspectives, beyond traditional boundaries. This implies integrating dimensions such as politics, morals and culture, placing value on the social aspects that go through these educational processes (Pérez, 2023).

### 1.3 Curriculum and Physical Education: what they are looking for

The curriculum has been defined as a theory of practice (Walker, 1982) since it embodies a continuous process that goes from ideals, purposes, ideas to practice. Historically, it has been configured as the privileged place for certain sectors of society to transmit their beliefs and perspectives in order to perpetuate their interests (Neira, 2010). In it, in a non-neutral manner, it is intentionally determined what students should learn and what are its foundations (Apple, 2004; Salgado et al., 2021). Therefore, it is in the curriculum where, when developing it, different dimensions converge, such as:

- The consequences of a political action in which power dynamics are confronted (Silva, 2013).
- They are produced taking into account different educational paradigms on learning: behaviorist, constructivist and critical (Toruño, 2020).
- It conditions the evaluation and in this context it is necessary not to associate knowledge only with behaviors, being necessary to move to a free curriculum model focused on learning and not only on measurement (Stenhouse, 1987).

In addition, it is a space that conditions teaching professionalism (Gimeno-Sacristán, 1992).

The curricula in PE has been characterized by the presence of different curricular perspectives (Kirk, 2010) among which stand out: a) traditionalist whose orientation is technicist and positivist heir of behaviorism and Tyler, which pursues the final result and performance (Contreras and Torres, 2023) observable, measurable and quantifiable objectives

(Monzón, 2010) this perspective has been dominant in PE and Chile has not been the exception (Moreno and Poblete, 2015; Moreno et al., 2014); b) conceptual empiricist is characterized by including new disciplines in the teaching processes and c) reconceptualization based on critical learning theory and which pursues emancipatory social change, the decrease of inequality and social injustice (Apple, 2004; Giroux, 1997).

In our country (Chile), the current PE school curriculum still does not renew its paradigm (Moreno, 2018); it has even gone back a few years by turning its epistemological focus towards health and the biomedical perspective, which implies an eminently hygienist and mechanical conception. This vision simplifies the learning of the subject, reducing it to the organic and psychological benefits that it can generate (Mujica et al., 2022), moving away from its pedagogical, formative and multidimensional sense. Another feature is that it is raised under a pedagogical model by objectives (MINEDUC, 2018), typical of the behaviorist paradigm, which must be addressed in a mandatory manner and without being modified by practicing teachers, only allowing an adaptation to different contexts. This has meant that the learning and teaching process is conditioned in terms of the evaluation it promotes, which basically seeks motor results and performance (Mujica et al., 2022) based on standardized and decontextualized evaluations, and by the search for learning related to physical condition.

In this scenario, the intention of PE and Health in the national curriculum is to become a central subject in the integral formation of the human being, focused on the development of motor skills, attitudes, leadership and self-care through the regular practice of physical exercise. Its objective is to promote an active and healthy lifestyle, contributing both to individual wellbeing and to the strengthening of social coexistence (Bases Curriculares, 2013). Seeking from the curriculum to address the high levels of sedentary lifestyles and obesity in our children and youth.

In order to advance towards these purposes, the Physical Education and Health curriculum proposes a series of thematic emphases that guide the pedagogical work. Among them are: the value of movement as a fundamental part of human development; the improvement of physical condition; the

promotion of the expressive qualities of the body; initiation in the practice of sports; the integration of various factors to promote an active and healthy life; respect for the rules of the game; cooperation and teamwork; and a broad vision of leadership, understood as a shared and situated capacity.

The evolution of the contents is evident in the motor skills and the attitudinal contents are strongly combined in the national curriculum, through aspects of the discipline and social skills.

From the point of view of curricular organization, the following axes are evident: motor skills; active and healthy life; and safety, fair play and leadership (MINEDUC, 2013).

From the curriculum, eight attitudinal contents that must be present in the cycle are made explicit; at the same time, the integration of other attitudinal dimensions is oriented, according to the proposal of the institutional educational project of each educational community. These attitudes should be included in the curriculum of the specialty: (a) recognize and value the benefits of regular physical activity practice for health and personal well-being, (b) show interest and commitment to improve their physical condition, incorporating physical activity as part of their daily routine, (c) feel self-confident when participating in physical activities, trusting in their abilities and enjoying movement, (d) participate actively in classes, showing enthusiasm and willingness to get involved in the different proposals, (e) encourage equal participation between men and women in all physical or sports activities, recognizing and valuing the contributions of each one. f) Accept and respect physical differences between people, avoiding any form of discrimination, g) be willing to work in a team, cooperate with others, listen to opinions, accept constructive criticism and contribute to the group, and h) commit to personal effort, seeking to surpass oneself and persevere in the face of challenges.

## 2. Methodology

The study was framed from a qualitative approach, by means of a documentary analysis. The use of this technique sometimes replaces the observer and the interviewer in situations that they cannot access (Latorre et al., 2005). This analysis allowed us to advance towards the description, understand-

ding a critical interpretation of the textual body, the central core of our analysis (Moreno et al., 2014), considering as main categories of analysis: evaluative approaches present in the national curriculum; evaluative agents, diversification of instruments, evaluative orientations and constructive alignment (Table 2). From the national curriculum of PE and Health, the above categories were analyzed considering the plans and programs of the 12 years of schooling of the Chilean educational system (MINEDUC, 2013), which includes from first grade to fourth grade. This analysis sought to scrutinize in the understanding of an interpretative reading of the documents the presence of the emancipatory perspective in the evaluative orientations of the official curriculum of the subject of PE in Chile.

The methodological procedure was based on the analysis of the official documents of the national curriculum (12 plans and programs), in turn, other documents, such as: guidelines of the school

physical activity unit (2020) and decree 67 on evaluation for learning (Curriculum and Evaluation Unit, 2018). An analysis was conducted with previously established categories, which were built from the dimensions that must be present in the evaluation with an emancipatory perspective for social justice. In addition, the category of constructive alignment was incorporated, which is based on analyzing the learning objectives that are linked to the didactic approaches and the evaluation criteria with the daily practices in the discipline, allowing to emphasize the coherences that might exist in this triad. The coding and analysis of the information was developed through the Atlas-ti 8 program. This software considerably speeds up the activities involved in the analysis process, such as text segmentation, coding, writing memos and annotations, offering the researcher the necessary tools and instruments for the thorough analysis of the information and optimal sharing of the findings (Sabariego-Puig et al., 2014).

**Table 2.** *Operational definition of the categories of analysis*

Categories	Operational definition
Evaluation approaches in the national curriculum	These are the epistemological dimensions of assessment theory that are evident in the PE and Health curriculum.
Evaluative agents	The key actors of the evaluation are: teacher (heteroevaluation); self-evaluation (the students); co-evaluation (the students among themselves).
Metacognitive critical reflective processes	These are the pedagogical actions within the scope of the evaluative experiences promoted by PE and Health curriculum that aim to generate self-regulation processes of learning and generate critical reflection.
Diversification of instruments	These are the types and variety of instruments promoted by the national Physical Education and Health curriculum.
Evaluation guidelines	These are the guidelines that MINEDUC, through the formative curriculum, promotes, emphasizes and directs teachers at the national level.
Constructive alignment	It is the articulation and coherence between what the curriculum promotes, what the teacher does and what he/she evaluates.

### 3. Results

In the guidelines provided by MINEDUC to evaluate learning, there are some important ideas about how to conceive the evaluation process in the discipline of PE and Health: it is pointed out that the evaluation must measure the progress, also finding an orientation that establishes the evaluation as an instrument that allows the self-regulation of the students; furthermore, it reveals that the evaluation must provide information that evidences strengths and weaknesses of the students and on

it, feedback of what has been learned according to the objectives that want to be obtained, and finally the evaluation must be a useful object to situate the planning (Supreme Decree of Education N.º 2960, 2012). Table 3 presents the analysis of the Physical Education and Health curriculum.

**Table 3.** *Documentary analysis of the PE and Health curriculum.*

Categories	Elementary	Secondary	Interpretations
Evaluative Approaches	Measurement evaluation	Measurement evaluation.	An evaluative approach to measurement is evident.
Evaluative agents	Self-evaluation Co-evaluation	If teachers guide their students and provide them with spaces for self-assessment and reflection, they will be able to evaluate their learning and assume an active and responsible role in their own formative process (MINEDUC, 2015a).	It only states the agent, although it does not provide guidelines on how to implement it.
Various instruments	It encourages the multiplicity of instruments such as for example in sixth grade it suggests: Self-assessment, Scoring scales, Checklist, Tests and execution, Anecdotal record, Rubric and Motor test (MINEDUC, 2012a, p. 43).	Use diverse evaluation strategies, according to the objective and intention of the evaluation. It is proposed to use multiple resources and evidences. In second grade, application and performance of activities, portfolios, anecdotal records, research projects (both group and individual), reports, presentations, and oral and written tests, among other strategies, are proposed (MINEDUC, 2012b, p. 43).	This is stated as a suggestion, but no examples of how to implement these different types of instruments are given.
Orientation of evaluations	It is recommended that teachers use different evaluation methods, depending on the objective to be evaluated. For example, in second grade “based on observation, information gathering, self-evaluation, co-evaluation, among others” (MINEDUC, 2012c, p. 24).	Carry out an exhaustive analysis of the results obtained in the evaluations, both at the global and individual levels. This analysis must systematize the information by organizing it according to objectives, axes, areas, skills or other components, in order to identify the pedagogical adjustments and support required. Likewise, the diversity of learning styles, “interests, levels and learning rhythms of students in the same course” (MINEDUC, 2012b, p. 21) must be considered, integrating varied stimuli and resources, such as visual, auditory or other elements, in order to guarantee an inclusive and effective educational response.	Teachers are oriented to the possibility of raising diverse evidences of learning, from different agents. It is stated in this section to generate feedback and analysis of the results, but it is not explicit with examples of how to approach it.
Constructive Alignment	It is evident that according to the scope of the objective (curriculum) and what is intended in the classroom (didactics) should be evaluated.	It is evident that according to the scope of the objective (curriculum) and what is intended in the classroom (didactics) should be evaluated.	There is evidence of articulation between the curriculum, didactics and evaluation. Declaratively, as it is a biomedical logic, it is coherent with what it proposes as evaluative orientation.

From the analysis of the documents of the curriculum of Physical Education and Health in Chile, 1st grade to 4th grade, a tension between two pedagogical perspectives is evident: on the one hand, moving towards a more inclusive, participatory and social justice-oriented education through the promotion of «the equal participation of men and women in any physical activity or sport» (MINEDUC, 2015a, p. 112); and on the other hand, a naturalized technical rationality from traditional models of teaching and evaluation that is expressed in the practice of «physical activities, demonstrating safe behaviors, such as: listening and following instructions» (MINEDUC, 2012c, p. 45).

From an enthusiastic point of view, the evaluative proposal incorporates a broader perspective, beyond physical performance, which indicates that the evaluation in the 8th grade curriculum «should consider indicators such as collaboration to achieve a common purpose and collaborative decision-making» (MINEDUC, 2015b, p. 46). This orientation suggests a change of focus towards socioemotional and citizenship skills, aligning with an emancipatory type of assessment, more comprehensive of the diversity of the student body.

However, when analyzing evaluative orientations from a critical point of view, clear evidence emerges that these proposals coexist with the predominant traditional discourse. The latter presents

a strong behaviorist perspective, reproducing movement and gestures, and measuring observed behavior. For example, in the fifth grade, the objective of «Demonstrating the correct execution of a national dance, using basic steps and folkloric music individually or in groups...» (MINEDUC, 2012d, p. 44). Here the emphasis returns to technical execution and individual performance, reversing in part the progress towards a more comprehensive and contextualized PE.

Along the same lines, some of the proposed instruments still respond to standardized logics, such as the use of physical tests with quantitative criteria. In secondary, for example, the use of the test is proposed, knowing that it is «a standardized test to classify individuals according to quantitative criteria. Examples: Eurofit battery, AAHPERD» (MINEDUC, 2015c, p. 49). Thus installing an evaluative logic that punishes students who do not meet the pre-established performance standards.

Similarly, in spite of the suggestion of a more participatory teaching, the curricular design still places the teacher as the main controller and evaluator of learning. This is expressed, for example, when it is stated in the fourth grade curriculum that: «The teacher is responsible for observing, recording, analyzing and assessing student learning based on evidence collected during the development of the class» (MINEDUC, 2015b, p. 52). This formulation, centered on the figure of the teacher as the exclusive evaluator, limits the possibility of a dialogic construction of knowledge and a shared evaluation that empowers students.

These results show the distancing of the evaluation presented by the curriculum of the specialty from Decree 67, which promotes an evaluation for student learning. From this perspective, the challenge is to incorporate early in teacher training the guidelines that regulate the evaluative processes in the Chilean school curriculum (Decree 67/2018 on evaluation, grading and school promotion), considering that these guidelines will regulate the evaluative practices in their performance as teachers in the school system in the future (Gallardo-Fuentes et al., 2023).

Little harmony is observed with respect to expanding the evaluating agents inside the classroom through self-evaluation, co-evaluation and heteroevaluation (MINEDUC, 2017, p. 66).

#### 4. Discussion and conclusions

Traditional evaluative approaches are evident in the PE and Health curriculum in Chile, because the current curriculum still focuses on observable, measurable and quantifiable objectives (Fierro, 2024) and emphasizes the final result (Contreras and Torres, 2023). As Moreno (2018) makes explicit, the national PE Curriculum has not been renewed, epistemologically it preserves the biomedical, health and hygienist perspective. In addition, our findings show that in the evaluative orientations a certain degree of student participation is promoted through self-evaluations, co-evaluations and other instruments. This is not completely consistent with the statement by Mujica et al. (2022) that the ministerial evaluative guidelines promote measurement and behaviorism, emphasizing objectivity, efficiency and passive learning. In this line, Moreno-Olivos (2021) points out that evaluation is still centered on the figure of the teacher, that teachers value both the mastery of the disciplinary content and the skills through which students express this mastery (verbal and written communication skills, autonomous learning, creativity, critical thinking). To be more precise, there is the idea of a traditional evaluation, standardized and far from the evaluative proposals of Decree 67 (MINEDUC, 2018) that seeks to distance from measurement and qualification and that aims at inclusion in the learning process and the right of education for all.

We were able to observe that PE and Health curriculum assumes a positivist approach that emphasizes results instead of formative processes of students (Fierro and Rocuant, 2023) and, in addition, ignores evaluations that consider the individual characteristics of the students (Tolgfors and Barker, 2023), which is distant from what Decree 67 promotes. Hence, the current curriculum lacks understandings about evaluation with an emancipatory perspective that would allow social justice and its transformation; rather, it could perpetuate segregation, inequality and economic models that disadvantage the least vulnerable groups (Fierro, 2024). There are no indications in the evaluative orientations of the subject to generate a critique of reality (Freire, 1989) that allows a problematizing, dialogic education and highlights cultural aspects (Bachelard, 1984), rather they are oriented to repro-

duce it. Thus, the results are in agreement with Silva (2006), who states that education must assume an instrumentalizing function of the subjects, orienting them towards the achievement of neoliberal market goals and logics (Carnoy, 2010). These logics are present in the Chilean curriculum.

