Universidad Pablo de Olavide (España)
International Journal of Educational Research and Innovation
número 25, 2026
ISSN: 2386-4303
DOI: 10.46661/ijeri.13253
Sección: Artículos
Recibido: 05-04-2026
Aceptado: 06-05-2026
Publicado: 27-05-2026
Páginas: 1-20

INTERNATIONAL JOURNAL OF EDUCATIONAL RESEARCH AND INNOVATION
REVISTA INTERNACIONAL DE INVESTIGACIÓN E INNOVACIÓN EDUCATIVA

Uso ético y responsable de la inteligencia artificial generativa en el alumnado universitario: diseño y validación de un instrumento mediante el Coeficiente de Competencia Experta

Ethical and Responsible Use of Generative Artificial Intelligence by University Students: Design and Validation of an Instrument Using the Expert Competence Coefficient

Ernesto Colomo-Magaña
University of Malaga
ecolomo@uma.es

Julio Cabero-Almenara
University of Sevilla
cabero@us.es

Julio Ruiz-Palmero
University of Malaga
julio@uma.es

Antonio Palacios-Rodríguez
University of Sevilla
aprodriguez@us.es

RESUMEN

Debido a la irrupción de la inteligencia artificial generativa (IAG) en la educación superior, resulta preciso orientar su uso desde principios éticos y prácticas responsables. El objetivo de este trabajo fue validar el Cuestionario de Prácticas Responsables y Éticas en el Uso Académico de la Inteligencia Artificial (CPREUA-IA) para alumnado universitario. Se utilizó el método de juicio de expertos, empleando el Coeficiente de Competencia Experta (CCE) para la selección de los evaluadores. De los 154 participantes iniciales, 77 alcanzaron el nivel de competencia alta requerido (CCE ≥ 0.8). Los resultados mostraron valoraciones positivas en los factores de claridad, coherencia y relevancia para las siete dimensiones del instrumento (prácticas éticas y morales, regulación metacognitiva, autorregulación, verificación crítica, gestión de la incertidumbre, uso legal y normativo, y formación continua), sin necesidad de eliminar ningún ítem. Se concluye que el instrumento es válido en

Cómo citar: Colomo-Magaña, E; Cabero-Almenara, J; Ruiz-Palmero; J & Palacios-Rodríguez, A. (2026). Uso ético y responsable de la inteligencia artificial generativa en el alumnado universitario: diseño y validación de un instrumento mediante el Coeficiente de Competencia Experta. *IJERI: International Journal of Educational Research and Innovation*, (25), 1-20. 10.46661/ijeri.13253

cuanto a su contenido, siendo necesaria su validación psicométrica con alumnado universitario.

PALABRAS CLAVE

Inteligencia artificial generativa; uso ético; uso responsable; alumnado universitario; cuestionario; coeficiente de competencia experta.

ABSTRACT

The rapid emergence of generative artificial intelligence (GAI) in higher education makes it necessary to guide its use on the basis of ethical principles and responsible practices. The aim of this study was to validate the Questionnaire on Responsible and Ethical Practices in the Academic Use of Artificial Intelligence (CPREUA-IA) for university students. The expert judgement method was employed, with the Expert Competence Coefficient (ECC) used to select evaluators. Of the 154 initial participants, 77 reached the required level of high competence (ECC ≥ 0.8). The results showed positive ratings for the clarity, coherence, and relevance factors across the seven dimensions of the instrument (ethical and moral practices, metacognitive regulation, self-regulation, critical verification, uncertainty management, legal and regulatory use, and ongoing training), with no items requiring elimination. It is concluded that the instrument demonstrates content validity, and that psychometric validation with university students is now required.

KEYWORDS

Generative artificial intelligence; ethical practices; responsible practices; university students; questionnaire; expert competence coefficient.

1. INTRODUCTION

The emergence of generative artificial intelligence (GAI) is rapidly transforming educational contexts, particularly higher education (Arroyo-Sagasta et al., 2025; Magallanes Ulloa et al., 2026; Singh et al., 2025). Its integration into the academic lives of university students has substantially modified teaching and learning processes (Cabero et al., 2026a; Carriere et al., 2026; Villarino, 2025), generating new ways of accessing knowledge, producing academic work, and engaging with learning (AL-Momani & Rababa, 2025; Kaur & Kapoor, 2025; Kong et al., 2024; Parveen & Alkudsi, 2024). However, this widespread and, in many cases, spontaneous and uncritical incorporation (Niño-Carrasco et al., 2025) has highlighted the need to guide its use on the basis of ethical and responsible principles that ensure its educational value (García-Peñalvo et al., 2024; Şahin, 2024; Shen et al., 2026; Vélez Rivera et al., 2024). When we talk about responsible and ethical use, we are referring to the safe, critical, and ethical implementation of AI. This goes beyond our knowledge of AI (digital literacy), what we know how to do with technologies (digital competence), or simply focusing on the values that guide technology use (digital ethics). Its focus is on how we interact with AI. In this context, it is essential to have empirical evidence that makes it possible to ascertain the extent to which university students use GAI ethically and responsibly in their learning processes (Gómez-García et al., 2025; Kong & Zhu, 2025; Zhu et al., 2025). Nevertheless, to date there are no precedents or instruments that specifically study the construct of practical GAI use by students in the context of higher education, which constitutes one of the contributions that the present study aims to make. With regard to the design of the tool, it is necessary to address a series of factors that are relevant to understanding the behaviours and conduct of university students in this respect.

In the first place, concern arises regarding the ethical and moral perspective of GAI use. For such use to be educational, following Peters' criteria (1969), it must be grounded in ethical principles and morally irreproachable actions. It is built upon decision-making in the axiological domain, materialising in explicit actions with a high normative content that progressively allows the internalisation of a deontological framework to guide and regulate its use in academic contexts (Ramos & López, 2019). In this way, the ethical use of AI is articulated around values such as honesty and equity (Floridi et al., 2018), acting as modulators of norms, boundaries, and behaviours—such as respect for assessment criteria, explicit declaration of AI use, or the avoidance of dishonest practices such as plagiarism. In order to analyse this, following the premise of Kong and Zhu (2025), attention will be paid to students' ethical and moral behavioural commitment in real academic situations.

