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Creativity and writing with generative artificial intelligence in the master's degree in teacher training

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The creative possibilities of Generative Artificial Intelligence (GenAI) are transforming writing processes across all educational levels. Since the emergence of OpenAI in 2022, multiple experiences and perspectives have emerged regarding the integration of GenAI in language and literature classrooms. These tools are reshaping traditional writing practices, opening new pathways to foster students' creativity, enhance critical thinking, and collaborative learning. This study analyzes the integration of GenAI over three academic years (2022–2023, 2023–2024, and 2024–2025) in the training of future Spanish Language and Literature teachers in Secondary Education. Specifically, it focuses on the course Research, Innovation, and Use of ICTs in the Teaching of Language and Literature, part of the Master's Degree in Secondary Education at the University of Alicante. Students' work is organized through a classroom blog (https://didacticalenguayliteraturaua2025.blogspot.com/, https://didacticalenguayliteraturaua2024.blogspot.com/, and https://didacticalenguayliteraturaua2023.blogspot.com/) and a dedicated social media hashtag for each academic year (#INVTICUA23, #INVTICUA24, and #INVTICUA25), allowing them to share work openly and interactively. The research employs a mixed-methods approach. First, a quantitative study was conducted using questionnaires at the beginning and end of the course to analyze students' learning about GenAI. A total of 118 participants (from #INVTICUA24 and #INVTICUA25) took part. Second, the process of introducing and integrating GenAI into established teaching activities is described, followed by a qualitative content analysis of students' work. Key activities include: (A) blog post writing with GenAI, examining how the tool assists in drafting weekly entries and types of errors generated; (B) I Couldn't Do This Without AI, a collaborative activity where students design a teaching proposal using an AI tool for Secondary Education classrooms; and (C) Education 2050 Stories, a creative writing exercise imagining the future of education using ChatGPT. Across all activities, students initially demonstrated limited knowledge of GenAI but progressively developed specific skills related to its educational use. Results confirm students' growing interest in these tools and reveal a consolidated learning process over the academic years. While these practices represent a novel approach and an opportunity for educational innovation, the ultimate goal is to normalize GenAI integration as a regular component of teacher training programs.

KEYWORDS

artificial intelligence, education, creativity, Spanish, literature

1 Introduction

The evolution of Artificial Intelligence (AI) over the last 4 years has been unstoppable and offers immense pedagogical possibilities, with constant innovations in the field of education that expand the dynamics available to teachers of any subject or stage (García-Peñalvo et al., 2024; Kaushik et al., 2025). The generative aspect (GenAI) of this technology expands the possibilities for reviewing, interacting with, and creating new texts, images, and audiovisual content, representing a radical transformation in language teaching (Ribes-Lafoz et al., 2024; Solak, 2024). The resent research shows specific practices in order to use AI in language and literature teaching (Mateo-Guillen et al., 2025; Khosrawi-Rad et al., 2022), with countless new tools to explore (Mateos Blanco et al., 2024). AI is capable of performing tasks typically done by humans (Forero-Corba and Bennasar, 2024) and is considered suitable of transforming education because it offers more effective methodologies and personalized solutions for each individual. GenAI is rapidly being incorporated in our academic practices (Baldrich and Domínguez-Oller, 2024), and protocols that allow us to recognize, deepen, and learn with its use are becoming widespread (Cassany, 2024). GenAI tools are not new and have existed since before the emergence of ChatGPT in November 2022, which can be regarded as a fundamental milestone in this field. However, there were already previous approaches that warned of the imminent revolution that its generalization to the general public would entail (González-Calatayud et al., 2021; Holmes et al., 2019). For example, in the Master's Degree lectures in Teacher Training at the University of Alicante, where this research was carried out, Tisselli's (2012) proposals and his website[1] for poetic creation with Generative Artificial Intelligence were already being cited more than 10 years ago.

Generative tools offer a new scenario for creativity (Ching and Mothi, 2025), opening up new frameworks and possibilities for digital creation, both in terms of text and images. Although it is necessary to be aware of the risks involved in using assistants such as ChatGPT for creative writing (Chowdhury-Niloy et al., 2024), it is necessary to experiment in depth to understand their enormous possibilities. In the field of language and literature teaching, it is essential to be aware of advances in creative writing with GenAI tools (Shidiq, 2023). Since 2022, these tools have become widespread and are now part of the digital ecosystem of education (Walter, 2024). Universities are adopting protocols for their use, such as Stanford University (2023) in the Universidad Nacional de Educación a Distancia-UNED (2023) in Spain, and there are countless guides available for quick learning of how to use them, such as those from UNESCO (Sabzalieva and Valentini, 2023) or UNAM (Grupo Académico IAG-UNAM, 2025). Their impact on the academic world has been impressive, and there are numerous publications analyzing specific uses and multiple systematic reviews on different topics (García-López et al., 2024; Pérez et al., 2025). Although these works are essential for understanding the broad field of study we are talking about and the enormous digital transformations it entails, they may soon become obsolete, on the one hand because the flow of publications is enormous, and on the other because the tools functionalities are constantly evolving.

In the field of Language and Literature Teaching, we can already find creative writing practices (Pellas, 2023) and academic writing practices (Zhao et al., 2024), as well as activities for developing linguistic communication skills, both in native languages (Solak, 2024) and additional languages (Yuen and Schlote, 2024). There is already ample evidence demonstrating their potential in both primary and secondary education (Martínez-Comesaña et al., 2023). GenAI tools can also be used to identify the needs of new students (Cassany, 2024) and personalize learning by providing immediate and individualized feedback for each student (Puertas and Cano, 2024).

It should also be noted that the use of GenAI raises multiple ethical questions (Akgun and Greenhow, 2022; Kölemen, 2024), both regarding its use and the authorship of the new products created, as well as issues of intellectual property or the use of large sources of written and visual information to train these new tools. The speed of digital innovation, as well as the rejection that has occurred in part of the educational sphere, can also generate a significant digital divide (Miras et al., 2023b).

1.1 Motivation, impact, and objectives

The present study arises from the growing need to examine, evaluate, and disseminate the pedagogical potential of Generative Artificial Intelligence (GenAI) in the training of secondary school teachers specializing in language and literature in Spain. To date, no specific studies have addressed the influence of AI on the teaching of Spanish Language and Literature Didactics within teacher education programs in the Spanish context (Martínez-Comesaña et al., 2023; Mateos Blanco et al., 2024). This research is therefore motivated by the aim of illustrating concrete pedagogical practices and learning dynamics that demonstrate the potential of GenAI for enhancing both subject teaching and the creative development of prospective teachers (Urmeneta and Romero, 2024). As most of the proposed activities are openly accessible through academic blogs, it is expected that their impact will be significant, offering practical, replicable examples of GenAI use that may be adapted to other instructional settings.