The theoretical components for emancipatory evaluation and its importance in social justice, highlighted by Freire (1989); Borjás (2014) and Hidalgo and Murillo (2016) highlight aspects such as: social participation, horizontal communication, cooperative practices, contextualization, significance, humanization and transformation, as well as processes such as: authentic evaluation; inclusive evaluation; participatory; democratic, are not evident in the national curriculum. Realistically, although it is true that inclusion is spoken as a general consideration, there are no methodological guidelines on how to implement these new understandings and their scope. However, the study by Peña et al. (2025) indicates that in initial teacher training there is a high valuation of the three domains of knowledge (conceptual, procedural and attitudinal), giving great relevance to the context where classes are carried out (planning), personal skills and the evaluation process (formative evaluation).

On the other hand, it is evident in the curriculum, the diversity of agents, materialized in the co-evaluation and self-evaluation, as well as the importance of a diversity of instruments such as portfolios, session notebooks, anecdotal records, etc., however, it is not made explicit how to approach them in the school processes.

Consequently and as a conclusion, the evaluative approach in the national curriculum of PE continues to be an approach focused on measurement, using evaluative guidelines based on learning indicators, which leads to a rejection of existing trends in the discipline with proposals for a more critical and social PE. This opens a possibility for new research that proposes the principles of understanding an evaluation with an emancipatory perspective for social justice, forming conscious bodies committed to the transformation of an often oppressive educational system (Moura-Barreto et al., 2025).

## Acknowledgments

This article is associated with the projects «Student voice as a transformative practice: towards the democratization of Physical Education teacher training» VRIP UBB No. DA2577214 and FONDECYT projects No. 1240883, 1230609 and PIDU Project No. DEP202207, all linked to evaluation processes in the educational context.

## Author contributions

Samuel Pérez-Norambuena: conceptualization, information review, drafting and project management.

Marcela Mora-Donoso: formal analysis, drafting and revision of the manuscript.

Sebastián Peña-Troncoso: Substantiation, revision, writing and editing of the manuscript.

Francisco Gallardo Fuentes: proofreading, editing and translation of the final manuscript

## References

- Apple, M. (2004). *Ideology and curriculum*. Routledge.
- Atienza, R., Valencia, A. & Devís, J. (2018). Experiencias de Evaluación en Educación Física. Una Aproximación desde la Formación Inicial del Profesorado. *Estudios pedagógicos*, 44(2), 127-147. <https://dx.doi.org/10.4067/S0718-07052018000200127>.
- Azzarito, L., Marttinen, R., Simon, M. & Markiewicz, R. (2014). 'I'm beautiful': A case for adopting a sociocultural perspective in physical education teacher education. *Sociocultural issues in physical education: Case studies for teachers*, 115-132.
- Barbosa de Lima, A. (2023). A abordagem crítico-emancipatória na educação física escolar. *FIEP bulletin*, 5(93), 546-555. <https://dx.doi.org/10.16887/93.a1.56>
- Beltrán, J., Barrios, J. & Carter, B. I. (2020). Racionalidad técnica-instrumental en educación física. Un estudio cualitativo en contexto chileno. *Revista Espacios*, 41(04). <https://bit.ly/45ijyYU>
- Blázquez, D. (2017). *Cómo evaluar bien educación física, el enfoque de la evaluación formativa*. Inde.
- Borjás, M. (2014). La evaluación del aprendizaje como compromiso: una visión desde la pedagogía crítica. *Rastros Rostros*, 16(30), 35-45. <https://doi.org/10.16925/ra.v16i30.816>
- Bourdieu, P. & Passeron, J. (1969). *Los estudiantes y la cultura*. Editorial Labor.

- Bracht, V. (1992). *Educação Física e aprendizagem social*. Magister.
- Brown, S. (2020). *Learning, teaching and assessment in higher education: global perspectives*. Bloomsbury Publishing. <https://bit.ly/43EJgpi>
- Cárcamo, J., Peña, S. & Cumilef, P. (2022). Validez de contenido de la Batería MOBAC para la evaluación del eje curricular de habilidades motrices en Educación Física. *Estudios pedagógicos*, 48(1), 309-322.  
<http://dx.doi.org/10.4067/S0718-07052022000100309>
- Carnoy, M. (2010). La ventaja académica de Cuba. ¿Por qué los estudiantes cubanos rinden más? México: Fondo de Cultura Económica.
- Carter-Thuillier, B., Pastor, V., Fuentes, F., Nahuelcura, R. & Beltran, J. (2022). Incorporar la competencia intercultural en la formación docente: examinando posibilidades para Educación Física en la macrozona sur de Chile. *Retos*, (43), 36-45. <https://doi.org/10.47197/retos.v43i0.88416>
- Carter-Thuillier, B., López-Pastor, V., Gallardo-Fuentes, F. & Carter-Beltrán, J. (2021). Educación Física, deporte e inmigración: analizando críticamente algunas posibilidades para Chile. *Ágora para la educación física y el deporte*, (23), 52-72. <https://doi.org/10.24197/aefd.0.2021.52-72>
- Carter-Thuillier, B. & Gallardo-Fuentes, F. (2021). Aprendizaje-servicio en contextos migratorios o culturalmente diversos: una revisión sistemática centrada en el campo de la Educación Física. *Estudios pedagógicos*, 47(4), 43-59. <http://dx.doi.org/10.4067/S0718-07052021000400043>
- Casassus J. (2003). *La escuela y la (des) igualdad*. LOM.
- Chihuailaf, L., Concha, R. e i Türk, Y. (2022). Sexism and misogyny in sports. *Revista Catalana de Pedagogia*, 21, 21-35. <https://doi.org/10.2436/20.3007.01.170>
- Chihuailaf, M., Flores, E., Maureira, F. & Gamboa, R. (2024). Estereotipos de género en la práctica de ejercicio físico y deporte en estudiantes universitarios de la carrera de Pedagogía en Educación Física en Chile. *Retos*, 55, 1-10. <https://doi.org/10.47197/retos.v52.101489>
- Coleman, J., Campbell, E., Hobson, C., McPartland, J., Mood, A., Weinfeld, F. & York, R. (1966). *Equality of educational opportunity*. National Center for Educational Statistics, Office of Education, U.S. Department of Health, Education, and Welfare.
- Contreras, J. & Torres, Á. (2023). Las evaluaciones educacionales estandarizadas desde la experiencia de los actores. *Educação e Pesquisa*, 49. <https://doi.org/10.1590/S1678-4634202349248451es>
- Córdoba, T., López-Pastor, V. & Sebastiani, E. (2018). ¿Por qué hago evaluación formativa en educación física? Relato autobiográfico de un docente. *Estudios pedagógicos*, 44(2), 21-38. <https://doi.org/10.4067/S0718-07052018000200021>
- Escobar, M. (2021). El Kemperi: saberes huaorani en los cuerpos. En *XIV Congreso Argentino, IX Latinoamericano y I Internacional de Educación Física y Ciencias*. Universidad Nacional de La Plata. Facultad de Humanidades y Ciencias de la Educación. <https://bit.ly/4dYpYyz>
- Eusse, K. G., Almeida, F. & Bracht, V. (2017). Cultura corporal e expresiones motrices: sobre a Educação Física no Brasil e na Colômbia. En *CONBRACE, 2017. Anais do XX Congresso Brasileiro de Ciências do Esporte e do VII Congresso Internacional de Ciências do Esporte*. Goiânia/GO: Organização de Mauro Myskiw-Porto Alegre: CBCE. <https://bit.ly/43yytNg>
- Evans, J. (1988). (ed.). *Teachers, Teaching and Control in Physical Education*. The Falmer Press.
- Fasanello, M. T., Nunes, J. A. & Porto, M. F. (2018). Metodologías colaborativas não extrativistas e comunicação: articulando criativamente saberes e sentidos para a emancipação social. *Pesquisa Brasileira em Ciência da Informação e Biblioteconomia*, 14(2). <https://doi.org/1029397/reciis.v12i4.1527>
- Feldman, D. & Diuk, B. (2021). Políticas de enseñanza y desigualdad: entre los formatos pedagógicos y las finalidades educativas. Pontificia Universidade Católica de Goiás. *Educativa*, 24(7), 1-29. <https://doi.org/10.18224/educ.v24i1.8662>
- Fierro, B. (2024). Análisis del Currículo de Educación Física en Chile: una mirada hacia la inclusión del estudiantado. *Retos*, (56), 941-948. <https://doi.org/10.47197/retos.v56.103946>
- Fierro, B. & Rocuant, A. (2023). Nivel socioeconómico e índice de masa corporal: predictores de la condición física en estudiantes chilenos. *Retos*, 50, 228-233. <https://doi.org/10.47197/retos.v50.98479>
- Freire, P. (1989). La práctica educativa. *Tiempos de Educación*, 292-300.
- Freire, P. (2004). *Pedagogía de la autonomía. Saberes necesarios para la práctica educativa*. Siglo XXI.
- Freire, P. (2005). *Pedagogía del oprimido*. Siglo XXI.
- Freire, P. & Faundez, A. (2013). *Por una pedagogía de la pregunta. Crítica a una educación basada en respuestas a preguntas inexistentes*. Siglo XXI.
- Frossard, M. L., Stieg, R. & Santos, W., (2021). Prácticas evaluativas en tres cursos de educación física en Sudamérica. *Alteridad*, 16(2), 211-222. <https://doi.org/10.17163/alt.v16n2.2021.04>
- Gallardo-Fuentes, F., Carter-Thuillier, B., Peña-Troncoso, S., Martínez-Angulo, C. & López-Pastor, V.

- (2023). Analizando críticamente la incorporación de las actuales normativas sobre evaluación, calificación & promoción escolar en la formación inicial del profesorado en educación física en Chile. *Interciencia*, 48(10), 544-551. <https://bit.ly/43S3xq9>
- Gallardo, F., López-Pastor, V. & Carter, B. (2017). ¿Hay evaluación formativa y compartida en formación inicial del profesorado en Chile? Percepción de alumnado, profesorado y egresados de una universidad. *Psychology, Society & Education*, 9(2), 227-238. <https://doi.org/10.25115/psye.v9i2.699>
- Gimeno-Sacristán, J. (1992). *El Currículum: una reflexión sobre la práctica*. Morata.
- Giroux, H. (1997). *Los profesores como intelectuales. Hacia una pedagogía crítica del aprendizaje*. Paidós.
- Giroux, H. (2003). *Pedagogía y política de la esperanza. Teoría, cultura y enseñanza*. Amorrortu editores.
- Carlos Martins, R., Gurgel Vieira, R. A., & Goes Lopes, J. P. (2023). Repercussões sindêmicas no desenvolvimento do PIBID/educação física em uma universidade sul-mineira: entre desafios e experiências exitosas. (2023). *Conexões*, 21(00), e023021. <https://doi.org/10.20396/conex.v21i00.8674820>
- Griffin, P. (1985). Teachers' perceptions of and responses to sex equity problems in a middle school physical education program. *Research Quarterly for Exercise and Sport*, 56, 103-110. <https://doi.org/10.1080/02701367.1985.10608443>
- Hidalgo, N. & Murillo J. (2016). Evaluación de Estudiantes para la Justicia Social. Propuesta de un Modelo. *Revista Internacional de Educación para la Justicia Social (RIEJS)*, 5(2), 159-179. <https://doi.org/10.15366/riejs2016.5.2.008>
- Kirk, D., (2010). *Physical Education Futures*. Routledge.
- Latorre, A., Del Rincón, D. y Arnal, J. (2005). *Bases metodológicas de la investigación educativa*. Experiencia.
- Leathwood, C. (2005). Assessment policy and practice in higher education: Purpose, standards and equity. *Assessment y Evaluation in Higher Education*, 30(3), 307-324. <https://doi.org/10.1080/02602930500063876>
- López-Pastor, V. (coord.) (2009). *La Evaluación Formativa y Compartida en Educación Superior: propuestas, técnicas, instrumentos y experiencias*. Narcea.
- López-Pastor, V. (2012). Didáctica de la educación física, desigualdad y transformación social. *Estudios pedagógicos*, 38(Especial), 155-176. <https://bit.ly/45bymZd>
- López, M. (2019). La pedagogía crítica como propuesta innovadora para el aprendizaje significativo en la educación básica. *Revista de Ciencias Humanísticas y Sociales (ReHuSo)*, 4(1), 99-112. Epub. <https://doi.org/10.33936/rehuso.v4i1.2120>
- Martínez, S. (2020). Evaluación situada en la formación de formadores. *Educere et Educare*, [S. l.], 15, 35. <https://10.17648/educare.v15i35.23889>
- McArthur, J. (2019). *La evaluación: una cuestión de justicia social. Perspectiva crítica y prácticas adecuadas*. Narcea.
- McLaren, P. (1984). *La vida en las escuelas: una introducción a la pedagogía crítica en los fundamentos de la educación*. Siglo XXI.
- Ministerio de Educación. (2012a). Programa de Estudio de Educación Física y Salud – 6° Básico. Santiago-Chile. <https://bit.ly/3SFJ82r>
- Ministerio de Educación. (2012b). Programa de Estudio de Educación Física y Salud – 2° Medio. Santiago-Chile. <https://bit.ly/4kJEUws>
- Ministerio de Educación (2012c). Programa de Estudio de Educación Física y Salud – 2° Básico. Santiago-Chile. <https://bit.ly/4kWJeyH>
- Ministerio de Educación (2012d). Programa de Estudio de Educación Física y Salud – 5° Básico. Santiago-Chile. <https://bit.ly/3HwJb4F>
- Ministerio de Educación. (2013). *Bases curriculares de Educación Física y Salud*. Santiago-Chile. <https://bit.ly/45LGYG2>
- Ministerio de Educación. (2015a). Bases curriculares de 1° a 6° Básico. Santiago-Chile. <https://bit.ly/43S0Jcp>
- Ministerio de Educación. (2015b). Programa de Estudio de Educación Física y Salud – 8° Básico. Santiago-Chile. <https://bit.ly/3FO6JLq>
- Ministerio de Educación. (2015c). Bases Curriculares de Educación Física y Salud – 7° Básico a 2° Medio. Santiago-Chile. <https://bit.ly/4kXqj9>
- Ministerio de Educación (2017). Bases Curriculares 7° básico a 2° medio. Santiago-Chile. <https://bit.ly/4dYz0vq>
- Ministerio de Educación de Chile. (2016). Educación Física y Salud. Santiago-Chile. <https://bit.ly/4kUTtn1>
- Ministerio de Educación de Chile. (2018). Decreto 67. *Biblioteca del Congreso Nacional de Chile*. Santiago-Chile. <https://bit.ly/4dVtKsw>
- Monzón, A. R. (2010). *Estudio, desarrollo, evaluación e implementación del uso de plataformas virtuales en entornos educativos en bachillerato, eso y programas específicos de atención a la diversidad: programas de diversificación curricular, programa de integración y programa*. Universidad Autónoma de Madrid.
- Moreno-Doña, A. (2018). La Educación Física chilena en educación básica: Una caracterización crítica.