The second aspect to consider is the impact of GAI on students' metacognitive processes, which encompass reflective thinking, planning, and cognitive self-regulation (Flavell, 1979). This factor is interdependent with the previous one, given that ethical reflection requires metacognitive capacity, and the cognitive regulation of GAI-mediated learning demands an active ethical stance regarding the role of GAI in one's own learning process (Kong et al., 2024). As Li and Samah (2026) have noted, overuse of GAI may affect the development of intrinsic cognitive skills, due to the possibility of externalising cognitive functions that previously rested entirely with university students, with a corresponding negative effect on their development. Taking these aspects into account, the purpose of this factor is to identify whether university students maintain cognitive control and are capable of regulating their own learning process (Sperling et al., 2024), or whether, on the contrary, they delegate such control to GAI.

Thirdly, the problem of abusive or dependent use of GAI by university students emerges, both through the delegation of learning-related cognitive processes and task completion to the tool (Vereau Amaya et al., 2025), and through the absence of explicit behavioural strategies for planning, limiting, and controlling its use. This concern is widespread among university students (Ruiz Mendoza et al., 2024), particularly among younger ones (Mamani-Roque et al., 2025), which underscores the urgency of training interventions to help them develop explicit self-regulation strategies (when to use AI, in which tasks, how frequently, and for how long). The aim of this factor is to enable students to become aware of and discern whether their use of GAI is strategic and functional, or whether it is, on the contrary, automated and uncritical.

Fourthly, the problem of GAI hallucinations arises, linked to incorrect, biased, or factually inaccurate responses to users' queries or requests (Kong & Zhu, 2025). Here, the issue does not lie so much in the GAI's failure—given the structural limitation of text-generating models—but rather in the lack of a systematic verification process on the part of students. In this regard, the study by Romeu Fontanillas et al. (2025) concludes that critical checking by students is not an innate disposition, but rather a pedagogical competence that can and should be developed in order to detect and identify potential biases that may arise (Jang et al., 2022; Kajiwara & Kawabata, 2024). The purpose of this factor is to analyse behaviours associated with the critical review of the veracity of AI-generated information, the detection of possible errors or inconsistencies, and the cross-checking of results against reliable academic sources.

The fifth factor to consider relates to how university students respond to technical or academic uncertainties that may arise from using GAI in their learning processes, as well as to the inherent risks of its use in educational settings. With regard to the latter, these are well-documented risks, primarily associated with the privacy and security of data shared with GAI (Khalid et al., 2023), as well as security breaches resulting from cyberattacks (Ahmad et al., 2023; Thiebes et al., 2021). As for technical or academic uncertainties, the aim is to prevent uncertainty about GAI use from generating anxiety (Zhu et al., 2025), guiding students towards the integration of behavioural strategies that allow for its responsible management. For these reasons, this factor examines the frequency with which actions are put into practice that promote cautious AI use, including avoidance or restriction behaviours in risk scenarios, the seeking of expert advice to ensure informed

and responsible use, and the requesting of teaching guidance to adjust its implementation in situations with potential academic implications.

The sixth factor is associated with the risk of students using GAI outside regulatory frameworks and legal compliance requirements. Among the most recurring concerns are those related to the infringement of intellectual property and copyright (Gaffar & Albarashdi, 2024; Lucchi, 2023). Although international reference frameworks exist, such as those provided by UNESCO (2021a; 2021b; 2023), which address critical aspects to be regulated and specific recommendations for the legal use of these technologies, students call for explicit norms and clear guidelines regarding the use of these tools in their academic activities (Ruiz Mendoza et al., 2024; Torres-Diaz et al., 2025). In light of this reality, this factor focuses on observable behaviours related to the verification of licences, copyright, and intellectual property requirements; the explicit acknowledgement of AI use in academic outputs; and compliance with current institutional regulations.

The seventh and final factor concerns the need for specific, high-quality training for the responsible use of GAI. The underlying problem lies in the early and experimental use of these tools by students, which occurs prior to receiving specific training on their functioning and implications. This manifests in incomplete training (Prohorovs et al., 2025), with results of limited value (Álvarez-Herrero, 2024), and in the existence of a gap between students who use these tools informally and those who have acquired the academic competence for their correct implementation (Niño-Carrasco et al., 2025). A firm institutional commitment to training, along with research evaluating its effectiveness (Sperling et al., 2024), is therefore required—without overlooking students' own active disposition to seek, update, and apply their AI knowledge. Accordingly, this dimension analyses the frequency of recurring actions that favour the acquisition of knowledge, skills, and competences for the responsible use of GAI.

All these factors must be taken into account in the development of an instrument capable of measuring whether university students' use of GAI is ethical and responsible. The absence of questionnaires validated for this purpose constitutes an obstacle to understanding students' actual behaviours and conduct, as well as a lack of evidence to support the design and implementation of educational policies and training processes tailored to this need.

1.1. Related Works

Various types of validated instruments exist that address the construct of responsible and ethical use of GAI by higher education students.

On the one hand, there are questionnaires in which responsible and/or ethical use appears as an explicit dimension within the developed tool. This is the case in the study by Trejo-Trejo and Gordillo-Espinoza (2026), who created an instrument to ascertain the perceptions of Mexican university students (n = 905) regarding their level of AI literacy and academic use of GAI, achieving satisfactory validity and reliability. In a similar vein, the research by Niño-Carrasco et al. (2025) validated a tool on the academic use of GAI, examining its impact on aspects such as knowledge, task completion, learning improvement, and ethical use, yielding strong reliability and psychometric validity data with a sample of 280 university students, also from Mexico. Likewise, the work of Cabero et al. (2026b) measured the cognitive, affective/emotional, behavioural, and ethical attitudes of 570 Latin American university students towards AI, using the SATAI questionnaire (Student Attitude towards Artificial Intelligence), extended with an ethical component, achieving excellent levels of reliability and validity.

On the other hand, there are instruments in which ethics with respect to GAI use constitutes the central axis of the tool, distinguishing between those that analyse participants' perceptions and those that examine their attitudes. Using perceptions as the construct under examination, the proposal by Gómez-García et al. (2025) measures responsible AI use by addressing aspects such as attitude, creativity, digital flow, and anxiety about its integration, for a sample of prospective teachers and educationalists (n = 548), achieving high reliability and a psychometric validation consistent with the model. For the construct of attitudes, the instrument developed by

Jang et al. (2022) assessed this aspect in relation to AI ethics among 1,076 university students, achieving the psychometric properties required for it to be considered valid and reliable.