In this context, the study is guided by two central research hypotheses, which are examined through the educational inquiry carried out following the implementation of selected teaching activities:

The first hypothesis posits that students enrolled in the Master's Degree in Secondary Education Teaching possess limited prior knowledge of GenAI, likely due to the absence of structured training in earlier academic stages. The null hypothesis assumes that these students already have a solid understanding of GenAI upon entering the program.

The second hypothesis seeks to validate the effectiveness of the proposed activities based on students' positive evaluations. If the intervention results in measurable learning gains and statistically significant differences are observed, the hypothesis will be supported.

The objectives of the study are outlined below:

The primary purpose of this article is to describe the pedagogical practices implemented with GenAI in Spanish language courses within the Master's Degree in Teacher Training

1 https://www.motorhueso.net/midipoet/

at the University of Alicante over the last 3 academic years. The study illustrates these practices through concrete examples of classroom activities and samples of student work, some of which are publicly accessible on course blogs and social media platforms. More specifically, the objectives pursued are threefold:

1. To explore the pedagogical applications of GenAI in the in the Spanish language and literature classroom.
2 To examine the extent of prior knowledge and familiarity with GenAI among prospective secondary school teachers.
3 To present a set of GenAI-based activities designed to foster writing skills and creativity in teacher education.

2 Materials and methods

To begin with, the study undertakes a descriptive content analysis of the activities involving Generative Artificial Intelligence (GenAI) implemented over three academic years (2022–2023, 2023–2024, and 2024–2025). This is followed by the presentation of a curated selection of student-produced outputs, some of which are openly accessible online. Finally, the research incorporates a quantitative analysis of the perceptions of Master's students in Secondary Education regarding the educational use of Artificial Intelligence.

2.1 Participants

The study was conducted with students enrolled in the course Research, Innovation, and Use of ICT in Language and Literature Teaching (Code:12059) of the Master's Degree in Compulsory Secondary Education, Vocational Training, and Language Teaching at the University of Alicante. Each course is identified with the acronym #INVTICUA, which is also used as a hashtag on social media. The year indicates the second part of the academic year, which is when the course is being taught. It is a non-random, convenience sample that corresponds to the majority of students in each course.

The research has been approved by the Ethics Committee of the University of Alicante ("Generative Artificial Intelligence for Language and Literature Teaching" Code UA-2025-04-30) for the various student activities, and all students have given their informed consent for the activities to be published openly, as stated in the teaching staff blog for each course.[2]

The distribution of the participating sample was as follows: #INVTICUA23, 38 students; #INVTICUA24, 36 students; #INVTICUA25, 44 students; total, 118 participants. In addition, the four authors participated: Rovira-Collado and Miras as teachers of the subject, Ruiz-Bañuls as a specialist in secondary education, and Mateo-Guillén as an advisor on the use of tools and the design of activities, as well as teacher of the same subject specializing in English language. Other colleagues also collaborated, such as Professor José Hernández Ortega from the Complutense University of Madrid, an expert in the use of technology in secondary education (Hernández-Ortega, 2020; Hernández-Ortega and Rayón-Rumayor, 2021), and professors María Samper-Cerdán and Joaquín Juan-Penalva from the Master's Degree in Teaching at Miguel Hernández University in Elx, experts in gamification (Juan-Penalva et al., 2024), who have given specific workshops in the different courses.

2.2 Instruments

In the last two editions of the course, quantitative research developed by the teaching staff and validated by external experts was conducted with a pretest at the beginning of the course and a posttest in the final sessions. A mixed-type questionnaire was designed, including 24 questions on an 11-point Likert scale (0 = "Strongly disagree" and 10 = "Strongly agree"), based on previous instruments (Galván-Fernández and Calderón-Garrido, 2024). The aim of these questions was to analyze students' perceptions of the familiarity, impact, and need to introduce artificial intelligence into teaching, especially in the area of language and literature teaching. In addition, the questionnaire included two open-ended questions about the AI tools as they were familiar with and the design of activities involving the use of AI. These questionnaires were administered at the beginning of the course of each academic year in February and at the end of it in May. The questionnaires are available on the course blog, along with many other digital resources used in the course.[3]

In addition to ChatGPT, many other AI tools have been tested. The fundamental tools for this research were the course's own working instruments. First, a teaching blog for each course, which we will mention below, that students had to imitate in group blogs to submit most of their assignments. There is also a blog for the specific practice of Multimodal Constellations on the Generation of '27 (Miras et al., 2023a). Secondly, various social networks were used. In #INVTICUA23[4] e #INVTICUA24[5] these X tags were used to share student practices. In #INVTICUA25[6] a new phase began with BlueSky to test its possibilities compared to the old *Twitter* (Rovira-Collado et al., 2023). Digital walls such as Padlet (https://padlet.com/jrovira_collado/noticias-sobre-ia-invticua24-i6wuddhalhnp9z50) and other tools for sharing information with students, such as Wakelet, were also used. (https://wakelet.com/wake/YR9dLTdXplhhA3YDFy2-T) Thirdly, students also used the course's own Moodle platform to share some of their work. Finally, Google Forms was used for some questionnaires, Google Spreadsheets for evaluating the different practices, and SPSS for processing the questionnaire data.

Subsequently, the teaching blogs URLs are listed in Table 1, indicating the number of students group blogs that arise from each model and the practices that students are expected to perform, along with the Multimodal Constellations (MC) group blog, which gathers activities from the three courses.

2 https://didacticalenguayliteraturaua2025.blogspot.com/p/acceso-abierto-privacidad-y-cesion-de.html

3 https://didacticalenguayliteraturaua2025.blogspot.com/

4 https://twitter.com/hashtag/INVTICUA23

5 https://x.com/search

6 https://bsky.app/hashtag/INVTICUA25

TABLE 1 Teaching blogs from the three academic years.

Course	Hashtag	Teaching blog	Group blogs	Proposed activities
22–23	*#INVTICUA23*	https://didacticalenguayliteraturaua2023.blogspot.com/	8	15
23–24	*#INVTICUA24*	https://didacticalenguayliteraturaua2024.blogspot.com/	7	15
24–25	*#INVTICUA25*	https://didacticalenguayliteraturaua2025.blogspot.com/	10	14
22–25	CM Generation 27	https://constelacionesgeneracion27.blogspot.com/	32 CM	5

Own elaboration.

FIGURE 1
Concha Méndez #INVTICUA23. Source: https://constelacionesgeneracion27.blogspot.com/2023/05/4-creacion-literaria-concha-mendez.html.

FIGURE 2
Carmen Conde #INVTICUA24. Source: https://constelacionesgeneracion27.blogspot.com/2024/05/4-creacion-literaria-carmen-conde.html.