- The Journal of the Latin American Socio-cultural Studies of Sport (ALESDE)*, 9(2), 65-78.  
<https://bit.ly/447XcYP>
- Moreno-Doña, A. & Almeida, F. (2021). Educación Física crítica en y desde Latinoamérica. *Ágora para la Educación Física y el Deporte*, 23, 1-6.  
<https://doi.org/10.24197/aefd.0.2021.1-6>
- Moreno, A., Toro, S. & Gómez, F. (2018). Crítica de la educación física crítica: eurocentrismo pedagógico y limitaciones epistemológicas. *Psychology, Society, & Education*, 10(3), 349-362.
- Moreno-Doña, A., Gamboa, R. & Poblete, C. (2014). La Educación Física en Chile: análisis crítico de la documentación ministerial. *Revista Brasileira de Ciências do Esporte*, 36(2), 411-427.  
<https://doi.org/10.1590/S0101-32892014000200010>
- Moreno-Doña, A. & Poblete, C. (2015). La educación física chilena y su profesorado: proponiendo algunos retos para la investigación en el área. *Retos: Nuevas Tendencias en Educación Física, Deportes y Recreación*, 28, 291-296.  
<https://doi.org/10.47197/retos.v0i28.35651>
- Moreno-Olivos, T. (2021). Cambiar la evaluación: un imperativo en tiempos de incertidumbre. *Alteridad. Revista de educación*, 16(2), 223-234.  
<http://orcid.org/0000-0002-0392-6621>
- Moura-Barreto, S., Nascimento-Corsino, L. & Lazarretti da Conceição, W. (2025). Autoestudio de incidentes críticos desde la perspectiva de la justicia curricular. *Alteridad*, 20(1), 50-60.  
<https://doi.org/10.17163/alt.v20n1.2025.04>
- Mujica, F., Santander, I., Uribe, N., Cáceres, P., Godoy, N. & Guzmán, J. (2022). Aprendizaje en Educación Física y Salud en Chile: estudio cualitativo del currículum de 7° básico a 2° medio. *Retos: nuevas tendencias en educación física, deporte y recreación*, (46), 843-851. <https://bit.ly/4jGO6a0>
- Murillo, F. J. & Hidalgo, N. (2016). Dime cómo evalúas y te diré qué sociedad construyes. *Revista Iberoamericana de Evaluación Educativa*, 8(1). <https://bit.ly/4kcWn69>
- Neira, M. (2010). El Currículo de Educación Física en la Perspectiva Cultural: fundamentos y práctica pedagógica. *Horizontes educacionales*, 15(2), 49-67. <https://bit.ly/45Ks3vS>
- Neira, M. & Masella, M. B. (2023). O currículo cultural da Educação Física em ação na Educação Infantil. *Ensino & Pesquisa*, 21(1), 7-21.  
<https://bit.ly/3Hzi6r5>
- Peña-Troncoso, S., Toro-Arévalo, S., Pazos, J. M., Pérez-Norambuena, S., Rocuant-Urzúa, A., Carter-Thuillier, B. & Peña-Troncoso, A. (2025). La evaluación actitudinal en la formación de profesores de “educación física” en Chile ¿En qué estamos? y ¿Hacia dónde vamos? *Sportis Sci J*, 11(1), 1-19.  
<https://doi.org/10.17979/sportis.2025.11.1.11230>
- Peña, S. & Toro, S. (2022). *Hacia una evaluación recíproca en la formación inicial docente*. En C. Sanhueza, C. Díaz y C. Espinoza (eds.), *La Formación Inicial Docente: desde la interdisciplinariedad en Chile*. Universidad de Concepción.
- Pérez, S. (2023). La promoción de valores en la formación del profesorado de Educación Física: una revisión sistemática. *Revista Educación*, 47(1), 676-694. <https://dx.doi.org/0000-0002-1710-328x>
- Pérez, S., Bravo, C. & Mora, M. (2021). Una experiencia transdisciplinar de trabajo comunitario en contextos de formación profesional. *Didac.*, 78, 20-31. <https://doi.org/10.48102/didac.2021.78>
- Pérez, S., Moreno, A., Trigueros, C. & Rivera, E. (2023). La educación en valores en la formación de profesores de educación física: ¿un asunto pendiente? *Movimento*, 29, e29044.  
<https://doi.org/10.22456/1982-8918.127584>
- Pérez, S. & Linzmayer, L. (2013). *Gimnasia Rítmica Formativa: propuesta para la educación física escolar*. Ediciones UBB.
- Pidhajnyj, L. A. (2024). *Percepciones de las y los estudiantes del Profesorado en Educación Física de la Universidad Nacional de La Matanza acerca de la evaluación de las materias deportivas*. (Tesis Postgrado). Universidad de Matanza.
- Ramírez, R. (2008). La pedagogía crítica: Una manera ética de generar procesos educativos. *FOLIOS*, 108-119.  
<https://www.redalyc.org/pdf/3459/345941358009.pdf>
- Reinaga, N. D. & Alcívar, Y. A. (2024). El papel de la educación en la promoción de la igualdad de oportunidades y la justicia social. *Nexus*, 3(1), 14-25.  
<https://doi.org/10.62943/nrj.v3n1.2024.17>
- Rezer, R. & Cunha, A. C. (2019). Conhecimento para o “tempo do inútil” – reflexões para o campo da Educação Física. En CONBRACE, 2019. *Anais do XXI Congresso Brasileiro de Ciências do Esporte e do VIII Congresso Internacional de Ciências do Esporte*. Natal/RN: Editora da Universidade Federal do Rio Grande do Norte.  
<https://bit.ly/43yXPKS>
- Sabariago-Puig, M., Vilà-Baños, R. & Sandín-Esteban, M. (2014). El análisis cualitativo de datos con ATLAS.ti. *REIRE*, 7(2), 119-133.
- Salgado, J., Carrera, C. & Yáñez, M. (2021). *Metodología de la enseñanza de actividades físico-deportivas*. Síntesis.
- Silva, I. & López-Pastor, V. (2015). ¿Cómo vive el alumnao la evaluación en formación inicial del profesorado?

- sorado? @tic. *Revista d'innovació educativa*, (14), 1-11. <https://doi.org/10.7203/attic.14.4171>
- Silva, T. (2013). *Documentos de identidade: uma introdução às teorias do currículo*. 3. ed. Autêntica.
- Silva, T. (2006). *O currículo como fetiche: a poética e a política do texto curricular*. *Autêntica Society*, 28(1), 1-16. <https://10.1080/13573322.2021.1967923>
- Souza, J. (2017). Educação Física Reflexiva: por uma reinterpretação da ontologia do movimento humano. Em CONBRACE, 2017. Anais do XX Congresso Brasileiro de Ciências do Esporte e do VII Congresso Internacional de Ciências do Esporte. Goiânia/GO
- Stenhouse, L. (1987). *La investigación como base de la enseñanza*. Morata.
- Tinning, R. (1988). Student teaching and the pedagogy of necessity. *Journal of Teaching in Physical Education*, 7(2), 82-89. <https://doi.org/10.1123/jtpe.7.2.82>
- Tolfors, B. & Barker, D. (2023). The glocalization of physical education assessment discourse. *Sport, Education and Society*, 28(1), 1-16. <https://doi.org/10.1080/13573322.2021.1967923>
- Toro, S. (2007). Una aproximación epistemológica a la didáctica de la motricidad desde el discurso y práctica docente. *Estudios Pedagógicos*, 33(1), 29-43. <https://doi.org/10.4067/S0718-07052007000100002>
- Toro, S., & Moreno-Doña, A. (2021). Educación Física como categoría colonial y neoliberal: transitando hacia la motricidad humana pensada en y desde Abya Yala. *Ágora para la Educación Física y el Deporte*, 23, 199-217. <https://doi.org/10.24197/aefd.0.2021.199-217>
- Toruño, C. (2020). Aportes de Vigotsky y la pedagogía crítica para la transformación del diseño curricular en el siglo XXI. *Revista Innovaciones Educativas*, 22(33), 186-195. <https://dx.doi.org/10.22458/ie.v22i33.3043>
- Unidad de actividad física escolar. (2020). *Orientaciones para la actividad física escolar*. División educación general. Ministerio de Educación, Santiago-Chile. <https://bit.ly/3ZoYWu7>
- Unidad de Currículum y Evaluación. (2018). Orientaciones para la implementación del decreto 67/2018 de evaluación, calificación y promoción escolar. <https://bit.ly/444dVfH>
- Walker, D. (1982). Curriculum theory is many things to many people. *Theory into practice*, 21(1), 62-65. <https://bit.ly/43XpuFH>
- Wright, J. (2000). Bodies, meanings and movement: a comparison of the language of physical education lesson and a Feldenkrais movement class. *Sport, Education and Society*, 5(1), 35-50. <https://bit.ly/43UDnmG>



# Relationship between technostress and academic goals in Peruvian university students

## *Relación entre el tecnoestrés y objetivos académicos en universitarios peruanos*

- Emilyn Verde-Avalos** is a professor at Universidad Peruana Unión (Perú) (emilynverde@upeu.edu.pe) (<https://orcid.org/0000-0003-2093-0208>)
- Dr. José Livia-Segovia** is a professor at Universidad Federico Villarreal (Perú) (jlivia@unfv.edu.pe) (<https://orcid.org/0000-0003-2226-3349>)
- Segundo Malca-Peralta** is a professor at Universidad Peruana Unión (Perú) (segundomalca@upeu.edu.pe) (<https://orcid.org/0000-0001-6294-1541>)
- Dr. Josué Turpo-Chaparro** is professor at Universidad Peruana Unión (Perú) (josuetc@upeu.edu.pe) (<https://orcid.org/0000-0002-1066-6389>)

**Received:** 2025-02-13 / **Revised:** 2025-06-08 / **Accepted:** 2025-06-13 / **Published:** 2025-07-01

### Abstract

Since 2020, educational digitalization has highlighted the impact of technostress on the academic goal orientation of Peruvian university students. This phenomenon affects their motivation, engagement, and ability to face educational challenges, emphasizing the importance of analyzing this relationship within the context of increasing digitalization. The study aimed to evaluate the relationship between technostress and academic goal orientation among Peruvian students, considering how technological demands and interpersonal relationships influence their performance. Additionally, it sought to identify strategies to mitigate the negative effects of technostress. A quantitative correlational study was conducted with 885 students using the Technostress Scale (TS4US) and the Academic Goals Orientation Questionnaire (AGOQ). Data were analyzed through statistical methods, including network analysis and a regression model. A significant negative correlation ( $r = -0.32$ ) was found between technostress and academic goal orientation. Technological demands and dysfunctional interpersonal relationships impacted goals related to learning and personal growth. The regression model explained 12.5% of the variability in goal orientation, highlighting the negative effects of technological skills-demands ( $\beta = -0.228$ ) and interpersonal relationships ( $\beta = -0.173$ ). It is essential to implement institutional strategies such as psychological support, digital training, and regulation of technology use to create healthy educational environments that enhance academic performance and strengthen orientation toward meaningful goals.

**Keywords:** technostress, academic goals, technology, university students.

### Resumen

Desde 2020, la digitalización educativa ha evidenciado el impacto del tecnoestrés en la orientación de objetivos académicos de estudiantes universitarios peruanos. Este fenómeno afecta su motivación, compromiso y capacidad para enfrentar desafíos educativos, subrayando la importancia de analizar esta relación en el contexto de la creciente digitalización. El estudio tuvo como objetivo evaluar la relación entre el tecnoestrés y la orientación de objetivos académicos en estudiantes peruanos, considerando cómo las demandas tecnológicas y las relaciones interpersonales influyen en su rendimiento. Además, identificar estrategias para mitigar los efectos negativos del tecnoestrés. Se realizó un estudio cuantitativo correlacional con 885 estudiantes, empleando la Escala de Tecnoestrés (TS4US) y el Cuestionario de Orientación de Objetivos Académicos (AGOQ). Los datos se analizaron mediante métodos estadísticos, incluyendo análisis de redes y un modelo de regresión. Se halló una correlación negativa significativa ( $r = -0.32$ ) entre tecnoestrés y orientación de objetivos académicos. Las demandas tecnológicas y relaciones interpersonales disfuncionales impactaron en metas relacionadas con aprendizaje y superación personal. El modelo de regresión explicó el 12,5 % de la variabilidad en los objetivos, destacando los efectos negativos de las habilidades-demandas tecnológicas ( $\beta = -0.228$ ) y relaciones interpersonales ( $\beta = -0.173$ ). Es esencial implementar estrategias institucionales como apoyo psicológico, capacitación digital y regulación del uso tecnológico para crear entornos educativos saludables que mejoren el desempeño académico y fortalezcan la orientación hacia metas significativas.

**Palabras clave:** tecnoestrés, objetivos académicos, tecnología, universitarios.

**Suggested citation (APA):** Verde-Avalos, E., Livia-Segovia, J., Malca-Peralta, S. & Turpo-Chaparro, J. (2025). Relationship between technostress and academic goals in Peruvian university students *Alteridad*, 20(2), 277-287. <https://doi.org/10.17163/alt.v20n2.2025.10>

## 1. Introduction

### 1.1 Technology and the emergence of technostress

Technology is an essential component in human development, enabling the transformation of the environment and enhancing individual creativity (Esparza and Rubio, 2016). In this context, Fuentes et al. (2024) highlight that information and communication technologies (ICT) have revolutionized contemporary education and communication, facilitating access to information and promoting key digital competencies. However, this advancement has brought with it negative consequences, such as technostress, a phenomenon linked to smartphone overuse (Roig-Vila et al., 2023), job loss and invasion of privacy, which manifests through fear and pressure, and affects both psychological well-being and academic performance of university students (Kim and Park, 2018). In addition, it has been identified as a risk factor associated with decreased job satisfaction (Toscano et al., 2024), negatively affecting the well-being and professional performance of faculty (Prieto-Quezada et al., 2023).

Technostress generates mental fatigue and demotivation, which has a negative impact on academic performance, hindering the concentration and organization necessary to achieve academic goals. It also limits the efficient use of technological tools for learning, reducing opportunities for academic success (Solano and Núñez, 2024). In this line, (Ponce et al., 2023) argue that high levels of technostress are associated with a significant decrease in academic performance. In extreme cases, such stress has led students to abandon their studies due to difficulties in adapting to digital environments (Masías et al., 2023).

According to Salazar-Concha et al. (2022), technostress is a psychosocial condition derived from the intensive use of ICTs, affecting both productivity and emotional well-being. Its effects include mental exhaustion and the appearance of dysfunctional behaviors, which negatively impact mental health and academic performance. The «Technostress Questionnaire» evidences the adverse effects of ICT on students' family relationships, work and health (Coppari et al., 2018). In line, Villavicencio-Ayub et al. (2020) point out psychological, social and biological impacts such as technoanxiety and technoaddiction.