Finally, a tool exists in which the construct under analysis is linked to the practical use of GAI, with responsibility and ethics implicit in the questionnaire items. This is the work of Liu et al. (2025), whose instrument examined the AI-assisted task processing strategies of 1,195 Chinese university students, achieving high levels of reliability and psychometric validity, enabling the diagnosis of AI's impact on their tasks and promoting a more balanced use thereof.

Despite the existence of various validated instruments, the predominant analytical orientation towards perceptions and attitudes highlights a gap regarding the actual use of GAI by university students. The absence of precedents makes this proposal an innovative contribution to the field of study on the responsible and/or ethical use of GAI, developing an instrument focused on behaviours, conduct, and patterns of use.

With regard to the content validation process using the Expert Competence Coefficient, this is a well-established technique in the scientific domain of the social sciences. This procedure is typically employed for two main purposes: validating resources, training programmes, or educational interventions through expert judgement to strengthen their viability or validating the content of a scientific questionnaire. Examples of the former include the work of Cabero and Barroso (2013), which constitutes one of the first approaches to the use of the expert competence coefficient, focused on the validation of a personal learning environment (PLE); the contribution of Cabero et al. (2020), centred on the validity of a t-MOOC training programme on teacher digital competences; and that of Fernández-Cerezo et al. (2026), concerning another MOOC on digital competences, but aimed at students with functional diversity. With regard to its use in validating questionnaire content, the work of León-Garrido et al. (2024) applied it to a tool focused on the evaluation of mobile apps for Music Education; while in the context of AI, it has recently been used by Rubio-Gragera et al. (2026) with 90 experts, successfully validating the content of an instrument to measure the digital competence of secondary education students in the use of AI.

2. METHODOLOGY

This study aims to conduct content validation of the Questionnaire on Responsible and Ethical Practices in the Academic Use of Artificial Intelligence (CPREUA-IA) through expert judgement. This is a technique that allows for the quantitative evaluation of the instrument's content and the establishment of statistical agreements among experts to ensure its validity. It is frequently used in educational research (Buitrago et al., 2023; Cabero et al., 2020) and is associated with the Delphi method (Buckley et al., 2022; Jones & Davies, 2023). However, given the difficulty of defining the concept of an expert, procedures are required that underpin the quality of their selection. Among the available options, this study adopts the Expert Competence Coefficient (ECC) criterion (Cabero & Barroso, 2013; Cabero et al., 2020).

The ECC is calculated using the following formula: $K = ½ (Kc + Ka)$. The variables in the formula are explained below.

K is the final value associated with the expert's level of competence. Its values allow a distinction to be made between experts with high competence ($K \geq 0.8$), moderate or average competence ($0.8 > K \geq 0.5$), and low competence ($K < 0.5$).

Kc refers to the knowledge coefficient. This is derived from the score assigned by the expert to a question regarding their degree of knowledge (on a scale of 0–10, where 0 corresponds to no knowledge and 10 to full knowledge) in areas such as teacher training in ICT, applications of Artificial Intelligence for Education, AI ethics, educational technology, digital ethics, or the educational use of digital technologies.

Ka refers to the argumentation coefficient. Its calculation is derived from the scores that experts assign to the different sources upon which they have built their knowledge on the subject. For

this purpose, the coefficients established by Cabero and Barroso (2013) are used, related to the degree (low, medium, high) to which different sources (personal theoretical analyses; experience gained from practical activity; study of works on the subject—both Spanish and international; personal knowledge of the state of the problem abroad; and intuition on the subject) have contributed to their knowledge and judgements regarding the responsible and ethical use of Artificial Intelligence applied to education.

2.1. Objective

To validate, through expert judgement, the "Questionnaire on Responsible and Ethical Practices in the Academic Use of Artificial Intelligence" in terms of its clarity, coherence, and relevance.

2.2. Instrument

This is an ad hoc questionnaire, registered under Entry Number 04/2026/650 in the Territorial Registry of Intellectual Property, under the Ministry of Culture of the Government of Spain. For validation through expert judgement, it was distributed via Google Forms, requesting sociodemographic information from participants, such as academic level, institution of employment, and main professional activity (teaching and research staff; teacher; researcher; technician; management; other). In addition, participants were asked about their experience in teaching related to Educational Technology and AI, as well as their participation in research or publications on the responsible and ethical use of GAI. All individuals who evaluated the questionnaire did so after providing informed consent, which was included at the beginning of the form. Subsequently, they were asked to evaluate 49 items, organised into 7 dimensions, in terms of their clarity, coherence, and relevance, using a 4-point Likert scale (1 = does not meet the criterion; 4 = high level of compliance). The Expert Competence Coefficient (ECC) was used as the criterion for expert selection and validity, including only participants with high competence (ECC ≥ 0.8).

2.3. Participants

After analysing the ECC of the 154 individuals who completed the questionnaire, only those who demonstrated a high level of expert competence (ECC ≥ 0.8) were included in the study. The final sample thus comprised 77 experts, representing 50 % of those who completed the questionnaire. It is noteworthy that the majority of experts hold a doctorate (80.5 %), followed by those with a master's degree (13 %), then those with a bachelor's or undergraduate degree (3.9 %), and a smaller proportion with a diploma qualification (2.6 %). Regarding the institution in which they work, the majority are employed at university level (77.9 %), while 15.6 % work in non-university settings, and 6.5 % of the experts work in training companies. With regard to their main activity, 76.6 % are engaged in teaching and research (PDI), while 13 % carry out technical duties and 10.4 % are teachers in non-university institutions. As for the delivery of training related to educational technology, artificial intelligence applied to education, digital ethics, the educational use of digital technologies, teacher training in ICT, or virtual training, 98.7 % have undertaken such work, which demonstrates a high level of expertise in this field. Furthermore, the percentage of experts with research experience in AI in the educational domain reaches 87 %, with 84.4 % having publications on this topic, which attests to the high expert profile of the selected sample.

2.4. Analysis procedure

After selecting the experts by ECC and considering only their ratings, descriptive statistics were calculated for the items comprising the instrument. This analysis was conducted for the three factors considered (clarity, coherence, and relevance). In addition, descriptive statistics were also calculated for the seven dimensions of the instrument, thereby corroborating the assessment of the theoretical constructs from which the proposed items derive.