2.3 Procedure

The incorporation of Generative Artificial Intelligence constitutes a novel development across all educational levels. In the activities designed, instructors initially present a model of use, which students are subsequently expected to replicate or adapt by exploring alternative applications. It is therefore pertinent to outline the principal activities implemented over the three academic years under study. These activities are presented in clusters, allowing for an examination of their evolution within each subject area. All activities were carried out between February and May of each year, coinciding with the final stage of the academic calendar.

3 Results

First, the activities carried out with Artificial Intelligence are presented and organized into three overarching categories: 1. Generative practices #INVTICUA; 2. I can't do this without AI, and 3. Stories with GenAI about Education 2050. The first category includes three subheadings: 3.1. GenAI publications on blogs; 2. Online theory videos; 3. Images for the Constellations of Generation of '27. Although evidence of dissemination on social media is not included in this paper, most of the outputs can be accessed through X and BlueSky by searching the aforementioned hashtags.

Secondly, the article presents a statistical analysis of the questionnaires completed by students during the last two academic years.

3.1 Generative practices #INVTICUA

3.1.1 GenAI publications on blogs

Although GenAI was already used in some specific exercises in #INVTICUA23, it was not until #INVTICUA24 that the necessity of explicitly addressing its use from the very first session of the course was formally recognized. Therefore, a specific page was included in the general blog,[7] featuring specific reflections on ethical considerations and the potential misuse of Artificial Intelligence, particularly in relation to the respect for intellectual

7 https://didacticalenguayliteraturaua2024.blogspot.com/p/sobre-el-uso-educativo-de-ia.html

FIGURE 3
Rosa Chacel #INVTICUA25. Source: https://constelacionesgeneracion27.blogspot.com/2025/05/3-relatos-audiovisuales-rosa-chacel.html.

property. At the same time, students were consistently encouraged to engage with these tools in a responsible and constructive manner.

Therefore, the majority of the activities implemented followed a two-step structure. In the first stage, the teacher presented an example activity designed to illustrate the task. In the second stage, the same activity was reproduced using ChatGPT, which was explicitly identified with the corresponding tag: #Entradas con ChatGPT/ #Post with ChatGPT[8] It was assumed that students could make use of this or other GenAI tools, as had already been inferred in the previous course; therefore, a specific example of a response generated by this virtual assistant was presented. The quality of the response was then analyzed collectively, in order to determine whether the information provided was accurate or whether it contained any hallucinations. In this context, a hallucination refers to the generation of false or inaccurate data by an AI system, presented with apparent confidence—not with the intention to deceive, but as a consequence of pattern-based learning from multiple sources. For this reason, it is crucial to critically review all information provided by AI tools. Some illustrative examples include:

Practice 1IA. 10 digital tools. Original entries with ChatGPT in Spanish

1. *Prompt: Me puedes decir cuáles son las 10 herramientas digitales más importantes para un profesor de Secundaria. Muchas gracias:* https://didacticalenguayliteraturaua2024.blogspot.com/2024/02/practica-1ia-10-herramientas-digitales.html

- Práctica 2IA (optativa) La mirada del otro (enmascarado) #INVTICUA24. Entradas con ChatGPT

2. *Prompt: Me gustaría que me hicieras una lista con los 10 libros que leyó un adolescente durante el confinamiento de 2020 producido por la Covid19:* https://didacticalenguayliteraturaua2024.blogspot.com/2024/03/practica-2ia-optativa-la-mirada-del.html

- Práctica 4IA. Resumen de un artículo de investigación

3. *Prompt: Me gustaría un breve resumen crítico del siguiente artículo:* https://didacticalenguayliteraturaua2024.blogspot.com/2024/03/practica-4ia-resumen-de-un-articulo-de.html

- Práctica 11 IA. Taller de Juegos de Mesa

4. *Prompt: ¿Qué juegos de mesa conoces o juegas habitualmente? ¿Recuerdas algún juego cuando estudiabas en el Instituto? ¿Qué uso le das o darías a los juegos de mesa en tus clases? ¿Puedes trabajar la lengua o la literatura? Comenta algún juego de los vistos en clase u otro que conozcas y/o juegues habitualmente:* https://didacticalenguayliteraturaua2024.blogspot.com/2024/05/practica-11-ia-taller-de-juegos-de-mesa.html

- Práctica 12 (Optativa) IA

5. *Prompt: Me gustaría tener un abstract para un congreso de Didáctica de la Lengua y la Literatura, con el tema: "La Inteligencia artificial en la enseñanza de la literatura":* https://didacticalenguayliteraturaua2024.blogspot.com/2024/05/practica-12-optativa-ia.html

For example, in 2IA, ChatGPT was given the following instruction: "I would like you to make me a list of the 10 books that a teenager read during the 2020 lockdown caused by COVID-19." Although the answer was correct and the books were all real, the students discussed the choice of some works, such as The Little Prince, and not everyone in the group was familiar with all the readings, confirming the potential for acquiring new knowledge with GenAI. In 11IA, within a "Board Game Workshop for Literary Education," it was confirmed that the answers sometimes mixed information about games, but this error was only visible for the experts who taught this workshop (Juan-Penalva et al., 2024).

In 4IA, with the instruction: "I would like a brief critical summary of the following article," the limitations of the tool at that time (March 2024) were confirmed because it could not access a specific article on the internet, even though it was open access. In #INVTICUA25, it was possible to carry out this exercise by uploading the PDF of an article to ChatGPT, but it was immediately demonstrated to the students that this "mechanical" summary offered by the virtual assistant was of no use to them in their training, only to cover an activity. Finally, in 12IA, they were encouraged to share in Exercise 12. (Optional) a summary of their Master's Thesis in an imaginary Interstellar Congress on Research, Innovation, and the Use of ICT in Language and Literature Teaching. And ChatGPT's response offered a possible summary entitled "Artificial Intelligence in Literature Teaching:

8 https://didacticalenguayliteraturaua2024.blogspot.com/search/label/EntradasconChatGPT

Innovations and Challenges." Although the summary was formally well structured, it quickly became evident that its content was superficial and lacking in depth, largely due to the vagueness of the instructions initially provided. While GenAI can support the production of a wide variety of texts, effective use requires prior knowledge of the subject matter and, above all, the ability to formulate precise prompts in order to obtain appropriate and meaningful responses.

By the following edition of the course #INVTICUA25 course, the widespread integration of these tools was already consolidated. In some cases, student submissions were replicated alongside their corresponding GenAI-generated responses. For instance, in the first assignment—an activity carried out for many years—students were asked to identify the main technological tools they use in their daily academic and professional practices, as part of their Personal Learning Environment. As a prompt for ChatGPT in the previous course, the following was suggested: "Can you tell me the 10 most important digital tools for a secondary school teacher? Thank you very much." The corresponding blog entry subsequently presented ten useful categories.,[9] taking advantage of the same entry from February 2024. It is interesting to note that most of the students were unfamiliar with some of the categories or their definitions, such as "Learning Management System (LMS)," even though they had used them previously, or "Adaptive Learning Platforms." During the session, numerous new tools were introduced and explained, highlighting the significance of this type of activity for the development of Digital Teaching Competence among future secondary school teachers (Álvarez-Herrero, 2024).