Likewise, Ruiz et al. (2019) identify technoanxiety as the main variable associated with technostress, with negative effects on academic performance.

### 1.2 Consequences of technostress on academic performance.

In this framework, academic objectives play a fundamental role in providing direction, guiding academic behavior and contributing to the student's personal development (Chan Chi, 2022). According to Abello et al. (2022), an adequate orientation towards these objectives allows maintaining motivation, reducing university dropout and fostering commitment to professional training. Aladini et al. (2024) emphasize that the clear definition of goals and their alignment with the educational vision enable the student to face the challenges of the academic environment and achieve comprehensive wellbeing.

Academic goals operate as a framework that structures educational intentions and behaviors, promoting meaningful learning (Saborío-Taylor and Álvarez, 2023). These goals can be performance or learning oriented, allowing the student to adjust his or her approach according to contextual demands (Cabanach et al., 2017). In addition, they regulate student behavior in accordance with the stated purposes (Moreno et al., 2019). In a study with 100 university students, (Monroy, 2022) reported that 62 % focus on obtaining good grades, 32 % prioritize learning and only 6 % seek social recognition. Similarly, Roque et al. (2021), in a sample of 1235 health sciences students, found that 41.78% presented a predominant orientation towards goals focused on learning and improving skills.

### 1.3 Consequences of technostress on academic performance.

Several studies have shown the negative influence of technostress on academic performance. For example, Ponce et al. (2023) found a significant inverse relationship between both factors in a sample of 251 students, recommending reducing technostress to optimize academic performance. Likewise, Salazar-Concha et al. (2020), in a study with 118 Chilean university students, pointed out that technostress increases in contexts of high academic demand and scarce institutional support, as well as in

conditions of low digital competence. Another study found that 95.2% of the participants presented high levels of technostress, affecting dimensions such as skepticism, addiction and fatigue.

These findings highlight the need to implement curricular reforms that foster emotional and leadership skills to mitigate the impact of technostress in the academic environment (Quispe et al., 2024). Penado et al. (2021) analyzed this problem in Spanish students during the COVID-19, showing higher levels of technostress in face-to-face universities, associated with the lack of technological skills and resources.

Gonzabay-Flores and Santamaria-Romero (2024) reported that 35 % of students perceived a decrease in their ability to concentrate and 30% reported a negative impact on their academic performance due to technological stress. In other research, Suriá (2023) found that technostress particularly affected women, young people, students in initial courses and non-technological careers, and was associated with intensive use of ICTs. Finally, Huanacuni (2021) reported medium-high levels of technostress in 86.4 % of the participants, with technofatigue and technoaddiction being the most prevalent dimensions. Likewise, 82.14 % of the students obtained an academic performance considered regular.

Based on this scenario, this research aims to analyze the relationship between technostress and academic goal orientation in Peruvian university students. Although the existing literature has focused mainly on the relationship between technostress and academic performance, this study proposes to delve into its relationship with the formulation and orientation of academic goals, given its key role in self-regulation and student success.

## 2. Methodology

### 2.1 Design

This study adopts a quantitative approach and uses Network Analysis as its main technique. This methodology makes it possible to examine the structure of relationships and interactions between actors (individuals, groups or organizations), representing them as nodes and the relationships between them as links (Del Rosario and Peral, 2011). Through this approach it is possible to analyze patterns such as centrality, density and cohesion, which makes it pos-

sible to understand the dynamics of the network and the distribution of resources or influences within it (Sampieri et al., 2003). In this case, the relationship between technostress and academic goal orientation in university students is analyzed.

### 2.2 Participants

The sample consisted of 885 Peruvian university students. Most of the participants (69.5 %) were between 18 and 25 years old, followed by 19.3 % between 26 and 35 years old, and 11.2 % aged 36 years or older. In terms of gender, 53.2% are women and 46.8% are men.

Regarding their career, 27 % belong to Health Sciences, 24.7 % to Business Sciences, 20.5 % to Engineering and Architecture, 13.1 % to Human Sciences and Education, 7.7 % to other degrees, and 7 % to Theology. In relation to geographical origin, 37.4 % come from the coast, 33.9 % from the highlands, 25.1 % from the jungle, and 3.6 % are foreign students. In addition, 84.3 % come from private universities and 15.7% from public universities. Finally, 80.9 % of the students take face-to-face classes, while 19.1 % are coursing the blended program, reflecting current trends in higher education.

### 2.3 Instruments

a) Technostress: the questionnaire developed by Wang and Li (2019) and adapted by Vega-Muñoz et al. (2022) for Chilean students was used. This instrument consists of 19 items distributed in three factors: 1) Personal needs and technological resources (NSR by its acronyms in Spanish), 2) Interpersonal relationships (PPF by its acronyms in Spanish), and 3) Personal capabilities and technological demands (ADTE by its acronyms in Spanish). The response scale is a five-point Likert-type scale. The instrument showed high reliability, with a total Cronbach's Alpha of 0.925; and values of 0.887 for NSR, 0.753 for PPF and 0.921 for ADTE. The KMO index was 0.897, indicating excellent sample adequacy, supporting its validity in educational contexts.

b) Academic goal orientation: the instrument developed by Skaalvik (2002), validated in Spain by Navea (2012) and later in Colombia by Manrique-Abril (2020), was applied to nursing students. The exploratory factor analysis revealed four factors

explaining 53.4 % of the total variance, corresponding to the dimensions of the original instrument: ego self-frustration goal ( $\alpha = 0.838$ ), ego overcoming goal ( $\alpha = 0.733$ ), work avoidance goal ( $\alpha = 0.535$ ), and learning goal ( $\alpha = 0.508$ ). The overall reliability was adequate ( $\alpha = 0.714$ ).

## 2.4 Procedure

Data collection was carried out by means of an online questionnaire administered to students from different Peruvian universities over a period of two months. Previously, the corresponding permissions were obtained from university authorities and professors. The instruments were validated in the Peruvian context, guaranteeing their reliability and validity. The analyses were carried out with JASP statistical software, which was used to obtain the psychometric indicators of the instruments and to proceed to the network analysis between the main variables of the study.

## 2.5 Data analysis

Descriptive analyses were carried out to characterize the main variables. The internal consistency of the instruments was evaluated using Cronbach's Alpha coefficient. Subsequently, a Confirmatory Factor Analysis (CFA) was applied to validate the internal structure of the constructs. Finally, a Network Analysis was performed to visually and statistically explore the relationship between technostress and academic goal orientation.

## 2.6 Ethical criteria

The research was approved by the Ethics Committee of the Graduate School of the Universidad Peruana Unión (Resolution No. 2024-CEEPG-00045), complying with fundamental ethical principles. All participants gave their informed consent, ensuring their understanding of the objective and procedures of the study. Data confidentiality was guaranteed and the anonymity of the participants was safeguarded. In addition, the principles of nonmaleficence, justice, beneficence, and respect for autonomy were applied, allowing participants to withdraw from the study at any time without consequences.

## 3. Results

In Table 1, the item-test correlation values ranged from 0.68 to 0.82, indicating that all items contribute adequately to the measurement of the technostress construct. For the total of the 19 items, Cronbach's alpha and omega coefficients reached a value of 0.941 (95 % CI: 0.935-0.947), evidencing a high internal consistency of the instrument. In the Abilities-Techneducational Demands (ADTE) dimension, both coefficients were also 0.941 (95% CI: 0.935-0.947), with item-test correlations ranging between 0.709 and 0.802. In the Needs-Inputs-Resources (NSR) dimension, the reliability was 0.919 (95 % CI: 0.910-0.920), with correlations ranging between 0.700 and 0.818. Finally, in the Person-People Factor (PPF) dimension, the coefficients were 0.900 (95 % CI: 0.890-0.910), with correlations between 0.810 and 0.815. These results support the psychometric soundness of the instrument in each of its dimensions.

**Table 1.** Psychometric characteristics of the technostress instrument

Technoeducational Skills-Demands (ADTE)			
Item	Correlation of the element with the rest		
TE1	0.714		
TE2	0.768		
TE3	0.709		
TE4	0.745		
TE9	0.763		Omega and Alpha Reliability 0.919 (95% CI=0.91-0.92)
TE10	0.802		
TE11	0.778		
TE14	0.795		
TE15	0.800		
TE16	0.760		
Needs-Inputs-Resources (NSR)			
Item	Correlation of the element with the rest		
TE5	0.794		
TE6	0.808		
TE7	0.818		Omega and Alpha Reliability 0.919 (95%CI=0.91-0.92)
TE8	0.792		
TE12	0.701		
TE13	0.700		
Person-People Factor (PPF)			
Item	Correlation of the element with the rest		
TE17	0.815		Omega and Alpha Reliability 0.90 (IC95%=0.89-0.91)
TE18	0.810		
TE19	0.811		

In Table 2, corresponding to the academic goal orientation scale, the item-test correlations ranged from 0.610 to 0.759, evidencing that all items contribute significantly to the measurement of the construct. Item means ranged from 2.659 to 3.860, with standard deviations ranging from 1.078 to 1.215, reflecting adequate variability in responses. Cronbach's alpha and omega coefficients reached an

overall value of 0.943 (95 % CI: 0.937-0.948), indicating a high internal consistency of the scale. Items such as I10, with the highest item-test correlation (0.759), and I1, with the highest mean (3.860), stand out, reinforcing their relevance within the instrument. These results support the internal validity of the scale for assessing academic goal orientation in university students.

**Table 2.** Psychometric characteristics of the Academic Goal Orientation instrument

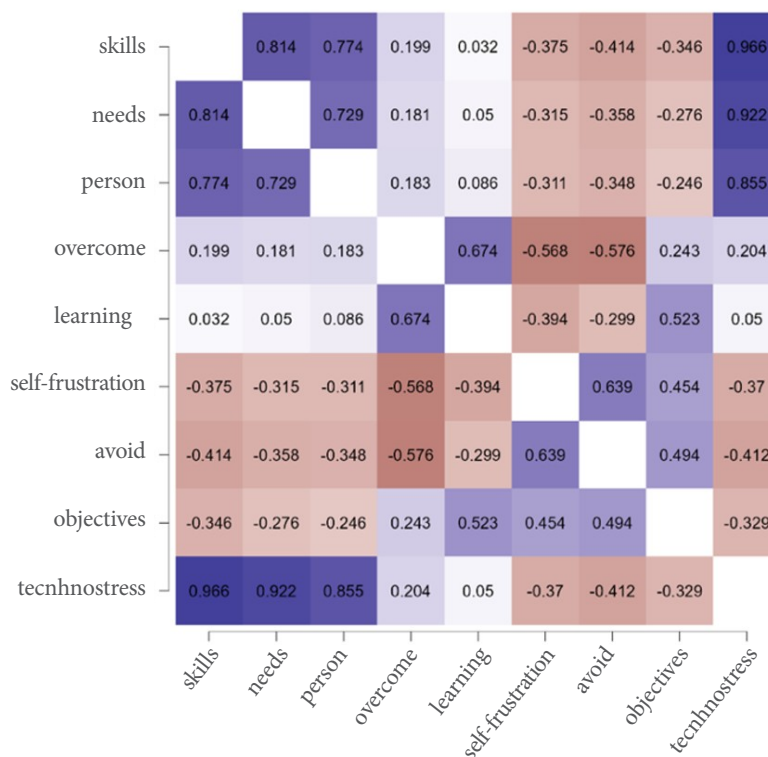
Reliability statistics from frequent individual items			
Item	Correlation of the element with the rest	Mean	DT
I7	0.732	2.958	1.191
I11	0.718	2.953	1.215
I14	0.736	2.901	1.192
V28	0.738	3.403	1.083
I6	0.725	3.397	1.078
I2	0.747	3.227	1.144
I10	0.759	3.167	1.108

Reliability statistics from frequent individual items				
Item	Correlation of the element with the rest	Mean	DT	
I8	0.690	2.834	1.171	
I15	0.668	2.777	1.190	
I12	0.634	2.659	1.192	
I3	0.654	2.947	1.186	
I16	0.642	3.776	1.123	
I1	0.626	3.860	1.113	
I9	0.610	3.840	1.109	
I5	0.651	3.692	1.163	

Figure 1 shows a negative correlation between technostress and academic goal orientation ( $r = -0.32$ ), suggesting that higher levels of technostress are associated with lower academic achievement orientation. This trend is replicated in the dimensions of technostress: Person-People Factor ( $r = -0.24$ ), Needs-Inputs-Resources ( $r = -0.27$ ),

and Technoeducational Skills-Demands ( $r = -0.34$ ). Likewise, the dimensions of academic orientation related to ego self-frustration ( $r = -0.37$ ) and work avoidance ( $r = -0.41$ ) show similar negative correlations, reinforcing the inverse relationship between technostress and adaptive academic attitudes.

**Figure 1.** Technostress heat map and academic goal orientation



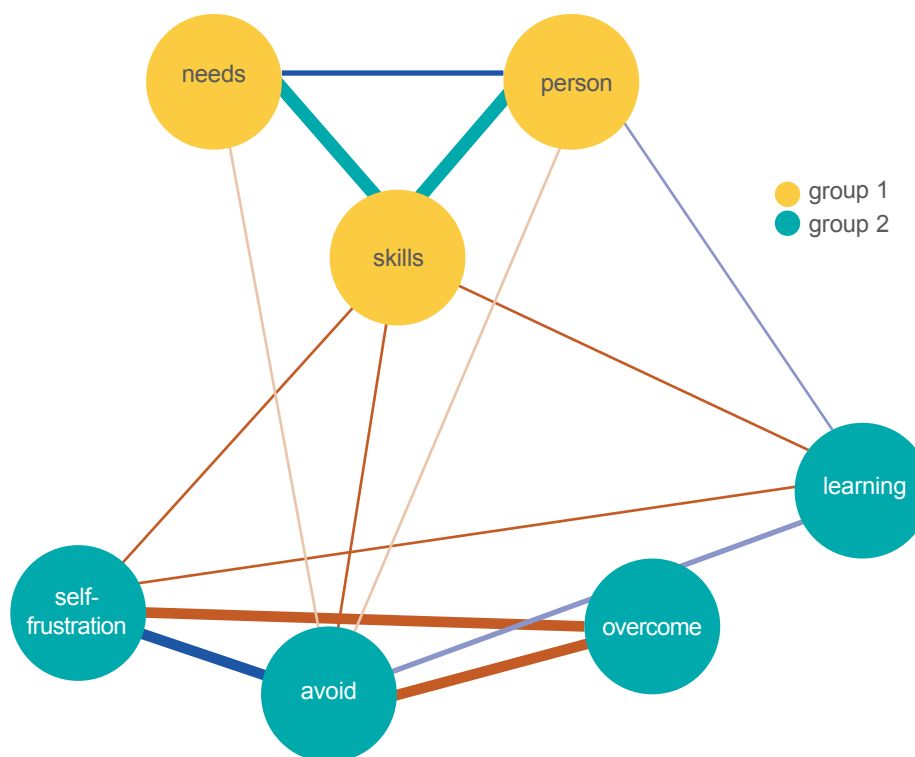
Network analysis evidences connections between technostress (represented by orange nodes) and academic goal orientation (blue nodes). Thicker lines indicate relationships of greater magnitude,

especially highlighting the influence of technostress on maladaptive academic attitudes such as work avoidance and ego self-frustration. In particular, the Technoeducational Skills-Demands dimension

shows a significant association with academic goals, suggesting that perceived technological demands affect how students cope with their academic goals.