3. RESULTS

This section begins by focusing on the descriptive statistics obtained for the items comprising the questionnaire across the clarity, coherence, and relevance factors (Table 1).

Table 1. Clarity, coherence, and relevance levels of the items.

Dimension	Item	Clarity		Coherence		Relevance	
		M	SD	M	SD	M	SD
Ethical and moral practices in AI use (DIM1)	1.1. I avoid presenting AI-generated content as my own without personal elaboration.	3.74	0.52	3.73	0.48	3.70	0.54
	1.2. I use AI while respecting the principles of academic honesty.	3.70	0.61	3.69	0.54	3.66	0.60
	1.3. I explicitly disclose the use of AI in assignments where I have employed it.	3.71	0.58	3.70	0.52	3.75	0.57
	1.4. I adapt my use of AI to the assessment criteria established by teaching staff.	3.48	0.77	3.57	0.75	3.78	0.48
	1.5. I avoid using AI in academic activities where its use is not permitted.	3.74	0.57	3.79	0.41	3.73	0.62
	1.6. I act on principles of equity and fairness, preventing AI from replacing my own required personal effort.	3.62	0.73	3.73	0.55	3.69	0.59
	1.7. I reflect on the ethical implications of using AI in my studies and how it affects my integrity as a future professional.	3.55	0.64	3.69	0.54	3.68	0.70

Dimension	Item	Clarity		Coherence		Relevance	
		M	SD	M	SD	M	SD
Metacognitive regulation practices in AI-mediated learning (DIM2)	2.1. I use AI intentionally to deepen my understanding of complex content.	3.57	0.66	3.73	0.55	3.68	0.57
	2.2. I assess whether my use of AI interferes with my concentration while completing an academic task.	3.62	0.65	3.62	0.63	3.58	0.68
	2.3. I use AI as a starting point to generate ideas that I subsequently develop through my own reasoning.	3.79	0.44	3.78	0.45	3.64	0.61
	2.4. I reformulate the instructions I give to AI (prompts) when the output does not adequately meet my learning objectives.	3.77	0.56	3.78	0.50	3.78	0.42
	2.5. I critically review whether my use of AI is changing the way I process information.	3.64	0.67	3.70	0.61	3.64	0.69
	2.6. I monitor the quality of my reasoning when using AI tools.	3.62	0.67	3.71	0.63	3.78	0.48
	2.7. I reflect on the changes I make to my learning strategy when using AI.	3.6	0.65	3.90	0.35	3.83	0.38

Dimension	Item	Clarity		Coherence		Relevance	
		M	SD	M	SD	M	SD
Self-regulation practices in academic AI use (DIM3)	3.1. I consciously decide when to use and when not to use AI tools in my studies.	3.68	0.66	3.73	0.60	3.62	0.59
	3.2. I set boundaries to avoid developing excessive dependence on AI in my assignments.	3.83	0.38	3.70	0.56	3.78	0.45
	3.3. I complete part of my academic work without using AI, even when I have access to it.	3.73	0.62	3.66	0.64	3.65	0.66
	3.4. I allocate specific time slots for AI use, preventing it from consuming all my study time.	3.70	0.69	3.53	0.80	3.51	0.91
	3.5. I organise my academic tasks by defining beforehand in which ones I will use AI and in which ones I will not.	3.71	0.58	3.65	0.66	3.66	0.70
	3.6. I discontinue my use of AI when I consider that I have already received the necessary support.	3.62	0.67	3.75	0.54	3.71	0.60
	3.7. I distribute my use of AI across different stages of a task rather than using it continuously.	3.68	0.60	3.69	0.63	3.56	0.85

Dimension	Item	Clarity		Coherence		Relevance	
		M	SD	M	SD	M	SD
Verification and critical error-control practices in AI use (DIM4)	4.1. I verify the accuracy of information generated by AI tools before incorporating it into academic work.	3.83	0.41	3.84	0.40	3.75	0.49
	4.2. I cross-check AI-generated results against reliable academic sources.	3.74	0.50	3.74	0.55	3.71	0.48
	4.3. I identify possible errors or inconsistencies in AI-generated texts.	3.71	0.58	3.73	0.55	3.82	0.39
	4.4. I analyse whether AI responses contain excessive simplifications, biases, or stereotypes.	3.74	0.59	3.77	0.48	3.69	0.59
	4.5. I modify or correct AI outputs when I detect inaccurate information.	3.71	0.54	3.69	0.59	3.69	0.57
	4.6. I avoid using AI-generated texts directly without prior critical review.	3.75	0.46	3.79	0.50	3.78	0.53
	4.7. I assess the quality and academic relevance of AI-generated content.	3.69	0.65	3.82	0.45	3.78	0.53

Dimension	Item	Clarity		Coherence		Relevance	
		M	SD	M	SD	M	SD
Uncertainty and risk management practices in AI use (DIM5)	5.1. I restrict my use of AI tools if I do not fully understand how they work or what they do with my data.	3.81	0.43	3.82	0.39	3.81	0.40
	5.2. I avoid using AI tools when I am unsure whether they are technically appropriate for the academic task at hand.	3.68	0.62	3.70	0.61	3.73	0.58
	5.3. I ask teaching staff whether the use of AI is appropriate when instructions are unclear in this regard.	3.68	0.66	3.62	0.78	3.64	0.69
	5.4. I seek technical guidance when an AI tool exhibits unexpected behaviour.	3.64	0.65	3.78	0.55	3.66	0.62
	5.5. I refrain from using AI if I perceive that doing so could lead to an academic sanction.	3.73	0.60	3.82	0.42	3.74	0.55
	5.6. I apply more restricted AI use in assessed tasks than in practical or support activities that do not carry a grade.	3.65	0.66	3.68	0.66	3.77	0.51
	5.7. I consider the potential impact of using AI on my grade or assessment before incorporating it into academic work.	3.70	0.59	3.60	0.78	3.73	0.62