However, the most significant change was the introduction of a specific protocol, beginning with Practice 3 in all entries.[10] This protocol was adapted from Cassany's (2024) proposal on the educational use of Artificial Intelligence. For each task, students were required not only to create their own entries but also to evaluate whether the same task could be accomplished using ChatGPT or other virtual assistants. The questions included in the protocol are as follows:

In your entry, you should also reflect on the following questions:

1. Is it possible to create this entry using Artificial Intelligence? What would be the possible results in terms of quality and originality?
2. Have I used Artificial Intelligence in this entry? How? For what purpose? What were the questions/instructions/prompts?
3. SWOT analysis: Identify the Strengths, Weaknesses, Opportunities, and Threats related to the use of AI in this context.
4. Is there a risk that this practice will be carried out automatically? Rate it from 0 (minimum risk) to 10 (maximum risk) and justify your answer.
5. Suggest other questions to broaden the discussion on the impact of AI on writing and managing blogs on language and literature teaching.

This reflection is essential for Master's students to analyze the characteristics of any activity they will ask their students to do in the future. In Practice 4. "Conference, Journal, or Article on DLL,"[11] as in #INVTICUA24, the evolution of the tool is evident. On this occasion, students were asked to present an academic activity related to Language and Literature Teaching, a scientific journal in the field, or a specific article. They were shown a summary generated by ChatGPT of one of the authors' own articles on Graphic Literary Biographies (Rovira-Collado et al., 2024b). The quality of this summary was evaluated based on a comprehensive understanding of the original work. The exercise confirmed the validity of such tools for generating precise summaries, particularly as some platforms, such as PDF-based applications, now offer this functionality directly. However, it was also pointed out that summarizing no longer makes sense as a mechanical activity because, in addition, if a student wanted to use that article in a subsequent project such as a master's thesis, a simple summary would not suffice. Similarly, using the same prompt, the assistant was asked to suggest related research; in this instance, it produced a hallucination, generating a completely fabricated bibliography. This highlights a common error frequently observed in university students' academic work, where ChatGPT is used as a source without verification, and the information is subsequently copied without assessing its reliability—an issue with significant implications for academic literacy (Baldrich et al., 2024). In the following exercise, which focused on this type of comic book which is very useful for literary education, it was also confirmed that the previous summary had left out many ideas that were necessary to carry out the suggested activities.[12] Additionally, activities about comics as a multimodal and cooperative learning medium were presented, a domain in which GenAI has not yet proven particularly effective.

3.1.2 Online theory videos

The course content includes an online teaching component designed to accommodate the schedule of students' work experience placements in secondary schools. Although numerous digital resources are already available, in this instance students were provided with a curated selection of videos for individual and group work. Four optional videos were suggested, and #INVTICUA24 required students to work on two specific videos on AI. These videos were as follows:

1. - *The Impact of AI on Literary Education. The Hispanic American Readings Project. Jose Manuel de Amo, University of Almería (2023).* https://youtu.be/VaMlex1cEM?si~=~qCxeEY3mdt45KM-O(1h).
2. - *Already immersed in generative AI: its potential for language teaching. Vicenta González Argüello and Joan*

9 https://didacticalenguayliteraturaua2025.blogspot.com/2025/02/practica-1ia-10-herramientas-digitales.html

10 https://didacticalenguayliteraturaua2025.blogspot.com/2025/02/practica-3-obligatoria-analisis-de-un.html

11 https://didacticalenguayliteraturaua2025.blogspot.com/2025/03/practica-4-congreso-revista-o-articulo.html

12 https://didacticalenguayliteraturaua2025.blogspot.com/2025/03/practica-5-biografias-literarias.html

Tomàs Pujolà Font, University of Barcelona (2024). https://vertice.cpd.ua.es/290215 (1:30 h. From the third hour after the broadcast).

Both videos originate from activities conducted at the University of Alicante in recent academic years. The first one was a lecture at the 5th Seminar on Hispanic American Literature in the Classroom, organized by the Mario Benedetti Center for Ibero-American Literary Studies. The second was a seminar by the ACQUA (Acquisition of Additional Languages) research group. In this practice, students were asked to write summaries, answer specific questions about the videos, and select links or threads on social media in order to analyze each talk. Afterwards, each student had to find a similar video for their class. The resulting work is available on each group's blogs and through the corresponding X and BlueSky threads. While GenAI can support certain aspects of these activities, they also demand substantial engagement and careful review by the students themselves.

3.1.3 Images for the Constellations of the Generation of '27

One course prior to the emergence of ChatGPT, during #INVTICUA22, the Multimodal Constellations on the Generation of '27 project (Miras et al., 2023a) was launched. This project, a central component of the course, was structured into multiple parts and documented on a dedicated blog, which compiles constellations from four academic years.[13] In addition to the visual mapping of multimodal elements related to a prominent figure in the 1927 literary movement and the corresponding bibliographic description, students were asked to produce literary and audiovisual creations inspired by the works of its members. In March 2023, GenAI was integrated into this practice. For that academic year, a constellation model was developed focusing on the poet Miguel Hernández, following the example of Federico García Lorca, which had been used in the previous academic year.

In the creative writing activity,[14] each group was first asked to create an acrostic poem using the author's first and last name. In this case, three models were offered by Carmen Alemany Bay and José Carlos Rovira Soler, leading specialists in the Orihuela poet's work, and Raquel Lanseros, a poet and teacher who participated in the project that year. Based on this selection of words, the students were asked to create an image with GenAI. Subsequently, other prompts were used to illustrate the constellations of each character. Various tools were used, such as *DALL-E, Midjourney, Sable Diffusion, Big AI Generator, Hot Pot, and ChatGPT*.

In the general blog on constellations in Table 2, there is some evidence of this experimentation with GenAI for image generation carried out at *#INVTICUA23* and *#INVTICUA24* in the Literary Creation workshop and at *#INVTICUA25* in the Audiovisual Stories workshop.

Below, selected examples of images generated by students using GenAI are presented in Figures 1–3.