This analysis allows us to identify critical areas of intervention to mitigate the negative effects of technostress on academic performance.

**Figure 2.** Network analysis between technostress and academic goal orientation



A multiple regression analysis was conducted to examine the relationship between technostress and academic goal orientation in college students. The model explained 12.5% of the observed variance ( $R^2 = 0.125$ ;  $F = 38.54$ ,  $p < .001$ ), suggesting that the dimensions of technostress contribute moderately to the explanation of the dependent variable. The Technoeducational Skills-Demands ( $B = -0.357$ ,  $\beta = -0.228$ ,  $t = -4.336$ ,  $p < .001$ ) and Person-People ( $B = -0.139$ ,  $\beta = -0.173$ ,  $t =$

$-3.369$ ,  $p = .001$ ) dimensions showed significant negative effects, indicating that higher levels of technological demands and interpersonal difficulties are associated with lower academic goal orientation. In contrast, the Needs-Inputs-Resources dimension did not present a significant effect in the model ( $B = 0.037$ ,  $\beta = 0.020$ ,  $t = 0.400$ ,  $p = .689$ ), suggesting that the perception of technological resources does not relevantly influence students' academic orientation

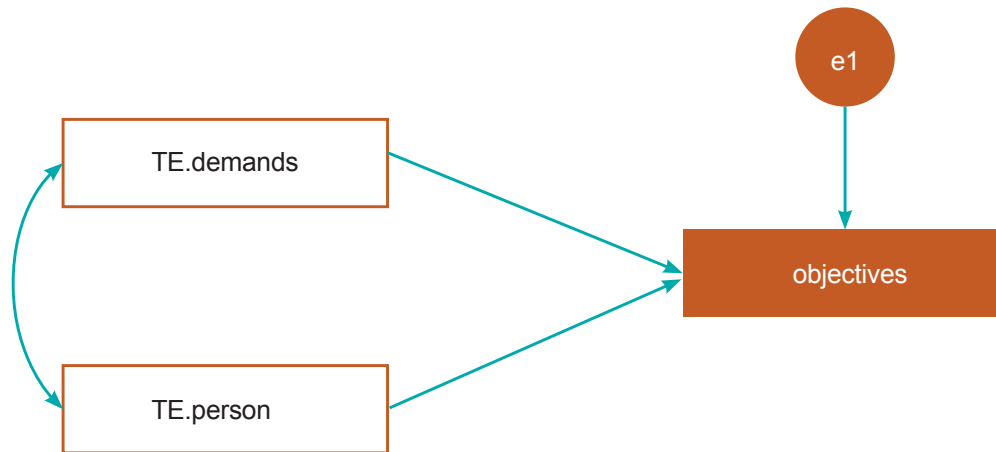
**Table 3.** Regression model of the technostress dimensions and academic objectives

Predictor variables	Not standardized coefficients		Standardized coefficients	t	Sig.
	B	Error Desv.	Beta		
(Constant)	60,856	.749		81,234	.000
TE.Claims	-.357	.082	-.228	-4,336	.000
TE.Resources	.037	.092	.020	.400	.689
TE.Person	-.139	.041	-.173	-3,369	.001

A structural model was built that included the dimensions Technoeducational Skills-Demands and Person-People, which presented a positive covariation of 0.72, indicating a high interrelation between them. The model showed significant associations with academic goal orientation and explained 11.4 %

of the variance of this variable. The fit indices were excellent, with a comparative fit index (CFI) of 1.0 and a square root of approximation residual (SRMR) of 0.000, supporting the adequacy of the model to represent the influence of technostress on academic orientation in college students.

**Figure 3.** SEM diagram of the explanatory model of the academic objectives



#### 4. Discussion

In response to the crisis in higher education, the Peruvian Ministry of Education established in 2014 the obligation to comply with basic quality conditions in universities, including adequate equipment for the teaching-learning process and the clear definition of academic objectives. Subsequently, standards were incorporated that required the implementation of a robust system of information and communication technologies (ICT), with the purpose of facilitating the achievement of academic objectives and ensuring the graduate profile defined in the curricular plans. Likewise, the importance of managing technostress was recognized as a critical factor to improve educational performance (SINEACE, 2018). This comprehensive reform aims to ensure that students achieve their academic goals effectively, promoting both academic success and student wellbeing.

In this context, the findings of this study evidence a negative and significant correlation between technostress and academic goal orientation in Peruvian university students, in line with that reported by Cabanach et al. (2017). These results suggest

that elevated levels of technostress may interfere with academic goal attainment, especially among students with a performance avoidance orientation, negatively affecting their motivation and ability to concentrate. Thus, technostress is configured as a factor that weakens goal focus, promotes avoidance behaviors and reduces academic engagement, in line with previous research on stress in educational contexts.

The network analysis conducted identified significant relationships between technostress and maladaptive attitudes such as ego self-frustration and work avoidance. These findings are consistent with Salazar-Concha et al. (2022), who highlight technostress as a psychosocial factor that contributes to burnout and decreased performance, even in the workplace. The presence of these attitudes in students with high levels of technostress reinforces the idea that this type of stress affects not only academic performance, but also self-regulation and perseverance, key elements for achieving educational goals.

However, Nascimento et al. (2024) offer a different view by pointing out that technostress can, in certain cases, be perceived positively, especially by teachers who interpret it as a challenge that stimulates pedagogical innovation. This contrast highlights that the impact of technostress is mediated by con-

textual and experiential factors. While in students its effect tends to be negative, in more experienced professionals it can function as a stimulus for the development of adaptive and transformative skills.

For their part, Moreno et al. (2019) point out that students with defined learning goals tend to develop more successful academic trajectories, in contrast to those oriented to avoid failure, who tend to adopt counterproductive behaviors, such as challenge avoidance. This approach supports the results of this study, in which it is observed that technostress, especially in interaction with an avoidance orientation, negatively influences academic performance. This relationship between goals, motivation, and successful performance underscores the need to implement differentiated intervention strategies that help students effectively manage technostress and develop a proactive approach toward their educational goals.

This study contributes theoretically to the field by evidencing the negative impact of technostress on academic orientation, reinforcing the importance of considering this variable in models of student motivation and achievement.

However, some limitations should be considered. Despite having a large sample of Peruvian students, the results cannot be generalized to other cultural or geographic contexts. The cross-sectional quantitative design limits the analysis of the evolution of technostress over time. The use of self-administered questionnaires could have introduced self-perception or social desirability biases. In addition, potentially influential variables such as family support, socioeconomic conditions or previous digital skills, which could modulate the relationship between technostress and academic orientation, were not included. Nor were mediating or moderating variables, such as digital literacy or access to technological resources, explored. Finally, the study focused exclusively on university students, so it is recommended that other educational levels be included in future research to obtain a more comprehensive view of the phenomenon. The absence of a longitudinal approach also prevents us from capturing possible variations in contexts of accelerated educational digitalization.

## 5. Conclusions

The findings of this study show that technostress has a significant negative relationship with academic goal orientation in Peruvian university students. Specifically, high levels of technostress are associated with decreased motivation, decreased focus on educational goals and, consequently, lower academic performance. This relationship is reinforced by the results of network analysis, which identified consistent links between technostress and avoidance attitudes, such as ego self-frustration and the tendency to avoid academic work. These patterns reflect not only an interference of technostress on academic performance, but also its negative impact on students' emotional well-being and perseverance.

These results underscore the need to understand technostress as a multifactorial phenomenon that affects multiple dimensions of student behavior. From this perspective, it is urgent to design and implement institutional programs that include psychological support, training in digital skills and coping strategies. Such initiatives would contribute not only to mitigate the adverse effects of technostress, but also to enhance essential adaptive competencies in highly digitalized educational environments.

Similarly, it is recommended that higher education institutions develop differentiated interventions that take into account individual variables, such as motivational orientation (learning vs. avoidance), level of digital literacy and possible differences in the way men and women experience and manage technological stress. Likewise, the formulation of educational policies that promote a balanced, conscious and ethical use of technologies could foster healthier, more inclusive and achievement-oriented learning environments.

In summary, this research provides valuable empirical evidence on the effect of technostress on academic goal orientation and highlights the importance of integrating preventive and intervention strategies that respond to the challenges of digital transformation in the university setting. Addressing technostress in a systematic and contextualized way represents a crucial opportunity to strengthen educational quality, promote student well-being, and ensure successful academic trajectories in an increasingly digitized society.

## Author contributions

**Emilyn Verde-Avalos:** conceptualization, research, validation, writing-revision and editing.

**José Livia-Segovia:** formal analysis, methodology, software, visualization.

**Second Malca-Peralta:** acquisition of financing, resources, original draft deed.

**Josué Turpo-Chaparro:** data curation, project management, supervision.

## References

- Abello, D., Alonso-Tapia, J. & Panadero, E. (2022). Cuestionario de metas situadas, ajuste y validación transcultural: comparación entre estudiantes colombianos y españoles. *Electronic Journal of Research in Educational Psychology*, 21(3), 667-692. <https://bit.ly/3ZxaStU>
- Aladini, A., Bayat, S. & Abdellatif, M. S. (2024). Performance-based assessment in virtual versus non-virtual classes: impacts on academic resilience, motivation, teacher support, and personal best goals. *Asian-Pacific Journal of Second and Foreign Language Education*, 9(1). <https://doi.org/10.1186/s40862-023-00230-4>
- Cabanach, R. G., Taboada, V. F., Souto-Gestal, A. & González Doniz, L. (2017). ¿Media la orientación de las metas académicas el estrés en estudiantes universitarios? Does the orientation of the academic goals mediate the stress in university students? *Revista de Investigación en Educación*, 15(2), 109-121. <https://bit.ly/3FM5Jrf>
- Chan Chi, G. I. (2022). Sentido de vida y metas de estudiantes en formación docente: caso de una universidad mexicana. *RIDE Revista Iberoamericana para la Investigación y el Desarrollo Educativo*, 13(25). <https://doi.org/10.23913/ride.v13i25.1248>
- Coppari, N. B., Bagnoli, L., Cudas, G., López, H., Martínez, Ú., Martínez, L. & Montaña, M. (2018). Validez y confiabilidad del cuestionario de tecnoestrés en estudiantes paraguayos. *Perspectivas en Psicología: Revista de Psicología y Ciencias Afines*, 15(2), 40-55. Universidad Nacional de Mar del Plata. <https://bit.ly/445vCul>
- Del Rosario, F. F. & Peral, P. D. (2011). Análisis de redes como Método para la definición de conceptos: Bibliografía. *Anales de Documentación*, 14(1), 1-14. Universidad de Murcia. <https://bit.ly/3HySI4W>
- Esparza, P. R. & Rubio, B. J. E. (2016). ¿Qué es Tecnología? Una aproximación desde la Filosofía: Disertación en dos movimientos. *Revista Humanidades*, 6(1), 1-43. <https://doi.org/10.15517/h.v6i1.25113>
- Fuentes, S. L., Cárdenas, B. J. P. & Chávez, B. R. M. (2024). Optimizando el aprendizaje colaborativo intercultural bilingüe mediado por las Tics: Caso Universidad Estatal de Bolívar. *ReHuSo: Revista de Ciencias Humanísticas y Sociales*, 9(2), 109-119. <https://doi.org/10.33936/rehuso.v9i2.6624>
- Gonzabay-Flores, C. F. & Santamaria-Romero, G. P. (2024). El impacto del tecnoestrés en el rendimiento académico de los estudiantes de Educación General Básica. *Polo del Conocimiento*, 9(9). <https://bit.ly/45TzUas>
- Huanacuni, L. R. (2021). Tecnoestrés & rendimiento académico en estudiantes de Enfermería en tiempos de COVID-19. *Investigación e Innovación: Revista Científica de Enfermería*, 1(2), 21-27. <https://doi.org/10.33326/27905543.2021.2.1218>
- Kim, K. & Park, H. (2018). The effects of Technostress on Information Technology Acceptance. *Journal of Theoretical and Applied Information Technology*, 31, 24. <https://bit.ly/4e1wyEp>
- Manrique-Abril, F. G. (2020). Academic goals orientation questionnaire for Colombian nursing students: validity and reliability study. *Nurse education today*, 84, 104226. + <https://doi.org/10.1016/j.nedt.2019.104226>
- Masias, Y. Y., Aco, C. E. A. & Colque, C. W. (2023). Tecnoestrés y rendimiento académico de estudiantes de primer ciclo de estudios de la Universidad Andina del Cusco, 2021. *Yachay - Revista Científico Cultural*, 12(2), 67-77. <https://doi.org/10.36881/yachay.v12i2.640>
- Monroy, H. E. J. (2022). Metas académicas de los jóvenes formados en una universidad privada. *Revista Universitaria Digital de Ciencias Sociales (RUDICS)*, 24, 1-18. <https://bit.ly/43I1eQL>
- Moreno, J. E., Chiecher, A. & Paoloni, P. (2019). Los estudiantes universitarios y sus metas académicas. Implicancias en el logro y retraso de los estudios. *Ciencia, Docencia y Tecnología*, 30(59 nov-abr). <https://doi.org/10.33255/3059/693>
- Nascimento, L., Correia, M. F. & Califf, C. B. (2024). Towards a bright side of technostress in higher education teachers: Identifying several antecedents and outcomes of techno-eustress. *Technology in Society*, 76. <https://doi.org/10.1016/j.techsoc.2023.102428>
- Penado, A. M. R.-D.-D. M. P., Rodicio-García, M. L., Mosquera-González, M. J. & Rego-Agraso, L. (2021). *Tecnoestrés objetivo en estudiantes universitarios durante la pandemia por COVID-19*. Adaya Press. <https://bit.ly/4kIZuDR>