Dimension	Item	Clarity		Coherence		Relevance	
		M	SD	M	SD	M	SD
Legal and regulatory AI use practices (DIM6)	6.1. I consult the terms of use and licences of AI tools before using them.	3.71	0.65	3.70	0.65	3.69	0.71
	6.2. I avoid entering personal data, my own or others', into the prompts I provide to AI tools.	3.66	0.62	3.71	0.60	3.75	0.54
	6.3. I check that AI-generated content does not infringe third-party copyright.	3.77	0.46	3.78	0.48	3.73	0.60
	6.4. I avoid using AI-generated materials when their legality or copyright status is unclear.	3.74	0.64	3.75	0.46	3.65	0.62
	6.5. I strictly comply with my university's specific regulations on the use of AI technologies.	3.71	0.54	3.68	0.57	3.75	0.52
	6.6. I fulfil the AI citation requirements established by teaching staff or style guides.	3.69	0.59	3.68	0.62	3.81	0.46
	6.7. I inform myself about the legal implications of using AI in the preparation of academic work.	3.79	0.59	3.78	0.53	3.65	0.74

Dimension	Item	Clarity		Coherence		Relevance	
		M	SD	M	SD	M	SD
Training and self-updating practices in AI (DIM7)	7.1. I seek up-to-date information on the functioning of AI tools used in educational contexts.	3.74	0.52	3.73	0.48	3.75	0.57
	7.2. I participate in courses, seminars, or training activities related to the use of AI in education.	3.74	0.57	3.71	0.51	3.75	0.43
	7.3. I consult guides, documents, or specialised resources to improve my academic use of AI tools.	3.71	0.60	3.69	0.63	3.81	0.49
	7.4. I apply to my university studies what I have learnt in AI training activities.	3.73	0.55	3.62	0.67	3.56	0.62
	7.5. I regularly review updates or changes in AI tools that I use for learning.	3.60	0.71	3.60	0.69	3.61	0.75
	7.6. I compare different AI tools to decide which best suits my academic needs.	3.71	0.54	3.74	0.59	3.69	0.49
	7.7. I update my AI skills when more advanced or relevant tools emerge.	3.73	0.62	3.68	0.57	3.71	0.48

The results obtained reflect a positive assessment of the items with respect to the three factors considered (clarity, coherence, and relevance), with means ranging from 3.55 as the minimum value (item 1.7 for clarity) to 3.90 as the maximum value (item 2.7 for coherence), as well as relatively contained standard deviations. The items associated with ethical and moral practices in AI use (DIM1) and the verification and critical error-control practices in AI use (DIM4) present particularly high and homogeneous scores, indicating that the experts consider them highly appropriate for evaluating the ethical and responsible use of generative artificial intelligence. In contrast, some items belonging to the dimensions of self-regulation in academic AI use (DIM3) and uncertainty and risk management in AI use (DIM5) display greater score dispersion, suggesting a somewhat lower level of agreement among experts. Nevertheless, the data obtained do not necessitate the elimination of any items, as their means remain above 3.55 across all criteria.

The following section analyses the results according to the dimensions of the instrument (Table 2).

Table 2. Clarity, coherence, and relevance levels of the dimensions.

Dimension	Code	Clarity		Coherence		Relevance	
		M	SD	M	SD	M	SD
Ethical and moral practices in AI use	(DIM1)	3.65	0.64	3.70	0.55	3.71	0.59
Metacognitive regulation practices in AI-mediated learning	(DIM2)	3.66	0.62	3.75	0.55	3.70	0.56
Self-regulation practices in academic AI use	(DIM3)	3.71	0.61	3.67	0.64	3.64	0.70
Verification and critical error-control practices in AI use	(DIM4)	3.74	0.54	3.77	0.51	3.75	0.51
Uncertainty and risk management practices in AI use	(DIM5)	3.70	0.60	3.72	0.62	3.72	0.57
Legal and regulatory AI use practices	(DIM6)	3.73	0.58	3.73	0.56	3.72	0,61
Training and self-updating practices in AI	(DIM7)	3.71	0.59	3.68	0.60	3.70	0.56
Total		3.70	0.60	3.72	0.58	3.71	0.59

As can be observed, the dimensions of the instrument reflect a positive and consistent evaluation. The means for all dimensions exceed 3.64 (the minimum value, corresponding to DIM3 for relevance) across all analysed criteria, standing out for the high ratings obtained. The dimensions of metacognitive regulation in AI-mediated learning (DIM2) and verification and critical error-control in AI use (DIM4) achieve the highest scores, particularly on the coherence criterion (3.75 and 3.77, respectively), suggesting that the experts consider the items within these dimensions to be well internally structured and to respond adequately to their measurement objectives. The dimension of self-regulation in academic AI use (DIM3) presents the highest standard deviations for relevance (0.70), indicating greater variability in ratings, although its means remain at satisfactory levels. The dimensions of ethical and moral practices in AI use (DIM1) and legal and regulatory AI use (DIM6) show a balanced assessment across all three criteria, reflecting a sound overall consideration by the experts.

With regard to the overall values achieved by the instrument as a whole, the global means for the factors indicate its suitability for evaluating the ethical and responsible use of artificial intelligence by university students, while the global standard deviations indicate a reasonable level of agreement among experts, with no discrepancies that would require the elimination of any item.

4. DISCUSSION

The primary aim of this study was to validate, through expert judgement, the instrument designed to evaluate the ethical and responsible use of artificial intelligence by university students. To this end, the Expert Competence Coefficient was used as the selection criterion for evaluators, a procedure with a well-established tradition in the field of educational technology (Cabero & Barroso, 2013; Cabero et al., 2020).

With regard to expert selection, of the 154 participants who comprised the initial sample, 77 were ultimately considered experts by virtue of achieving a high level of expert competence (ECC ≥ 0.8), yielding a broad and representative sample for the field of AI in education. The final sample was consistent with those of other studies that have employed this technique, as well as with the indicator value used for content validation through expert judgement of instruments in educational contexts (Fernández-Cerezo et al., 2026; Rubio-Gragera et al., 2026).

With regard to the assessment of the instrument, the analysis of the factors considered (clarity, coherence, and relevance) at item and dimension level yielded positive results for the tool as a whole. At a general level, the consideration of all dimensions was positive, with means above 3.64 out of 4 across all criteria, indicating the pertinence and adequate construction of the instrument.