In 2023, Bing AI Generator was given the following instruction, directly in English: *"A realistic photograph of two women seen from behind walking through the streets of Madrid during the 1920s, the first holding a paintbrush, the second holding a book and throwing a hat into the air."*

With DALL-E in 2024, the prompt was: *"Show me an image of Carmen Conde Abellán as a comic book heroine. I want her superhero costume to have the letter "K" on the chest. Add traditional Spanish elements. The city of Cartagena, Spain, should appear in the background. Also add some books and writing pens."*

With ChatGPT, in 2025, the prompt used was: *"I need you to generate an image of a starter pack featuring Rosa Chacel as a doll, with gray hair tied back, round glasses, and a simple navy blue dress, holding her work Memorias de Leticia Valle. On the other hand, I want elements such as a typewriter, a brown suitcase with travel tags (symbolizing her exile and travels), a coffee cup, and a notebook to appear, representing her intellectual life, and finally a feminist symbol alluding to her position as a prominent woman in literature."*

As there are several writers who appear in all three courses, such as Vicente Aleixandre, Carmen Conde, and Concha Méndez, it is interesting to analyze the rapid evolution of these tools. While the visual capabilities of GenAI are considered both engaging and pedagogically valuable, it is important to emphasize that such applications should not replace the work of professional illustrators. Moreover, we consistently uphold intellectual property rights, reinforcing this principle in all classroom activities involving GenAI. All these images accompany the constellation on each of these individuals, protagonists of one of the most important literary generations. Creativity in the use of images is also accompanied by proposals for textual creation, imitating the writing of different artists. GenAI can also be used for poetic creation and analysis (Hitsuwari et al., 2023). The practice of multimodal constellations within our department has also evolved through the use of ChatGPT, leading to the development of specialized assistants to support both the creation and evaluation of new constellations created by students (Miras et al., 2026).

3.2 This cannot be done without AI

Another group practice that has gradually evolved over time is "I can't do this without AI." Until #INVTICUA22, it was called "I can't do this without ICT," an activity where the use of some form of technology was essential to complete a task, always within the field of Language and Literature Teaching. For example, to create a collaborative text from home, students needed a tool similar to Google Drive or all the audiovisual possibilities offered by mobile phones, such as podcasts, book trailers, booktoks... With the new design, the practice was conceived as a group project in which each group had to select an AI tool and develop a teaching proposal related to language or literature teaching.

To begin with, each group had to select the tool they wanted to work with in the secondary school classroom, as well as the subject area (language or literature). Students were provided with a list of AI tools, although they were not required to limit themselves to these. One of the key elements of the exercise was the annotated bibliography of online materials available on the selected tool. Each group had to find between five and ten documents (academic articles, popular articles, tutorials, etc.) and reflect on their content. Next, a presentation of the chosen tool was

13 https://constelacionesgeneracion27.blogspot.com/

14 https://miguelhernandezmultimodal.blogspot.com/p/4-creacion-literaria.html

TABLE 2 Audiovisual creations GenAI constellations generation of '27.

Course	Link literary creation/image created with AI	Author generation '27
#INVTICUA23	https://constelacionesgeneracion27.blogspot.com/2023/05/4-creacion-literaria_16.html	Vicente Aleixandre
#INVTICUA23	https://constelacionesgeneracion27.blogspot.com/2023/05/4-creacion-literaria_21.html	Max Aub
#INVTICUA23	https://constelacionesgeneracion27.blogspot.com/2023/05/4-creacion-literaria_31.html	Carmen Conde
#INVTICUA23	https://constelacionesgeneracion27.blogspot.com/2023/05/4-creacion-literaria-concha-mendez.html	Concha Méndez
#INVTICUA23	https://constelacionesgeneracion27.blogspot.com/2023/05/4-creacion-literaria_22.html	Elisabeth Mulder
#INVTICUA23	https://constelacionesgeneracion27.blogspot.com/2023/05/pedro-salinas-creacion-literaria.html	Pedro Salinas
#INVTICUA24	https://constelacionesgeneracion27.blogspot.com/2024/05/4-creacion-literaria-vicente-aleixandre.html	Vicente Aleixandre
#INVTICUA24	https://constelacionesgeneracion27.blogspot.com/2024/05/4-creacion-literaria-carmen-conde.html	Carmen Conde
#INVTICUA24	https://constelacionesgeneracion27.blogspot.com/2024/06/iv-creacion-literaria-concha-mendez.html	Concha Méndez
#INVTICUA25	https://constelacionesgeneracion27.blogspot.com/2025/06/3-relatos-audiovisuales-rafael-alberti.html	Rafael Alberti
#INVTICUA25	https://constelacionesgeneracion27.blogspot.com/2025/05/3-relatos-audiovisuales-vicente.html	Vicente Aleixandre
#INVTICUA25	https://constelacionesgeneracion27.blogspot.com/2025/06/3-relatos-audiovisuales-luisa-carnes-la.html	Luisa Carnés
#INVTICUA25	https://constelacionesgeneracion27.blogspot.com/2025/05/3-relatos-audiovisuales-rosa-chacel.html	Rosa Chacel

Own elaboration.

prepared, adapted to a secondary school or high school audience, including an introduction to its possible uses and an explanation of how it can be used.

The tools proposed in #INVTICUA23 were the following, although this list has since been modified:

1. Prismas https://santillana.es/contenido-digital/#/
2. *CapCut* https://www.capcut.com/es-es/
3. *Gradescope* https://www.gradescope.com/
4. *Scribble Diffusion* https://scribblediffusion.com/
5. *Grammarly* https://www.grammarly.com/
6. *DeepL* https://www.deepl.com/es/translator
7. *Jasper* https://www.jasper.ai/
8. *Runway* https://runwayml.com/
9. *Fliki* https://fliki.ai/
10. *Resemble* https://www.resemble.ai/
11. *Play.ht* https://play.ht/
12. *Frase* https://www.frase.io/
13. *Copy.ai* https://www.copy.ai/
14. *Articoolo* http://articoolo.com/
15. *Midjourney* https://www.midjourney.com/
16. *Dream* https://dream.ai/
17. *Craiyon* https://www.craiyon.com/
18. *Rytr* https://rytr.me/
19. *Copymatic* https://copymatic.ai/
20. *Peppertype* https://www.peppertype.ai/
21. *Designify* https://www.designify.com/
22. *Anyword* https://anyword.com/
23. *Regie* https://www.regie.ai/
24. *HyperWrite* https://hyperwriteai.com/
25. *Wordtune* https://www.wordtune.com/

. . . Or suggest another AI tool.

The next step was the design of a short teaching sequence within a specific course. The proposal constituted the central part of the work, focusing on language or literature content, which was then presented in class and discussed collectively. Table 3 shows the applications and the type of tools chosen by each group according to the course (#INVTICUA23, #INVTICUA24, and #INVTICUA25).

The diversity of the tools employed, in terms of their functionalities, is noteworthy: although *Capcut* was chosen by five different groups, *Runway* also features as a video editor. Video and voice generators such as *Fliki* and *Play.ht* also appear, as do writing assistants such *as Copy.ai* and *Hyperwrite*, and image generation platforms such as *Craiyon, Midjourney,* and *AI Comic Factory*. This range of functionalities enabled students to engage with and critically discuss generative technologies, as well as the linguistic and literary analyses they provide. There was a broad consensus that these tools contribute significantly to fostering student creativity (Urmeneta and Romero, 2024).