- Ponce, P. J. E., Hernández, G. E., Jalixto, E. H. M. & Chiri, S. P. C. (2023). El tecnoestrés en el rendimiento académico en estudiantes. *Horizontes. Revista de Investigación en Ciencias de la Educación*, 7(28), 852-861.  
<https://doi.org/10.33996/revistahorizontes.v7i28.559>
- Prieto-Quezada, Ma. T., Romero-Sánchez, A. & Oliva, H. (2023). Adicción a las TIC. Perspectiva docente desde tres centros universitarios. *Alteridad*, 18(1), 48-58.  
<https://doi.org/10.17163/alt.v18n1.2023.04>
- Quispe, J. L., Quispe, Ú. I., Farias, C. V. & Hernández, P. Y. (2024). Tecnoestrés en el desgaste académico de estudiantes universitarios del Perú. *Areté, Revista Digital del Doctorado en Educación de la Universidad Central de Venezuela*, 10(19).  
<https://doi.org/10.55560/arete.2024.19.10.9>
- Roig-Vila, R., López-Padrón, A. & Urrea-Solano, M. (2023). Dependencia y adicción al smartphone entre el alumnado universitario: ¿Mito o realidad? *Alteridad*, 18(1), 34-47.  
<https://doi.org/10.17163/alt.v18n1.2023.03>
- Roque, H., Alonso, G. S., Salazar, G. Y. E., Criollo, C. A. del R. & Curay, Y. C. E. (2021). Estrategias de aprendizaje y metas académicas en estudiantes universitarios ecuatorianos de ciencias de la salud. *EDUMECENTRO*, 13(3), 196-216.  
<https://bit.ly/4dYh9oe>
- Ruiz, D. V. E., Ríos-Manríquez, M. & Sánchez-Fernández, M. D. (2019). Los Tecno Recurso Laborales y su impacto en el Tecnoestrés. Un Caso empírico. *International Journal of Innovation*, 7(2), 299-311.  
<https://doi.org/10.5585/iji.v7i2.247>
- Saborío-Taylor, S. & Álvarez, C. A. (2023). Las metas académicas según escalas de aprendizaje, logro y refuerzo social: un estudio desde las percepciones según género. *Revista Ensayos Pedagógicos*, 18(2), 1-24. <https://doi.org/10.15359/rep.18-2.14>
- Salazar-Concha, C., Encina Ramírez, C., Rojas Ramírez, G. & Araya-Guzmán, S. (2022). Technostress and its effect on productivity in university students in times of COVID-19. *Revista Venezolana de Gerencia*, 27(100), 1721-1738.  
<https://doi.org/10.52080/rvgluz.27.100.26>
- Salazar-Concha, C., Ficapal-Cusí, P. & Boada-Grau, J. (2020). Tecnoestrés. Evolución del concepto y sus principales consecuencias. *Teuken Bidikay - Revista Latinoamericana de Investigación en Organizaciones, Ambiente y Sociedad*, 11(17), 165-180. <https://doi.org/10.33571/teuken.v11n17a9>
- Sampieri, H. R., Fernández, C. C. & Baptista, P. L. (2003). *Metodología de la Investigación*. <https://bit.ly/3HACnNb>
- SINEACE. (2018). *Explicación de estándares del modelo de acreditación de programas de estudios de educación superior universitaria*. <https://bit.ly/3Tl2v0W>
- Skaalvik, E. M. (2002). Self-enhancing and self-defeating ego goals in mathematics lessons: relationships among task and avoidance goals, achievement, self-perceptions, anxiety, and motivation (A Scientific Educology). *International Journal of Educology*, 16(1). <https://bit.ly/3HGkOuR>
- Solano, C. V. V. & Núñez, L. L. (2024). Estudios transdisciplinarios en comunicación y sociedad. *revistainvecom.org* (Vol. 5, Issue 2). [www.revistainvecom.org](http://www.revistainvecom.org).
- Suriá, M. R. (2023). Use of technologies, techniques and their influence on academic performance in university students. *Anuario de Psicología*, 53(2), 33-42. <https://doi.org/10.1344/anpsic2023.53/2.4>
- Toscano, F., Galanti, T., Giffi, V., Fiore, T. Di, Cortini, M. & Fantinelli, S. (2024). The mediating role of technostress in the relationship between social outcome expectations and teacher satisfaction: evidence from the COVID-19 pandemic in music education. *Research in Learning Technology*, 32. <https://doi.org/10.25304/rlt.v32.3086>
- Vega-Muñoz, A., Estrada-Muñoz, C., Andreucci-Annunziata, P., Contreras-Barraza, N. & Bilbao-Cotal, H. (2022). Validation of a measurement scale on technostress for university students in Chile. *International Journal of Environmental Research and Public Health*, 19(21). <https://doi.org/10.3390/ijerph192114493>
- Villavicencio-Ayub, E., Aguilar, D. G. I. & Calleja, N. (2020). Impact of technostress on the Mexican population and its relation with sociodemographic and work variables. *Psicogente*, 23(44). <https://doi.org/10.17081/psico.23.44.3473>
- Wang, X. & Li, B. (2019). Technostress among teachers in higher education: An investigation from multidimensional person-environment misfit. *Frontiers in Psychology*, 10(JULY). <https://doi.org/10.3389/fpsyg.2019.01791>



# Publication guidelines

## *(Normas editoriales)*



Source: <https://www.shutterstock.com/es/image-photo/woman-sitting-desk-working-home-social-1696731895>

# Publication Guidelines of «Alteridad»

## 1. General information

«Alteridad» is a bilingual scientific journal of the Salesian Polytechnic University of Ecuador (UPS), published since January 2006 uninterruptedly, on a semi-annual basis (January-July).

It is an arbitrated scientific journal, with peer-review system under the double-blind review, following the publication standards of the American Psychological Association (APA). This system ensures authors an objective, impartial and transparent review process, making it easier for authors to be included in reference international databases, repositories, and indexes.

«Alteridad» is indexed in the Web of Science's Emerging Sources Citation Index (ESCI), at the Scientific Electronic Library Online (SciELO), in the REDALYC Scientific Information System, in the directory and selective catalog of the Regional Online Information System for Scientific Journals of Latin America, the Caribbean, Spain and Portugal (Latindex), in the Directory of Open Access Journals (DOAJ), in the European Reference Index for the Humanities and Social Sciences (ERIHPLUS), on the Dialnet Portal. It is evaluated in the Information Matrix for Journal Analysis (MIAR), the Integrated Classification of Scientific Journals (CIRC), and the Qualis review system for CAPES journals. In addition, it is in repositories, libraries and specialized catalogs around the world.

The journal is published in two versions: electronic (e-ISSN: 1390-8642) and printed (ISSN: 1390-325X) in Spanish and English; each manuscript is identified with a Digital Object Identifier System (DOI). All articles published in «Alteridad» have the Creative Commons Attribution-Non-Commercial-Share Equal license (RoMEO blue journal).

## 2. Scope and policies

### 2.1 Topics

«Alteridad» is a journal specialized in Education and its transdisciplinary topics such as Didactics, School Management, Educational Technology, Social Pedagogy, among others, all related to the main topic.

### 2.2 Contributions

All manuscripts must be original, and must not have been published in any other journal or must not be in the arbitration or publication process in another journal. Empirical research results are published in Spanish, Portuguese or English, and studies and state-of-the-art are also allowed:

**a) Research:** 5000 to 7500 words, including title, abstracts, descriptors, tables, and references. Assessment will be made of research results, methodological rigor, the relevance of the subject, the quality of scientific discussion, the variety, timeliness, and richness of bibliographic references (preferably publications indexed in JCR and Scopus). At least 35 references must be included.

#### **(b) Studies and literature reviews**

- **Studies:** 5000 to 7500 words of text, including tables and references. The debate, the relevance of the topic, the originality of the contributions and the bibliographical references (preferably of publications indexed in JCR and Scopus) will be especially valued. Expected 35 references minimum.
- **Literature reviews:** 6000 to 8500 words of text, including tables and references. An exhaustive review of the state of the art of a current research topic will be considered, with justified

and selective references of approximately 70 works (preferably from publications indexed in JCR and Scopus).

## 2.3 Sections

The journal has a semi-annual periodicity (20 articles per year), published in January and July and has two sections of five articles each by number; the first referring to a **Monographic** topic prepared in advance and with thematic topic and the second, a section of **Miscellaneous**, composed of varied contributions related with educational topics.

## 3. Editorial process

### 3.1 Submission of manuscripts

Manuscripts must be submitted only and exclusively through the Open Journal System (OJS), in which all authors must register in advance, although only one will be responsible for the correspondence. No author may submit or review two manuscripts simultaneously, estimating a time of four consecutive numbers (2 years). An article may have a maximum of 3 authors, although if justified depending on the study, there may be up to 5.

«Alteridad» informs by email the reception of the manuscript submitted by the authors. The information related to the acceptance or rejection of the manuscript is sent by email and the platform; and in the case of acceptance, the author is also informed of the editing process.

The Guidelines for the Authors are on the website of the journal, in the Guidelines section, as well as the template for writing the paper (LaTeX/Overleaf or Word), the cover page and cover letter, the review protocol, the pre-submission list, the evaluation forms by the external reviewers and a guide for submitting the article through OJS. Before the submission, it is strongly recommended that the manuscript be checked with the Pre-Check Protocol. Two files should be sent simultaneously:

- a) **Cover page and cover letter** (use the official model), which must include:
  - **Cover page** (Title, Abstract and key words provided in the Manuscript).

- **Full name of each of the authors**, organized in priority order; followed by the professional category, institution, email of each author and ORCID number. It is mandatory to indicate if the authors have a PhD academic degree (include Dr. before the name).
  - A **Cover letter** will also be included indicating that the manuscript is an original contribution, has not been sent or evaluated in another journal, with the signature of the authors, and acceptance (if applicable) of formal changes to the manuscript compliant with the rules and partial transfer of rights to the publisher.
- b) Fully anonymized **manuscript**, in accordance with the rules referred to in section 4.

### 3.2 Review process

Upon having received the document and in a maximum period of 30 days, the correspondence author shall receive a notification, indicating whether the manuscript is considered or dismissed for the arbitration process by the scientific reviewers. In case that the article has formal problems or does not address the educational subject or has a high similarity percentage to another document(s), the editorial board shall reject the paper without the option to send it back. Conversely, if it has superficial problems, it will be returned to the author for corrections before starting the evaluation process. The submission date of the article will be considered based on the final submission when the article is presented with the corrections.

The articles will be scientifically evaluated by an average of three experts of the topic. Reports will indicate the following recommendations: Accept the Submission, Publishable with Modifications, Sent the manuscript back for its Review, Not Publishable. The acceptance or rejection of the manuscript for its publication will be decided from the analysis of external reports. In the case of dissenting results, it shall be forwarded to a new opinion, which shall be final. The protocol used by reviewers is public (researches; studies and state-of-the-art).

In general, once the external scientific reviews are taken into view, the criteria justifying the decision on the acceptance/rejection of the manuscript by the Editorial board are:

- Current and novelty.

- Relevance and significance: advancement of scientific knowledge.
- Originality.
- Reliability and scientific validity: proven methodological quality.
- Organization (logical coherence and formal presentation).
- External support and public/private funding.
- Co-authoring and internationalization degree of the proposal and the team.
- Presentation: good writing.

The timeline for the scientific evaluation of manuscripts after the previous estimation procedures by the Editorial Board is up to 100 days. As for the manuscripts sent for Calls for papers, their scientific review dates begin once the call finishes. Manuscripts that are positively evaluated and require modifications must be sent with the changes within the next 15 days.

### 3.3 Editing and publishing of the manuscript

The edition and layout processes of the accepted articles is performed by the Technical Board of the journal along with the Abya-Yala Editorial. «Alteridad» reserves the right to make style corrections and editorial changes if necessary to improve the manuscript. A proof of printing in PDF format will be sent to the authors for correcting typography and spelling, and its review and comments must be sent within three days. The Editorial provides authors a free professional translation of the final version of the manuscript into English (or Spanish, according to the original version), guaranteeing its international consultation and dissemination. Articles will be published on the journal's platform in both versions (Spanish and English) and in the following formats: PDF, HTML, EPUB and XML-Jats.

## 4. Structure of the manuscripts

The manuscripts shall be submitted in typeface Arial 10, simple spacing, fully justified and without tabs or white space between paragraphs. Only large blocks (title, authors, abstracts, key words, credits, and captions) will be separated with white space. The page must be two centimeters in all its margins. Manuscripts must be submitted in Microsoft Word

document (.doc or .docx), ([https://alteridad.ups.edu.ec/pdf/alteridad/Microsoft\\_Word\\_Template.docx](https://alteridad.ups.edu.ec/pdf/alteridad/Microsoft_Word_Template.docx)) o LaTeX/ Overleaf (.tex) (<https://www.overleaf.com/latex/templates/revista-alteridad-ecuador/svvcjcbgm-crrv>), requiring the file to be anonymized in File Properties to avoid the information related to the identification of the author/s.

### 4.1 Cover page

**Title (Spanish and English):** Concise but informative, in Spanish in the first line and in English in the second, consisting of as many significant terms as possible. The title is not only the responsibility of the authors, hence changes can be proposed by the Editorial Board. A maximum of 80 characters with space are accepted.

**Abstract (Spanish and English):** It must be concise and must follow this order: justification, objectives, methodology used (approach and scope), more relevant results, discussion, and main conclusions. It must be written impersonally "The present work analyzes...". In the case of the Abstract (in the other language), the use of automatic translators will not be accepted. It will be between 220/230 words.

**Key words (Spanish and English):** 6 keywords must be presented for each language, and must be directly related to the topic of the manuscript. The use of the keywords presented in UNESCO's Thesaurus is recommended (<http://bit.ly/2kIgn8I>). New terms would be accepted only in exceptional cases if they present a standardized scientific nature.

### 4.2 IMRDC Structure

For those works involving empirical research, the manuscripts will strictly respect the IMRDC structure, with the headings of Economic Supports and Notes being optional. Literature Studies and Reviews may be more flexible under their headings, especially in Methodology, Results and Discussion. In all types of works, bibliographic references are mandatory.

1. **Introduction:** It should include the theoretical foundations and purpose of the study, using bibliographic citations, as well as the review of the most significant literature of the topic at the national and international level. The use of

high-impact references (JCR and Scopus) will be positively valued.

2. **Methodology:** The approach and methodology used must be written in a way that the reader can easily understand the development of the research. It should contain the explanation on the approach (quantitative, qualitative or mixed) and the scope (exploratory, descriptive, correlational or explanatory). When appropriate, it shall describe the sample and the sampling form, and it must refer to the type of statistical analysis applied. If it is an original methodology, it is necessary to set out the reasons that have led to its use and describe the possible limitations.
3. **Results:** Efforts will be made to highlight the most relevant results and observations of the investigation, describing, without making judgments, the material and methods used for the analysis. The results will be presented in figures and/or tables according to the journal's standards (See section 4.4). They will appear in a logical sequence in the text, tables or figures, avoiding data redundancy.
4. **Discussion and conclusions:** It will summarize the most important findings, relating the observations with interesting studies, pointing to contributions and limitations, without resulting in data already commented in other sections. In addition, this section should include deductions and lines for future research.

### 4.3 Economic support and notes

**Economic support (optional):** Council Science Editors recommends that authors specify the source of funding for the research. Works on the endorsement of competitive national and international projects will be considered a priority. In any case, for the scientific assessment of the manuscript, it must be anonymized with XXXX only for its initial evaluation, in order not to identify authors and research teams, which must be set out in the Cover Letter and subsequently in the final manuscript.

**Notes:** if necessary, notes will be at the end of the article (before references). They should be used to clarify terms or make marginal annotations. Note numbers are placed in superscript, both in the text and in the final note. Notes collecting simple

bibliographic citations (without comments) are not allowed, as these should be in the references. If it contains a cite, the reference must also be found in the Bibliography section.