Noteworthy are the dimensions of verification and critical error-control in AI use (DIM4) and metacognitive regulation in AI-mediated learning (DIM2), in which items were rated with greater homogeneity. This was a relevant finding, given that the capacity for reflection and critical verification of GAI responses (Romeu Fontanillas et al., 2025), as well as metacognitive control over the use of this resource in the learning process (Li & Samah, 2026; Sperling et al., 2024), have been identified as key aspects for the ethical and responsible use of these tools in learning contexts (Şahin, 2024; Shen et al., 2026).

Although the dimension of self-regulation in academic AI use (DIM3) presented somewhat greater dispersion for relevance, its means were satisfactory. Finally, the fact that no items required elimination during this content validation process was, in itself, a noteworthy finding, given that it is common practice to review or remove items following expert assessment.

5. CONCLUSIONS

The impact of GAI on the learning processes of university students has grown exponentially in recent years (Cabero et al., 2026a; Kaur & Kapoor, 2025; Magallanes Ulloa et al., 2026). Nevertheless, its incorporation into the educational domain has not always been conducted in a structured and critical manner (Niño-Carrasco et al., 2025), making it necessary to guide its use on the basis of ethical principles and responsible practices (García-Peñalvo et al., 2024; Vélez Rivera et al., 2024). To achieve this, it is essential to analyse how and how frequently higher education students use GAI in their academic practices.

However, existing precedents reveal the lack of tools that examine the behaviours and conduct of this group with respect to the implementation of GAI. Consequently, after establishing that existing instruments measured ethical and responsible use either as a particular construct or, when it constituted the focus of analysis, from a perception- and attitude-based approach, an instrument was designed to address the existing methodological gap—this being the main contribution of the present study. This tool, focused on academic usage practices, has been validated through the Expert Competence Coefficient (ECC) (Cabero & Barroso, 2013; Rubio-Gragera et al., 2026). The findings of this study corroborated that the instrument was methodologically sound, receiving the support and validation of the experts for the items and dimensions that had been constructed on the basis of theoretical and scientific advances on the subject. The descriptive statistics for clarity, coherence, and relevance indicate the pertinence of the instrument and the positive agreement among experts, with no items requiring elimination from the proposal in the content validation process.

With regard to limitations, these lie in the biases of the sample used. As this constitutes a content validation through expert judgement, both the number of participants and their field of knowledge are influential factors. Although 77 participants achieved the high expert coefficient (ECC ≥ 0.8), the number of participants could have been higher in order to broaden the assessment of the subject of study. Concerning the experts' field of knowledge, while the sample is representative of the field of educational technology and GAI, it would have been valuable to include participants from the fields of ethics, philosophy of education, or educational psychology.

With regard to future lines of research, the next step involves conducting the psychometric validation process of the instrument, so as to verify both its applicability and effectiveness with university students. In parallel, different variables could be incorporated to contextualise the data obtained, and, from the analyses of these variables linked to the implementation of the instrument, formative decisions could be taken to shape educational policies regarding the responsible and ethical use of GAI by university students. Finally, it would be interesting to see the feasibility of its applicability in different educational contexts, being able to adjust the items for use among students of other compulsory educational stages, as well as with practicing teachers, taking into account the responsible use that they make of AI in the exercise of their educational work.

ACKNOWLEDGMENTS

Thanks to Professor Julio Cabero-Almenara (University of Seville) for inviting Professor Ernesto Colomo Magaña (University of Málaga) to carry out a research stay between March and June 2026 in the area of Didactics and School Organization at the University of Seville. This study was conducted during the course of this research stay.

AVAILABILITY OF DATA AND MATERIALS

The data analyzed during the present study and supporting findings are available from the authors upon request.

STATEMENT OF ETHICS

Informed written consent was secured from all participants, adhering to the ethical standards of the Declaration of Helsinki.

AUTHORSHIP CONTRIBUTION

Conceptualization, author 1, author 3; Data curation, author 4; Formal analysis, author 1, author 4; Funding acquisition, author 3; Investigation, author 1, author 2; Methodology, author 1, author 2; Project administration author 3; Software, author 4; Resources, author 3; Supervision, author 2; Validation, author 1, author 4; Visualization, author 3, author 4; Writing – original draft, author 1; Writing – review & editing, author 2

FUNDING

This study has received funding through the State Program for Research and Experimental Development, within the framework of the State Plan for Scientific, Technical, and Innovation Research 2024–2027 (Knowledge Generation Projects 2024), Ministry of Science, Innovation, and Universities. Reference number: PID2024-155949OB-I00.

REFERENCES

Ahmad, S. F., Han, H., Alam, M. M., Rehmat, M., Irshad, M., Arraño-Muñoz, M., & Ariza-Montes, A. (2023). Impact of artificial intelligence on human loss in decision making, laziness and safety in education. *Humanities and Social Sciences Communications*, *10*(1), 1-14. https://doi.org/10.1057/s41599-023-01787-8

AL-Momani, M. O., & Rababa, E. M. (2025). Degree of employment artificial intelligence technologies in the educational process from the point of view of university students. *IJERI: International Journal of Educational Research and Innovation*, (24), 1–12. https://doi.org/10.46661/ijeri.8306

Álvarez-Herrero, J. F. (2024). Opinión del alumnado universitario de educación sobre el uso de la IA en sus tareas académicas. *European Public & Social Innovation Review*, *9*, 1-18. https://doi.org/10.31637/epsir-2024-534

Arroyo-Sagasta, A., Anton, E., Zuberogoitia, A., & Egaña, T. (2025). Perceptions of first-year university students toward artificial intelligence: awareness, actitud, and trust. *Pixel-Bit. Revista De Medios Y Educación*, *74*(8), 1-16. https://doi.org/10.12795/pixelbit.116875

Buitrago, R., Salinas, J., & Boude, O. (2023). Validation of a Model for the Formalization of Personal Learning Pathways Through Expert Judgment. *Journal of Higher Education Theory and Practice*, *23*(12), 225-242. https://doi.org/10.33423/jhetp.v23i12.6283

Buckley, J., Seery, N., & Kimbell, R. (2022). A Review of the Valid Methodological Use of Adaptive Comparative Judgment in Technology Education Research. *Frontiers in Education*, *7*, 787926. https://doi.org/10.3389/feduc.2022.787926

Cabero, J., & Barroso, J. (2013). La utilización del juicio de experto para la evaluación de TIC: el coeficiente de competencia experta. *Bordón. Revista De Pedagogía*, *65*(2), 25–38. https://doi.org/10.13042/brp.2013.65202