The proposals also encompassed a variety of approaches, including sequences focused on literary reading, narrative creation, textual analysis, and audiovisual production. Overall, the objective was to integrate oral and written expression with digital literacy. The teacher's role was primarily that of a guide and mediator, offering support and fostering reflection on the ethical and functional boundaries of GenAI. The activities were predominantly designed for students in the third and fourth years of secondary education, although several initiatives targeted upper secondary school, with educational uses ranging from the creation of illustrated stories with *Craiyon* or *Cuenti.to* to the production of poetry collections with *Perplexity*.

Of particular note is the review of academic and informative literature, which allowed the groups to take a critical approach to the use of AI in the classroom. Most of the submissions included between 5 and 11 references, demonstrating a rigorous approach to works that either present issues related to the use of AI in education or describe experiences with the tool in question. This theoretical component reinforced the educational and reflective nature of the practice.

This practice was also included in the blog, which contained links to the two AI questionnaires that students had to complete.[15]

3.3 Stories with GenAI on education 2050

The longest-standing practice in this subject is writing texts that explore prospective scenarios for the future of education. Through various literary and audiovisual science fiction stories, students were asked to write a story about their future as teachers (Rovira-Collado et al., 2024a). When this practice was initiated in 2010, the projected horizon for the exercise was 2030; however, it has since been extended to 2050. In January 2023, 3 months after the launch of ChatGPT, the decision was made to integrate AI into the development of the practice as a novel educational challenge (Celik et al., 2022). This integration was first implemented in the Master's Degree in Educational Research, within a subject similar to ours (#INVDLLUA22).[16]

On that first occasion, at the end of the practice session, some questions were raised:

A. Are you familiar with ChatGPT tools? What do you think about the use of AI in education?
B. Was it difficult to use? Comment on whether it helped or hindered your work.
C. Is the story you obtained similar to the one you would have written?

This new version of the practice with GenAI has been maintained for three academic years: #INVTICUA23; #INVTICUA24; #INVTICUA25. In #INVTICUA25, the entry that includes some of the stimuli mentioned for creating the story about the future[17] contains the following instructions.

STORY ABOUT EDUCATION IN 2050 WITH CHATGPT. An original story was created and then improved through various questions and suggestions. Both the original and final stories were published, and the process of improving the story was explained. In addition, you can share everything on BlueSky:

> *1. Document the process of constructing the story and the different instructions given to ChatGPT in a BLUESKY thread.*
> *2. Write a final message or messages reflecting on the use of this tool and whether you consider yourselves to be the authors of the final story.*
> *3. The FINAL and INITIAL stories will be uploaded INDIVIDUALLY to your course blogs.*
> *4. Don't forget to include the hashtag #INVTICUA25 in each "BLUIT."*

The practice has been further enriched, with over 200 stories currently available for analysis (100 initial and 100 final) across different courses. Similar to the constellations project, the creation of accompanying images was incorporated as an extension of the practice. Specific studies have also examined the use of prompts in each story, emphasizing the importance of providing precise instructions to these virtual assistants (Walter, 2024). Table 4 presents selected examples from the most recent course to illustrate the process.

In our university's Master's Degree in Educational Research, ChatGPT has been used to create these stories in different courses (#INVDLLUA22; #INVDLLUA23 and #INVLIJUA25), all of which can be found in the previous blog, which also includes contributions from students.[18] In the latest edition, a more elaborate exercise was carried out, focusing on the entire creative process through GenAI.

The activity was grounded in the same educational sequence, *Education 2050*, centered on the "Education of the Future" (Rovira-Collado et al., 2024a), which brings together various representations of the future through both literary and cinematic science fiction. Below, an initial model story—previously produced by the teaching team—is presented. The story was analyzed in terms of its literary and linguistic features, as well as the type of future it depicts. Both its explanation and creation were facilitated using ChatGPT.

Subsequently, another final story was presented. The text was analyzed again, pointing out the differences and confirming that it was also a story created entirely by ChatGPT through successive prompts. Students were required to follow the same process, presenting an initial story and a final version. However, the body of the work focused on documenting the entire process, collecting the different prompts and making a brief comment on each step, explaining the decisions made. The story had to incorporate specific intertextual references, according to each person's interests, as well as key issues related to the future, such as sustainability.

Upon completion of the writing process, students were required to generate three distinct images with GenAI to accompany the final story, ensuring alignment with its content and characteristics. As with previous exercises, the initial output could not be used directly; students were expected to document the iterative improvement process. They were also required to specify the tool employed, provide the prompts used, and explain the rationale behind the selection of the final images. The practice concluded with a comprehensive reflection on the entire sequence. The outline of the sequence is as follows:

1. First phase: Planning the story
1.1. Choosing the topic
1.2. Searching for literary or cinematographic references
1.3. Searching for GenAI technologies
1.4. Reflection on the SDGs in the education of the future
2. Second phase: Developing the story with GenAI
2.1. Generating the initial story
2.2. Refining the story through interaction with GenAI
2.3. Classifying the prompts
2.4. Improving and revising the text
3. Third phase: Creating images with GenAI

15 https://didacticalenguayliteraturaua2025.blogspot.com/2025/05/practica-13-esto-no-lo-puedo-hacer-sin.html

16 https://sintiempoparaleerua.blogspot.com/2023/01/actividad-vi-educacion-en-2030-chatgpt.html

17 https://didacticalenguayliteraturaua2025.blogspot.com/2025/05/practica-10-la-educacion-en-2030-chatgpt.html

18 https://sintiempoparaleerua.blogspot.com/

TABLE 3 List of AI tools by group.

Group	Course	Application	Type
GR01	*#INVTICUA23*	Fliki	Generative (text to video)
GR02	*#INVTICUA23*	Copy.ai	Generative (text)
GR03	*#INVTICUA23*	Runway	Generative (image and video)
GR04	*#INVTICUA23*	CapCut	AI-assisted audiovisual editing
GR05	*#INVTICUA23*	Designify	Visual generative
GR06	*#INVTICUA23*	Play.ht	Generative (text to voice)
GR07	*#INVTICUA23*	Prismas	Using AI for learning and tracking
GR08	*#INVTICUA23*	Midjourney	Generative (text to image)
GR09	*#INVTICUA24*	Pixton	Visual generative
GR10	*#INVTICUA24*	CapCut	AI-assisted audiovisual editing
GR11	*#INVTICUA24*	HyperWrite	Text generation and writing assistant
GR12	*#INVTICUA24*	Gemini	Text generation
GR13	*#INVTICUA24*	Craiyon	Generative (text to image)
GR14	*#INVTICUA24*	Phind	Text generation
GR15	*#INVTICUA24*	CapCut	AI-assisted audiovisual editing
GR16	*#INVTICUA25*	Wordwall	AI assistant with personalization
GR17	*#INVTICUA25*	Fliki	Audiovisual generation
GR18	*#INVTICUA25*	UDPipe	Natural language processing
GR19	*#INVTICUA25*	CapCut	AI-assisted audiovisual editing
GR20	*#INVTICUA25*	Cuenti.to	Generative (text and image)
GR21	*#INVTICUA25*	Perplexity	Text generation
GR22	*#INVTICUA25*	AI Comic Factory	Visual generation
GR23	*#INVTICUA25*	Runway	Audiovisual generation
GR24	*#INVTICUA25*	CapCut	AI-assisted audiovisual editing

Own elaboration.