### 4.4 Bibliography

Bibliographical citations should be reviewed in the form of references to the text. Bibliography that is not cited should not be included in the text. Its number must be sufficient and necessary to contextualize the theoretical framework, methodology used and research results in an international research space: minimum 35 for empirical research manuscripts, and around 70 for literature studies and reviews.

They will be presented alphabetically by the author's first last name (adding the second one only in case the first one is very commonly used). The quote should be extracted from the original documents, preferably journals and to a lesser extent books. Given the significance of citation indexes and impact factor calculations, the use of references from indexed publications in JCR and/or Scopus and the correct citation following APA 7 norms is valued (<http://bit.ly/35FNGvN>).

It is mandatory that references with DOI (Digital Object Identifier System) be written in the References (can be obtained on <https://search.crossref.org/>). All journals and books without DOI must contain a link (in its online version, if applicable, and in a shorten version using Bitly: <https://bitly.com/>), and the websites must include the consultation date using the format provided.

Journal articles must be presented in English, with the exception of those in Spanish and English, in which case they will be presented in both languages using square brackets.

### Norms for the references

#### a) Periodic publications

- **Journal article (one author):** Ochoa, A. (2019). The type of participation promoted in schools is a constraint factor for inclusive education. [El tipo de participación que promueve la escuela, una limitante para la inclusión]. *Alteridad*, 14(2), 184-194. <https://doi.org/10.17163/alt.v14n2.2019.03>

- **Manuscript from a journal (until twenty authors):** Guarderas, P., Larrea, M., Cuvi, J., Vega, C., Reyes, C., Bichara, T., Ramírez, G., Paula, Ch., Pesantez, L., Íñiguez, A., Ullauri, K., Aguirre, A., Almeida, M., & Arteaga, E. (2018). Sexual harassment in Ecuadorian universities: content validation for instrument development. [Acoso sexual en las universidades ecuatorianas: validez de contenido de un instrumento de medición]. *Alteridad*, 13(2), 214-226. <https://doi.org/10.17163/alt.v13n2.2018.05>
  - **Manuscript from a journal (without DOI):** López, L., & Ramírez-García, A. (2014). Medidas disciplinarias en los centros educativos: ¿Suficientes contra el acoso escolar? *Perfiles Educativos*, 36(145), 32-50. <https://bit.ly/37Xd5mw>
- b) Books and chapters of books**
- **Complete books:** Cuéllar, J.C., & Moncada-Paredes, M.C. (2014). *El peso de la deuda externa ecuatoriana*. Abya-Yala.
  - **Chapter of books:** Padilla-Verdugo, J. (2014). La Historia de la Educación desde los enfoques del conocimiento. In E. Loyola (Ed.), *Ciencia, Tecnología y Sociedad (CTS). Miradas desde la Educación Superior en Ecuador* (pp. 107-128). Abya-Yala. <https://bit.ly/3etRnZH>
- c) PhD or Master dissertations**
- Llorent, M. (2019). *Las políticas educativas TIC en el plano autonómico: el caso de Andalucía* [Tesis doctoral, Universidad de Sevilla]. Depósito de Investigación Universidad de Sevilla. <https://bit.ly/3YRTRr5>

## Guidelines for Headings, Tables and Figures

The headings of the article shall be numbered in Arabic, without full case of capital letters, no underscores, no bold ones. The numbering must be at most three levels: 1. / 1.1. / 1.1.1. A carriage return will be established at the end of each numbered heading.

Tables and figures must be presented in the text in Word or LaTeX located in the place selected by the authors. They shall be used only when necessary and suitable, and must be up to 6 between tables and figures (more only under extraordinary cases if justified). Both must be listed in Arabic and titled with the des-

cription of their content. If the source of the table or figure corresponds to another author, the authors must incorporate the source consulted below the table [for example, Source: Romero-Rodríguez (2016, p. 32)].

Tables must be elaborated in document, thus tables cut and pasted from other documents that cannot be edited in the diagramming process will not be accepted. The figures, in addition to being incorporated in the document, must be sent as supplementary material when submitting to «Alteridad» OJS, with a quality greater than 600 dpi, in TIFF, JPEG or PNG files.

In the case of LaTeX/Overleaf, figures must be loaded in the template in original PDF format in order to maintain its quality, since conversion from other formats can lower the quality of the figure. In the case of Word, in addition to being incorporated in the document, figures must be sent as complementary material when submitting the file on the OJS of «Alteridad», having a quality higher than 600 dpi in TIFF, JPEG or PNG.

## 5. Fees and APC

«Alteridad» is an Open Access journal, included in the Directory of Open Access Journals (DOAJ) that offers all its production online for the scientific community. There are not fees throughout the editorial process for the publishing articles, including scientific review, layout and translation thereof. There is no publication fee, no Article Processing Charge (APC) associated with this publication, neither for authors nor for readers. The journal is also licensed by Creative-Commons Attribution-Non-Commercial-Share Equal (RoMEO blue journal), which allows free access, download and archive of published articles. All expenses and financing of «Alteridad» derive from the contributions made by the Salesian Polytechnic University.

## 6. Ethical responsibilities

Each author shall submit a responsible statement of authorship and originality, as well as their ethical responsibilities.

- **Originality:** The works must be original and should not be evaluated simultaneously in another publication; hence, the authors are responsible to comply with this standard. The opinions expressed in the published articles are

the responsibility of the author/s «Alteridad» as CrossRef®'s international partner, uses the CrossCheck® and iThenticate® anti-plagiarism tool to ensure the originality of the manuscripts.

- **Authorship:** The list of signatory authors should include only those who have contributed intellectually to the development of the work. Collaborating in data collection is not sufficient criteria of authorship. «Alteridad» rejects any responsibility for possible conflicts arising from the authorship of the manuscripts published.
- **Use of Artificial Intelligence:** In case artificial intelligence is used at any stage of the research presented in the article, authors have to clearly highlight it in the cover letter/cover-letter associated with the article, indicating the specific section(s) where artificial intelligence has been used. The purpose of this indication is to inform readers about the sections where this technology has been used, providing more transparency and understanding about its application in the research presented.

The journal *Alteridad* recognizes the importance of maintaining high ethical standards in scientific research, particularly in the use of artificial intelligence (AI).

It is at the discretion of the editorial team, the acceptance of the publication that has used artificial intelligence.

- **Transmission of copyright:** the transfer of rights of the manuscript published in «Alteridad» will be included in the cover letter. The Salesian Polytechnic University (the publisher) has the copyright of published articles; it favors and allows the reuse of these under the license indicated above.

## 7. Promotion and dissemination of the published article

The authors commit to disseminate their published article as well as to the whole journal using the link of the website of «Alteridad» (<https://alteridad.ups.edu.ec/index.php/alteridad/>). In addition, they are encouraged to share their published article in academic networks (Academia.edu, ResearchGate, Mendeley, Kudos, ...), social networks (Twitter, Facebook, LinkedIn, ...), also publishing the DOI in these), institutional repositories, Google Scholar, ORCID, web or personal blog, among others. Authors are also encouraged to share the published article through email lists, research groups, and personal contacts.

«Alteridad» has a Metric Measurement System (PlumX) that allows verifying the compliance with this commitment. The impact of previous works will be considered for submitting future articles in «Alteridad».

# Normas de publicación en «Alteridad»

## 1. Información general

«Alteridad» es una publicación científica bilingüe de la Universidad Politécnica Salesiana de Ecuador (UPS), editada desde enero de 2006 de forma ininterrumpida, con periodicidad fija semestral (enero-julio).

Es una revista científica arbitrada, que utiliza el sistema de evaluación externa por expertos (*peer-review*), bajo metodología de pares ciegos (*double-blind review*), conforme a las normas de publicación de la *American Psychological Association* (APA). El cumplimiento de este sistema permite garantizar a los autores un proceso de revisión objetivo, imparcial y transparente, lo que facilita a la publicación su inclusión en bases de datos, repositorios e indexaciones internacionales de referencia.

«Alteridad» se encuentra indexada en el *Emerging Sources Citation Index* (ESCI) de *Web of Science*, en la *Scientific Electronic Library Online* (SciELO), en el Sistema de Información Científica REDALYC, en el directorio y catálogo selectivo del Sistema Regional de Información en Línea para Revistas Científicas de América Latina, el Caribe, España y Portugal (Latindex), en el *Directory of Open Access Journals* (DOAJ), en el *European Reference Index for the Humanities and Social Sciences* (ERIHPLUS), en el Portal Dialnet; está evaluada en la Matriz de Información para el Análisis de Revistas Científicas (MIAR), en la Clasificación Integrada de Revistas Científicas (CIRC), y en el sistema Qualis de revisión de revistas de CAPES. Además, se encuentra en repositorios, bibliotecas y catálogos especializados de todo el mundo.

La revista se edita en doble versión: electrónica (e-ISSN: 1390-8642) e impresa (ISSN: 1390-325X) en español e inglés; siendo identificado cada trabajo con un *Digital Object Identifier System* (DOI). Todos los artículos publicados en «Alteridad» tienen licencia Creative Commons Reconocimiento-No-Comercial-Compartir igual (RoMEO blue journal).

## 2. Alcance y política

### 2.1 Temática

«Alteridad» es una revista especializada en Educación y sus líneas transdisciplinarias como Didáctica, Gestión de Centros Escolares, Educomunicación, tecnología educativa, Pedagogía Social, entre otras; y todas aquellas disciplinas conexas interdisciplinariamente con la línea temática central.

### 2.2 Aportaciones

Todos los trabajos deben ser originales, no haber sido publicados en ningún medio ni estar en proceso de arbitraje o publicación. Se editan preferentemente resultados de investigación empírica, redactados en español, portugués o inglés, siendo también admisibles estudios y selectas revisiones de la literatura (*state-of-the-art*):

- a) **Investigaciones:** 5000 a 7500 palabras de texto, incluyendo título, resúmenes, descriptores, tablas y referencias. Se valorarán especialmente los resultados de la investigación, el rigor metodológico, la relevancia de la temática, la calidad de la discusión científica, la variedad, actualidad y riqueza de las referencias bibliográficas (preferiblemente de publicaciones indexadas en JCR y Scopus). Se esperan mínimo 35 referencias.
- b) **Estudios y revisiones de la literatura**
  - **Estudios:** 5000 a 7500 palabras de texto, incluidas tablas y referencias. Se valorará especialmente el debate generado, la relevancia de la temática, la originalidad de las aportaciones y riqueza de las referencias bibliográficas (preferiblemente de publicaciones indexadas en JCR y Scopus). Se esperan mínimo 35 referencias.
  - **Revisiones de la literatura:** 6000 a 8500 palabras de texto, incluidas tablas y referencias. Se valorará la revisión exhaustiva del estado de

la cuestión de un tema de investigación actual con referencias justificadas y selectivas de alrededor de 70 obras (preferiblemente de publicaciones indexadas en JCR y Scopus).

## 2.3 Secciones

La revista tiene periodicidad semestral (20 artículos por año), publicada en los meses de enero y julio y cuenta por número con dos secciones de cinco artículos cada una, la primera referida a un tema **Monográfico** preparado con antelación y con editores temáticos y la segunda, una sección de **Misceláneas**, compuesta por aportaciones variadas que traten temas educativos de forma prioritaria.

## 3. Proceso editorial

### 3.1 Envío de manuscritos

Los manuscritos deben ser enviados única y exclusivamente a través del *Open Journal System* (OJS), en el cual todos los autores deben darse de alta previamente, si bien uno solo de ellos será el responsable de correspondencia. Ningún autor podrá enviar o tener en revisión dos manuscritos de forma simultánea, estimándose una carencia de cuatro números consecutivos (2 años). Un artículo podrá tener como máximo 3 autores, aunque si se justifica en función del tamaño del estudio, podrán ser hasta 5.

«Alteridad» acusa recepción de los trabajos enviados por los autores e informa por email y mediante la plataforma del proceso de aceptación o rechazo; y en el caso de aceptación, del proceso de edición.

En el Portal oficial de la revista, en la sección Normativas, están las Normas para Autores, las plantillas para la redacción de los manuscritos (LaTeX/Overleaf o Word), la Portada y Carta de presentación, el Protocolo de chequeo previo al envío, los formularios de evaluación por parte de los revisores externos y una guía para el envío del artículo a través de OJS. Antes de su envío se recomienda encarecidamente que se compruebe el manuscrito con el Protocolo de chequeo previo. Deben remitirse simultáneamente dos archivos:

- a) **Portada y Carta de presentación** (usar el modelo oficial), en la que aparecerán:

- **Portada** (Título, Resumen y Descriptores previstos en el Manuscrito).
- **Nombre y apellidos completos** de cada uno de los autores, organizados por orden de prelación; seguido por la categoría profesional, centro de trabajo, correo electrónico de cada autor y número de ORCID. Es obligatorio indicar si se posee el grado académico de doctor (incluir Dr./Dra. antes del nombre).
- Se incluirá además una **declaración** (Cover letter) de que el manuscrito se trata de una aportación original, no enviada ni en proceso de evaluación en otra revista, confirmación de las autorías firmantes, aceptación (si procede) de cambios formales en el manuscrito conforme a las normas y cesión parcial de derechos a la editorial.
- **Manuscrito** totalmente anonimizado, conforme a las normas referidas en el epígrafe 4.

### 3.2 Proceso de revisión

En un plazo máximo de 30 días, a partir de la recepción del documento, el autor de correspondencia recibirá una notificación, indicando preliminarmente si se estima o desestima para el arbitraje por los revisores científicos. En el caso de que el artículo presente deficiencias formales, no trate el tema educativo o tenga un elevado porcentaje de similitud con otro(s) documento(s), el Consejo editorial desestimaré el trabajo sin opción de vuelta. Por el contrario, si presenta carencias superficiales de forma, se devolverá al autor para su corrección antes de comenzar del proceso de evaluación. La fecha de recepción del artículo no computará hasta la recepción correcta del mismo.

Los artículos serán evaluados científicamente por una media de tres expertos en el tema. Los informes indicarán las siguientes recomendaciones: Aceptar el envío, Publicable con modificaciones, Reenviar para revisión, No publicable. A partir del análisis de los informes externos, se decidirá la aceptación o rechazo de los artículos para su publicación. En el caso de resultados discrepantes se remitirá a un nuevo dictamen, el cual será definitivo. El protocolo utilizado por los revisores es público (Investigaciones; Estudios y revisiones de la literatura).

En general, una vez vistas las revisiones científicas externas, los criterios que justifican la decisión

sobre la aceptación/rechazo de los trabajos por parte del Consejo Editor son los siguientes:

- Actualidad y novedad.
- Relevancia y significación: avance del conocimiento científico.
- Originalidad.
- Fiabilidad y validez científica: calidad metodológica contrastada.
- Organización (coherencia lógica y presentación formal).
- Apoyos externos y financiación pública/privada.
- Coautorías y grado de internacionalización de la propuesta y del equipo.
- Presentación: buena redacción.