Cabero, J., Barroso, J., Palacios, A., & Llorente, C. (2020). Marcos de Competencias Digitales para docentes universitarios: su evaluación a través del coeficiente competencia experta. *Revista Electrónica Interuniversitaria De Formación Del Profesorado*, *23*(2). https://doi.org/10.6018/reifop.413601

Cabero, J., Barroso, J., Loaiza, M., & Palacios, A. (2026b). Artificial Intelligence in higher education: cognitive, emotional, behavioral and ethical attitudes of Latin American students. *Journal of New Approaches in Educational Research*, *15*, 13. https://doi.org/10.1007/s44322-026-00063-2

Cabero, J., Palacios, A., Llorente, C., & Barroso, J. (2026a). Aceptación de ChatGPT en educación superior: Actitudes y percepciones del modelo UTAUT2.REICE. *Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación*, *24*(1). https://doi.org/10.15366/reice2025.23.4.001

Carriere, N., Colomo, E., & Palacios, A. (2026). La inteligencia artificial como herramienta de personalización en entornos educativos: beneficios y desafíos éticos. En E. Sánchez, V. Cebrián, E.A. García, y S. Ruiz (Eds.), *Educación y tecnología: transformar la investigación en la era de la Inteligencia Artificial* (pp. 226-235). Dykinson.

Fernández-Cerero, J., Cabero-Almenara, J., & Fernández-Batanero, J. M. (2026). Evaluación de un MOOC para la formación en competencias digitales docentes como apoyo a estudiantes con diversidad funcional. *EDMETIC*, *15*(1), art.7. https://doi.org/10.21071/edmetic.v15i1.18580

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American Psychologist*, *34*(10), 906–911. https://doi.org/10.1037/0003-066X.34.10.906

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Vlacke, P., & Vayena, E. (2018). AI4People: An ethical framework for a good AI society: Opportunities, risks, principles and recommendations. *Minds and Machines*, *28*, 689-707. https://doi.org/10.1007/s11023-018-9482-5

Gaffar, H., & Albarashdi, S. (2024). Copyright protection for AI-generated works: Exploring originality and ownership in a digital landscape. *Asian Journal of International Law*, *15*(1), 23-46. https://doi.org/10.1017/S2044251323000735

García Peñalvo, F. J., Alier, M., Pereira, J., & Casany, M. J. (2024). Safe, Transparent, and Ethical Artificial Intelligence: Keys to Quality Sustainable Education (SDG4). *IJERI: International Journal of Educational Research and Innovation*, (22), 1–21. https://doi.org/10.46661/ijeri.11036

Gómez-García, M., Ruiz-Palmero, J. Boumadan-Hamed, M., & Soto-Varela, R. (2025). Perceptions of future teachers and pedagogues on responsible AI. A measurement instrument. *RIED-Revista Iberoamericana de Educación a Distancia*, *28*(2), 105-130. https://doi.org/10.5944/ried.28.2.43288

Jang, Y., Choi, S., & Kim, H. (2022). Development and validation of an instrument to measure undergraduate students' attitudes toward the ethics of artificial intelligence (AT-EAI) and analysis of its difference by gender and experience of AI education. *Education and Information Technologies*, *27*(8), 11635-11667. https://doi.org/10.1007/s10639-022-11086-5

Jones, I., & Davies, B. (2023). Comparative judgement in education research. *International Journal of Research & Method in Education*, *47*, 170-181. https://doi.org/10.1080/1743727x.2023.2242273

Kajiwara, Y., & Kawabata, K. (2024). AI literacy for the ethical use of chatbots: Will students accept AI ethics? *Computers and Education: Artificial Intelligence*, *6*, 100251. https://doi.org/10.1016/j.caeai.2024.100251

Kaur, D., & Kapoor, V. (2025). Students' Perspectives on the Educational Benefits of ChatGPT: A Quantitative Exploration. Innoeduca. *International Journal of Technology and Educational Innovation*, *11*(2), 5-24. https://doi.org/10.24310/ijtei.112.2025.21927

Khalid, N., Qayyum, A., Bilal, M., Al-Fuqaha, A., & Qadir, J. (2023). Privacy-preserving artificial intelligence in healthcare: Techniques and applications. *Computers in Biology and Medicine*, *158*, 106848. https://doi.org/10.1016/j.compbiomed.2023.106848

Kong, S. C., Cheung, M. Y. W., & Tsang, O. (2024). Developing an artificial intelligence literacy framework: Evaluating a literacy course for senior secondary students using a project-based learning approach. *Computers and Education: Artificial Intelligence*, *6*, 100214. https://doi.org/10.1016/j.caeai.2024.100214

Kong, S. C., & Zhu, J. (2025). Developing and validating an AI ethical awareness scale for secondary and university students: Cultivating ethical awareness through problem solving with AI tools. *Computers and Education: Artificial Intelligence*, *9*, 100447. https://doi.org/10.1016/j.caeai.2025.100447

León-Garrido, A., Barroso-Osuna, J. M., & Llorente-Cejudo, M. C. (2024). Diseño y validación de un instrumento de evaluación para apps móviles musicales a través del juicio de expertos. *Aula Abierta*, *53*(2), 169–179. https://doi.org/10.17811/rifie.20620

Li, D., & Samah, N.B.A. (2026). Cultivation of metacognitive skill development through generative AI system use among university students: A focus on self-regulation and reflective thinking. *International Journal of Education and Practice*, *14*(1), 488-507. https://doi.org/10.18488/61.v14i1.4762

Liu, X., Xiao, Y., & Li, D. (2025). Assessing strategic use of artificial intelligence in self-regulated learning: Instrument development and evidence from Chinese university students. *International Journal of Educational Technology in Higher Education*, *22*, art. 69. https://doi.org/10.1186/s41239-025-00567-5

Lucchi, N. (2023). ChatGPT: A case study on copyright challenges for generative artificial intelligence systems. *European Journal of Risk Regulation*, *15*(3), 602-624. https://doi.org/10.1017/err.2023.59

Magallanes Ulloa, E., López Flores, J. I., & Carrillo García, C. R. (2026). Artificial Intelligence Literacy in Higher Education: A Reflective Analysis of Training Needs and Student. Pixel-Bit. *Revista De Medios Y Educación*, *75*(4), 1-17. https://doi.org/10.12795/pixelbit.117817

Mamani-Roque, M., Quispe-Aquise, J., Manrique-Jaramillo, Y. V., & Cruz-Laricano, E. O. (2025). Academic self-efficacy and dependence on artificial intelligence in a sample of university students. *Sapienza: International Journal of Interdisciplinary Studies*, *6*(1), e25008. https://doi.org/10.51798/sijis.v6i1.916

Niño-Carrasco, S. A., Castellanos-Ramírez, J. C., Perezchica Vega, J. E., & Sepúlveda Rodríguez, J. A. (2025). Percepciones de estudiantes universitarios sobre los usos de inteligencia artificial en educación. *Revista Fuentes*, *27*(1), 94-106.