TABLE 4 Education 2050 entries with ChatGPT at #INVTICUA25.

Course	Specific entry education 2050	Prompts used	Use of GenAI images
#INVTICUA25	https://amantesdelaticteratura.blogspot.com/2025/05/practica-10-la-educacion-en-2030-chatgpt_21.html	4	No
#INVTICUA25	https://tictacarpediem.blogspot.com/2025/06/practica-10-la-educacion-en-2050-con.html	2	Yes
#INVTICUA25	https://laiaessueno2025.blogspot.com/2025/06/practica-10-la-educacion-en-2050-con.html	4	Yes
#INVTICUA25	https://labibliotecadealejandr-ia.blogspot.com/2025/06/practica-10-la-educacion-en-2077.html	5	Yes
#INVTICUA25	https://vorticesemantico.blogspot.com/2025/05/practica-10-la-educacion-en-2050-chatgpt.html	3	Yes

Own elaboration.

3.1. Generating narrative images

3.2. Justifying the images

4. Fourth phase: Final reflection.

4.1. Evaluating the process and the use of GenAI in creative writing.

In addition, this practice was also carried out in 2025 in the English language specialization course of the Master's Degree in Teaching, parallel to #INVTICUA25, with the entire process conducted in English. In this case, an explanatory video is shown, also created with Artificial Intelligence by Carmen Cutillas, a student in the Master's Degree in Educational Research.[19]

In this case, the research does not focus on the final outcomes of the stories; rather, the central element of analysis is the process

19 https://www.youtube.com/watch

and the use of different prompts (Mateo-Guillen et al., 2026). This approach better illustrates the role of GenAI as a tool to enhance student creativity. Additionally, students were encouraged to experiment with text types and to pay particular attention to the writing quality and linguistic accuracy of the final story, aiming to approximate the perspective of a future teacher in 2025 envisioning education in 2050.

Before the experiment took place, there was a general superficial understanding of the multiple possibilities offered by GenAI tools, based solely on the results provided in the initial interactions. After the experiment, there was widespread surprise about the quality and depth of the final stories, demonstrating deep reflection throughout the process that consolidated the learning achieved by the people who created these stories together with ChatGPT.

As this is a creative proposal, when it came to creating literary texts, there was also deep reflection on their authorship (Tsao and Nogues, 2024), reaching a general consensus that this is shared between ChatGPT and the people who have written multiple instructions. The correction and structure of the final version have also been subject to various revisions, demonstrating the students' concern to offer the best possible texts. In this sense, GenAI is not a threat, but an opportunity for creative writing (Chowdhury-Niloy et al., 2024).

3.4 Educational research on GenAI in the secondary education master's degree

During #INVTICUA23, it was not possible to validate a suitable questionnaire for these emerging practices. However, in the subsequent two courses, the aforementioned research was conducted using pre-tests and post-tests to assess students' perceived learning regarding GenAI. The results are presented separately, as participation varied and knowledge of GenAI evolved rapidly over these two years. The average reliability of the questionnaires, calculated using Cronbach's alpha, indicated a high level of internal consistency (α between 0.93 and 0.98).

3.4.1 Results of #INVTICUA24

The initial questionnaire was completed by 30 participants (pretest), while the final questionnaire was answered by 22 participants. Table 5 shows the means and standard deviation of the pretest responses for a selection of items included in the questionnaire. The scale ranges from 0 (minimum knowledge) to 10 (maximum knowledge). It can be seen that the initial perception of familiarity with generative AI was considerably low (M = 4.83); the same is true for confidence in using AI in student assessment (M = 5.80) and the ability to improve written expression with the help of AI (M = 5.17).

The post-test questionnaire, completed by 22 students, shows positive progress in certain key areas regarding the integration of AI in education. First, it reveals a notable increase in familiarity with generative AI systems (DIF = +1.03). Similarly, there is a significant improvement in confidence in using AI to assess student performance (DIF = +1.02), an aspect about which there was some skepticism in the initial questionnaire. Two other items deserve special mention: expression and comprehension skills. The belief that AI can help improve students' written expression showed a considerable increase (DIF = +0.83), as did the service it can provide for improving reading comprehension (DIF = +0.77). These results are particularly relevant for language and literature teaching, given the change in attitude they reveal towards fundamental skills in this area. Table 6 shows the results of the selected items and the difference with the pretest results. To assess whether the observed differences reach statistical significance, the t statistic values and corresponding significance levels (p) obtained through a paired-sample t-test were analyzed. The findings indicate increases across all selected items. According to the t-test results, these differences are statistically significant in the vast majority of cases, particularly for items associated with familiarity with generative AI, the development of pedagogical strategies, and the design of AI-based learning activities.

3.4.2 Results of #INVTICUA25

The initial questionnaire for the #INVTICUA25 course received a total of 32 responses (Table 7). Students once again expressed low familiarity with GenAI tools (M = 4.63) and some uncertainty when using them in assessment tasks (M = 5.97). However, they expressed a high need for AI training for professional development (item 3, M = 7.34), which shows a certain discrepancy between the practical knowledge they had at their disposal and their perception of its importance. The group showed moderate optimism about the future of the link between AI and education (M = 6.53), and somewhat more pronounced optimism on issues of media literacy (M = 7.28).

The post-test questionnaire, consisting of 27 responses, revealed a positive evolution in the perception of AI integration in education compared to the pre-test. Firstly, an increase in familiarity with GenAI tools was observed (DIF = +1.60), as well as an improvement in confidence in using GenAI to assess student performance (DIF = +1.40).

Other relevant items also presented significant improvements. For example, the perception that AI can contribute to the development of critical thinking in students increased significantly (DIF = +1.49), as did the conviction that specific teaching strategies involving AI are necessary (DIF = +1.89), which showed the most pronounced change of all the items. Likewise, there has been an increase in the assessment of AI's potential to stimulate creativity (DIF = +0.92), although with some variability in the responses. The t statistic values for INVTICUA25 confirm increases across all analyzed items, with statistically significant differences ($p < 0.05$). In this case, the improvements are primarily related to activity design, media literacy, and the development of students' competences.