El plazo de evaluación científica de manuscritos, superados los trámites previos de estimación por el Consejo Editor, es de 100 días como máximo; los remitidos para *Calls for papers*, sus fechas de revisión científica se inician al cierre de los mismos. Los trabajos que sean evaluados positivamente y requieran modificaciones, deberán ser reenviados con los cambios, dentro de los siguientes 15 días.

### 3.3 Edición y publicación del manuscrito

El proceso de corrección de estilo y maquetación de los artículos aceptados es realizado por el Consejo Técnico de la Revista en coordinación con la Editorial Abya-Yala. «Alteridad» se reserva el derecho de hacer corrección de estilo y cambios editoriales que considere necesarios para mejorar el trabajo. A los autores de artículos se enviará una prueba de imprenta en formato PDF para su corrección únicamente de tipografía y ortografía, mismo que deberán reenviar en un máximo de tres días. La Editorial realizará, gratuitamente para los autores, la traducción profesional de la versión final del manuscrito al idioma inglés (o español, según la versión original), lo que garantizará su consulta y difusión internacional. Los artículos serán publicados en la plataforma de la revista en sus dos versiones idiomáticas (español e inglés) y en los siguientes formatos: PDF, HTML, EPUB y XML-Jats.

## 4. Estructura de los manuscritos

Los trabajos se presentarán en tipo de letra Arial 10, interlineado simple, justificado completo y sin tabuladores ni espacios en blanco entre párrafos. Solo se separarán con un espacio en blanco los gran-

des bloques (título, autores, resúmenes, descriptores, créditos y epígrafes). La página debe tener dos centímetros en todos sus márgenes. Los trabajos deben presentarse en formato de Microsoft Word (.doc o .docx) ([https://alteridad.ups.edu.ec/pdf/alteridad/Plantilla Microsoft Word.docx](https://alteridad.ups.edu.ec/pdf/alteridad/Plantilla%20Microsoft%20Word.docx)) o LaTeX/ Overleaf (.tex) (<https://www.overleaf.com/latex/templates/revista-alteridad-ecuador/svvjcbgmcrrv>), siendo necesario que el archivo esté anonimizado en Propiedades de Archivo, de forma que no aparezca la identificación de autor/es.

### 4.1 Portada

**Título (español) / Title (inglés):** Conciso pero informativo, en castellano en primera línea y en inglés en segunda, conformado por el mayor número de términos significativos posibles. El título no solo es responsabilidad de los autores, pudiéndose proponer cambios por parte del Consejo Editorial. Se aceptan como máximo 80 caracteres con espacio.

**Resumen (español) / Abstract (inglés):** Se describirán de forma concisa y en este orden: justificación del tema, objetivos, metodología empleada (enfoque y alcance), resultados más relevantes, discusión y principales conclusiones. Ha de estar escrito de manera impersonal “El presente trabajo analiza...”. En el caso del *Abstract* no se admitirá el empleo de traductores automáticos. Tendrá como extensión entre 220/230 palabras.

**Descriptores (español) / Keywords (inglés):** Se deben exponer 6 descriptores por cada versión idiomática relacionados directamente con el tema del trabajo. Será valorado positivamente el uso de las palabras claves expuestas en el Thesaurus de la UNESCO (<http://bit.ly/2kIgn8I>). Solo en casos excepcionales se aceptarán términos nuevos, siempre que tengan un carácter científico estandarizado.

### 4.2 Estructura IMRDC

Para aquellos trabajos que se traten de Investigaciones de carácter empírico, los manuscritos respetarán rigurosamente la estructura IMRDC, siendo opcionales los epígrafes de Apoyos y Notas. Los trabajos que se traten de Estudios y revisiones de la literatura podrán ser más flexibles en sus epígrafes, especialmente en Metodología, Resultados y

Discusión. En todas las tipologías de trabajos son obligatorias las Referencias bibliográficas.

- 1 **Introducción:** Debe incluir los fundamentos teóricos y el propósito del estudio, utilizando citas bibliográficas, así como la revisión de la literatura o los trabajos relacionados más significativos del tema a nivel nacional e internacional. Se valorará positivamente el uso de referencias de alto impacto (JCR y Scopus).
- 2 **Metodología:** El enfoque, alcance y diseño metodológico deben ser redactados de forma que el lector pueda comprender con facilidad el desarrollo de la investigación. En su caso, describirá la muestra y la forma de muestreo, así como se hará referencia al tipo de análisis estadístico aplicado. Si se trata de una metodología original, es necesario exponer las razones que han conducido a su empleo y describir sus posibles limitaciones.
3. **Resultados:** Se procurará resaltar los resultados y las observaciones más relevantes de la investigación, describiéndose, sin hacer juicios de valor, el material y métodos empleados para el análisis. Los resultados se expondrán en figuras o/y tablas según las normas de la revista (Ver epígrafe 4.4). Aparecerán en una secuencia lógica en el texto, las tablas o figuras imprescindibles, evitando la redundancia de datos.
4. **Discusión y conclusiones:** Resumirá los hallazgos más importantes, relacionando las propias observaciones con estudios de interés, señalando aportaciones y limitaciones, sin redundar datos ya comentados en otros apartados. Asimismo, el apartado de discusión y conclusiones debe incluir las deducciones y líneas para futuras investigaciones.

### 4.3 Apoyos y Notas

**Apoyos (opcionales):** El *Council Science Editors* recomienda a los autor/es especificar la fuente de financiación de la investigación. Se considerarán prioritarios los trabajos con aval de proyectos competitivos nacionales e internacionales. En todo caso, para la valoración científica del manuscrito, este debe ir anonimizado con XXXX solo para su evaluación inicial, a fin de no identificar autores y equipos de investigación, que deben ser explicitados

en la Carta de Presentación y posteriormente en el manuscrito final.

**Las notas:** En caso necesario, irán al final del artículo (antes de las referencias). Deben ser utilizadas para aclarar términos, hacer anotaciones marginales o indicar el posible uso de herramientas de Inteligencia Artificial. Los números de notas se colocan en superíndice, tanto en el texto como en la nota final. No se permiten notas que recojan citas bibliográficas simples (sin comentarios), pues éstas deben ir en las referencias. En caso de contener alguna cita, su referencia deberá encontrarse también en la sección de Referencias bibliográficas.

### 4.4 Referencias bibliográficas

Las citas bibliográficas deben reseñarse en forma de referencias al texto. No debe incluirse bibliografía no citada en el texto. Su número ha de ser suficiente y necesario para contextualizar el marco teórico, la metodología usada y los resultados de investigación en un espacio de investigación internacional: mínimo 35 para los manuscritos de investigaciones de carácter empírico, y alrededor de 70 para los estudios y revisiones de literatura.

Se presentarán alfabéticamente por el primer apellido del autor (agregando el segundo solo en caso de que el primero sea de uso muy común). Las citas deberán extraerse de los documentos originales preferentemente revistas y en menor medida libros. Dada la trascendencia para los índices de citas y los cálculos de los factores de impacto, se valorarán positivamente el uso de referencias provenientes de publicaciones indexadas en JCR y/o Scopus y la correcta citación conforme a la Norma APA 7 (<http://bit.ly/35FNGvN>).

Es prescriptivo que todas las citas que cuenten con DOI (Digital Object Identifier System) estén reflejadas en las Referencias (pueden obtenerse en <https://search.crossref.org/>). Todas las revistas y libros que no tengan DOI deben aparecer con su link (en su versión on-line, en caso de que la tengan, acortada, mediante Bitly: <https://bitly.com/>), y de los sitios web además la fecha de consulta en el formato indicado.

## Normas para las referencias

### a) Publicaciones periódicas

- **Artículo de revista (un autor):** Ochoa, A. (2019). The type of participation promoted in schools is a constraint factor for inclusive education. *Alteridad*, 14(2), 184-194. <https://doi.org/10.17163/alt.v14n2.2019.03>
- **Artículo de revista (hasta veinte autores):** Guarderas, P., Larrea, M., Cuvi, J., Vega, C., Reyes, C., Bichara, T., Ramírez, G., Paula, Ch., Pesantez, L., Íñiguez, A., Ullauri, K., Aguirre, A., Almeida, M., & Arteaga, E. (2018). Acoso sexual en las universidades ecuatorianas: validez de contenido de un instrumento de medición. *Alteridad*, 13(2), 214-226. <https://doi.org/10.17163/alt.v13n2.2018.05>
- **Artículo de revista (sin DOI):** López, L., & Ramírez-García, A. (2014). Medidas disciplinarias en los centros educativos: ¿Suficientes contra el acoso escolar? *Perfiles Educativos*, 36(145), 32-50. <https://bit.ly/37Xd5mw>

### b) Libros y capítulos de libro

- **Libros completos:** Cuéllar, J.C., & Moncada-Paredes, M.C. (2014). *El peso de la deuda externa ecuatoriana*. Abya-Yala.
- **Capítulos de libro:** Padilla-Verdugo, J. (2014). La Historia de la Educación desde los enfoques del conocimiento. In E. Loyola (Ed.), *Ciencia, Tecnología y Sociedad (CTS). Miradas desde la Educación Superior en Ecuador* (pp. 107-128). Abya-Yala. <https://bit.ly/3etRnZH>

### c) Tesis doctorales y de maestría

- Llorent, M. (2019). *Las políticas educativas TIC en el plano autonómico: el caso de Andalucía* [Tesis doctoral, Universidad de Sevilla]. Depósito de Investigación Universidad de Sevilla. <https://bit.ly/3YRTRr5>

### d) Medios electrónicos

- Aunión, J. (2011, marzo 12). La pérdida de autoridad es un problema de toda la sociedad, no es específico del aula. *El País*. <https://bit.ly/2N1M9Dp>

## Normas para epígrafes, tablas y figuras

Los epígrafes del cuerpo del artículo se numerarán en arábigo. Irán sin caja completa de mayúsculas, ni subrayados, ni negritas. La numeración ha

de ser como máximo de tres niveles: 1. / 1.1. / 1.1.1. Al final de cada epígrafe numerado se establecerá un retorno de carro.

Las tablas y figuras deben presentarse incorporadas en el texto en Word o LaTeX ubicadas en el sitio en el que los autores consideren que deben estar. Se emplearán únicamente cuando sean necesarias e idóneas, debiendo limitarse su uso por cuestiones de espacios a seis entre tablas y figuras (salvo casos excepcionalmente justificados). Ambas deben ser enumeradas en arábigo y tituladas con la descripción de su contenido. Si la fuente de la tabla o figura no fuera de elaboración propia, los autores deberán incorporar al pie de la tabla o la figura la fuente de la que se extrae [por ejemplo, Source: Romero-Rodríguez (2016, p. 32)].

Las tablas deben estar elaboradas en el propio documento por lo que no se aceptarán tablas cortadas y pegadas de otros documentos que no puedan ser editados en el proceso de diagramación.

Para mantener la calidad de las figuras, en el caso de LaTeX/Overleaf, deben ser cargadas en la plantilla en formato original PDF, puesto que la conversión desde otros formatos puede disminuir la calidad de la figura. En el caso de Word, además de ser incorporadas en el documento, deberán ser enviadas como material complementario al momento del envío en el OJS de «Alteridad», debiendo tener una calidad superior a 600 dpi, en archivos de tipo TIFF, JPEG o PNG.

## 5. Tasas y APC

«Alteridad» es una revista *Open Access*, incluida en el *Directory of Open Access Journals* (DOAJ) que oferta toda su producción de forma íntegra online en abierto para toda la comunidad científica. Asimismo, no establece ninguna tasa económica durante todo el proceso editorial para la publicación de los artículos, incluyendo la revisión científica, la maquetación y la traducción de los mismos. No existe ningún *publication fee*, ni *Article Processing Charge* (APC) vinculados con esta publicación, ni para autores ni para lectores. Asimismo, la revista tiene licencia *Creative-Commons Reconocimiento-No-Comercial-Compartir* igual (RoMEO blue journal), lo que permite libre acceso, descarga y archivo de los artículos publicados. Todos los gastos, insumos y financiamiento de «Alteridad»

proviene de los aportes realizados por la Universidad Politécnica Salesiana.

## 6. Responsabilidades éticas

Cada autor/es presentará una declaración responsable de autoría y originalidad, así como sus responsabilidades éticas contraídas.

- **Originalidad:** Los trabajos deben ser originales y no deben estar siendo evaluados simultáneamente en otra publicación, siendo responsabilidad de los autores el cumplimiento de esta norma. Las opiniones expresadas en los artículos publicados son responsabilidad del autor/es. «Alteridad», como socio internacional de CrossRef®, emplea la herramienta antiplagio CrossCheck® y iThenticate® para garantizar la originalidad de los manuscritos.
- **Autoría:** En la lista de autores firmantes deben figurar únicamente aquellas personas que han contribuido intelectualmente al desarrollo del trabajo. Haber colaborado en la recolección de datos no es, por sí mismo, criterio suficiente de autoría. «Alteridad» declina cualquier responsabilidad sobre posibles conflictos derivados de la autoría de los trabajos que se publiquen.
- **Uso de Inteligencia Artificial:** En caso de que se utilice inteligencia artificial en cualquier etapa de la investigación presentada en el artículo, se requerirá a los/as autores/as destacarlo claramente en la carta de presentación/coverletter asociado al artículo, manifestando la sección o secciones específicas donde se ha hecho uso de la inteligencia artificial. Esta indicación tiene como objetivo informar a los lectores sobre las secciones en las que se ha empleado esta tecnología, proporcionando una mayor transparencia y comprensión sobre su aplicación en la investigación presentada.

La revista Alteridad reconoce la importancia de mantener altos estándares éticos en la investigación científica, particularmente en el empleo de inteligencia artificial (IA).

Queda a discreción del equipo editorial, la aceptación de la publicación que haya utilizado inteligencia artificial.

- **Transmisión de los derechos de autor:** se incluirá en la carta de presentación la cesión de derechos del trabajo para su publicación en «Alteridad». La Universidad Politécnica Salesiana (la editorial) conserva los derechos patrimoniales (copyright) de los artículos publicados; favorece y permite la reutilización de las mismas bajo la licencia de uso indicada en *ut supra*.

## 7. Promoción y difusión del artículo publicado

Los autores se comprometen a darle la máxima difusión a su artículo publicado, así como a toda la revista, utilizando el link a la página web de «Alteridad» (<https://alteridad.ups.edu.ec/index.php/alteridad/>). Además, se les exhorta a compartir y archivar su artículo publicado en las redes académicas (Academia.edu, ResearchGate, Mendeley, Kudos, ...), sociales (Twitter, Facebook, LinkedIn, ... , publicando en estos también el DOI), repositorios institucionales, Google Scholar, ORCID, web o blog personal, entre otras. Asimismo, se anima a los autores a compartir el artículo publicado a través de listas de correo electrónico, grupos de investigación y contactos personales.

«Alteridad» cuenta con sistemas de medición de métricas alternativas (PlumX) que permiten verificar el cumplimiento de este compromiso. Para la postulación de futuros artículos de autores de «Alteridad», se tendrá presente el impacto de los trabajos anteriores.