Parveen, M., & Alkudsi, Y. M. (2024). Graduates' Perspectives on AI Integration: Implications for Skill Development and Career Readiness. *IJERI: International Journal of Educational Research and Innovation*, (22), 1–17. https://doi.org/10.46661/ijeri.10651

Peters, R. S. (1969). *El concepto de educación*. Paidós.

Prohorovs, A., Tsaryk, O., & Frick, W. C. (2025). Ethical aspects of GenAI use by university students: an international survey. *International Journal of Education and Practice*, *13*(4), 1472-1490. https://doi.org/10.18488/61.v13i4.4469

Ramos, G., & López, A. (2019). Formación ética del profesional y ética profesional del docente. *Estudios Pedagógicos*, *45*(3), 185-199. http://dx.doi.org/10.4067/S0718-07052019000300185

Romeu Fontanillas, T., Romero Carbonell, M., Guitert Catasús, M., & Baztán Quemada, P. (2025). Challenges of generative artificial intelligence in higher education: Promoting its critical use among students. *RIED-Revista Iberoamericana de Educación a Distancia*, *28*(2), 209-231. https://doi.org/10.5944/ried.28.2.43535

Rubio-Gragera, M., Palacios-Rodríguez, A., & Colomo-Magaña, E. (2026). Competencia digital e inteligencia artificial: diseño y validación de un instrumento para alumnado de Educación Secundaria mediante juicio de expertos. *Texto Livre*, *19*, e57860. https://doi.org/10.1590/1983-3652.2026.57860

Ruiz Mendoza, K. K., Miramontes Arteaga, M. A., & Reyna García, C. (2024). Percepciones y expectativas de estudiantes universitarios sobre la IAG. *European Public & Social Innovation Review*, *9*, 1-21. https://doi.org/10.31637/epsir-2024-357

Şahin, C. (2024). Artificial intelligence technologies and ethics in educational processes: solution suggestions and results. *Innoeduca. International Journal of Technology and Educational Innovation*, *10*(2),201-216. https://doi.org/10.24310/ijtei.102.2024.19806

Shen, W., Chai, C-S., Chiu, T.K.F., Woon, K., Meng, H., King, I., Wong, S., & Yam, Y. (2026). Longitudinal relationships between student ethical considerations, behavioral intention, and perceived knowledge in artificial intelligence Education. *Computers & Education*, *249*, 105614. https://doi.org/10.1016/j.compedu.2026.105614

Singh, S., Singh, P., & Kaur, V. (2025). Understanding ChatGPT Adoption among Higher Education Students in Punjab, India: An Application of UTAUT2 Model. (2025). *Innoeduca. International Journal of Technology and Educational Innovation*, *11*(1), 5-28. https://doi.org/10.24310/ijtei.111.2025.20219

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*, 1-13. https://doi.org/10.1016/j.caeo.2024.100169

Thiebes, S., Lins, S., & Sunyaev, A. (2021). Trustworthy artificial intelligence. *Electronic Markets*, *31*, 447-464. https://doi.org/10.1007/s12525-020-00441-4

Torres-Diaz, J. C., Duart, J., Rivera, D., & Beltran Flandoli, A. (2025). Artificial intelligence and academic integrity: Exploring plagiarism in Ecuadorian universities. *International Journal for Educational Integrity*, *21*, 35. https://doi.org/10.1007/s40979-025-00209-3

Trejo-Trejo, G.A., & Gordillo-Espinoza, E. (2026). Validación de un instrumento para medir el uso académico de la IAGen en estudiantes universitarios. *Pixel-Bit, Revista de Medios y Educación*, *75*(7), 1-17. https://doi.org/10.12795/pixelbit.117960

UNESCO. (2021a). *Recomendación sobre la ética de la inteligencia artificial*. UNESCO.

UNESCO. (2021b). *Inteligencia artificial y educación: Guía para las personas a cargo de formular políticas*. https://unesdoc.unesco.org/ark:/48223/pf0000379376

UNESCO. (2023). *Guía para la inteligencia artificial generativa en la educación y la investigación*. UNESCO.

Vélez Rivera, R., Muñoz Álvarez, D., Leal Orellana, P., & Ruiz-Garrido, A. (2024). Uso de Inteligencia Artificial en educación superior y sus implicancias éticas. Mapeo sistemático de literatura. *Hachetetepé. Revista científica De Educación Y Comunicación*, (28), 1105. https://doi.org/10.25267/Hachetetepe.2024.i28.1105

Vereau Amaya, E. A., Soto Zavaleta, A. R., Vásquez Luján, I. G., González López, E., Tomanguilla Reyna, J., & Ríos Gonzales, J. D. (2025). Between assistance and dependence: Artificial intelligence and critical thinking. A study on first-year university students. *International Journal of Learning, Teaching and Educational Research*, *24*(12), 118-134. https://doi.org/10.26803/ijlter.24.12.6

Villarino, R. T. (2025). Artificial Intelligence (AI) integration in Rural Philippine Higher Education: Perspectives, challenges, and ethical considerations. *IJERI: International Journal of Educational Research and Innovation*, (23), 1-25. https://doi.org/10.46661/ijeri.10909

Zhu, W., Huang, L., Zhou, X., Li, X., Shi, G., Ying, J., & Wang, C. (2025). Could AI Ethical Anxiety, Perceived Ethical Risks and Ethical Awareness About AI Influence University Students' Use of Generative AI Products? An Ethical Perspective. *International Journal of Human–Computer Interaction*, *41*(1), 742–764. https://doi.org/10.1080/10447318.2024.2323277