Overall, the results reflected a positive change in attitude toward AI as an educational resource. As was the case in the #INVTICUA24 questionnaires, items related to the development of written expression and comprehension also experienced a considerable increase. Table 8 shows the results of the selected items and the difference with the pretest results.

Overall, both groups exhibited a significant improvement in students' perceptions regarding the educational use of generative AI. To verify the consistency of the obtained results and explore the relationships among variables, a mixed ANOVA was conducted. The effects of measurement time, participant group, and their interaction were examined. The results of the analysis are presented in Table 9.

A significant main effect of measurement time was observed[($F(1) = 18.42$, $p < 0.001$, $\eta^2 = 0.31$], indicating

TABLE 5 Descriptive pretest results in #INVTICUA24.

Instrument variables analyzed	Pre-test average	Standard deviation
Item 2. I consider myself familiar with generative AI systems	4.83	1.78
Item 6. AI will enhance students' creativity	6.40	2.37
Item 7. AI will improve the development of critical thinking	5.60	2.36
Item 12. I would feel confident using AI for performance evaluation	5.80	2.30
Item 14. It is essential to develop pedagogical strategies with AI	6.27	2.61
Item 15. It is essential to develop strategies for media literacy	7.20	2.46
Item 16. AI will help students develop communication skills	5.83	2.70
Item 17. It is essential to design activities with AI to create content	6.30	2.73
Item 18. AI will facilitate problem solving among students	5.93	2.29
Item 20. I am optimistic about the future of education with AI	6.53	2.84
Item 22. AI can improve the writing skills of my future students	5.17	2.84
Item 24. AI can help my future students' reading comprehension	5.23	2.61

Own elaboration.

TABLE 6 Descriptive post-test results of #INVTICUA24.

Instrument variables analyzed	Post-test average	Standard deviation	Difference with pretest	*t*	*p*
Item 2. I consider myself familiar with generative AI systems	5.86	1.86	+1.03	2.37	0.026
Item 6. AI will enhance students' creativity	6.91	2.43	+0.51	3.02	0.005
Item 7. AI will improve the development of critical thinking	6.36	2.26	+0.76	2.61	0.014
Item 12. I would feel confident using AI for performance evaluation	6.82	2.36	+1.02	2.45	0.022
Item 14. It is essential to develop pedagogical strategies with AI	6.95	2.54	+0.69	3.86	0.001
Item 15. It is essential to develop strategies for media literacy	7.64	2.75	+0.44	3.11	0.004
Item 16. AI will help students develop communication skills	6.45	2.24	+0.62	3.24	0.003
Item 17. It is essential to design activities with AI to create content.	6.86	2.32	+0.56	3.78	0.001
Item 18. AI will facilitate problem solving among students	6.36	2.01	+0.43	2.95	0.006
Item 20. I am optimistic about the future of education with AI	7.09	2.20	+0.56	2.84	0.008
Item 22. AI can improve the writing skills of my future students	6.00	2.76	+0.83	3.36	0.002
Item 24. AI can help my future students' reading comprehension	6.00	2.67	+0.77	2.57	0.016

Own elaboration.

an overall improvement in students' perceptions from pretest to posttest. A significant group effect was also found [$F(1) = 4.76$, $p = 0.034$, $\eta^2 = 0.07$], with higher mean scores in the second group (INVTICUA25) compared to the first group. Moreover, the interaction between measurement time and group reached statistical significance [$F(1) = 5.12$, $p = 0.028$, $\eta^2 = 0.08$], suggesting that the magnitude of improvement differed between groups, being more pronounced among students in the INVTICUA25 group. Collectively, these findings substantiate the positive impact of the training intervention and indicate a trend toward greater acceptance of the integration of generative AI in educational contexts.

Finally, with the aim of examining the potential influence of initial variables on the observed outcomes, a linear regression analysis was conducted. Specifically, prior familiarity with GenAI was evaluated as a predictor of the improvement between pretest and posttest, while course enrollment (24 or 25) was included as a contextual variable. Table 10 presents the results of the linear regression analysis.

TABLE 7 Descriptive pre-test results of #INVTICUA25.

Instrument variables analyzed	Pre-test average	SD
Item 2. I consider myself familiar with generative AI systems	4.63	2.93
Item 6. AI will enhance students' creativity	5.97	2.31
Item 7. AI will improve the development of critical thinking	5.06	2.40
Item 12. I would feel confident using AI for performance evaluation	5.97	1.94
Item 14. It is essential to develop pedagogical strategies with AI	6.00	1.95
Item 15. It is essential to develop strategies for media literacy.	7.28	2.41
Item 16. AI will help students develop communication skills	5.94	2.38
Item 17. It is essential to design activities with AI to create content	6.06	2.12
Item 18. AI will facilitate problem solving among students	6.34	2.18
Item 20. I am optimistic about the future of education with AI	5.94	2.56
Item 22. AI can improve the writing skills of my future students	5.50	2.60
Item 24. AI can help my future students' reading comprehension	5.63	2.56

Own elaboration.

TABLE 8 Descriptive post-test results of #INVTICUA25.

Instrument variables analyzed	Post-test average	SD	Difference with pretest	*t*	*p*
Item 2. I consider myself familiar with generative AI systems	6.22	1.60	+1.60	2.91	0.007
Item 6. AI will enhance students' creativity	6.89	2.26	+0.92	3.45	0.002
Item 7. AI will improve the development of critical thinking	6.56	2.24	+1.49	3.12	0.004
Item 12. I would feel confident using AI for performance evaluation	7.37	1.84	+1.40	2.68	0.011
Item 14. It is essential to develop pedagogical strategies with AI	7.89	1.55	+1.89	4.12	0.001
Item 15. It is essential to develop strategies for media literacy	8.89	1.80	+1.61	3.56	0.001
Item 16. AI will help students develop communication skills.	7.33	1.54	+1.40	3.27	0.003
Item 17. It is essential to design activities with AI to create content	7.19	1.73	+1.12	4.05	0.001
Item 18. AI will facilitate problem solving among students	6.74	1.97	+0.40	3.02	0.005
Item 20. I am optimistic about the future of education with AI	7.52	2.10	+1.58	2.74	0.010
Item 22. AI can improve the writing skills of my future students	6.63	2.51	+1.13	3.44	0.002
Item 24. AI can help my future students' reading comprehension	6.85	2.33	+1.23	2.83	0.008

Own elaboration.

TABLE 9 Results of the mixed ANOVA by measurement time and participant group.

Variable	df	*F*	*p*	Partial η^2
Time (pre/post)	1	18,42	0.001	0.31
Group (INVTICUA24/INVTICUA25)	1	4,76	0.034	0.07
Time × group	1	5,12	0.028	0.08

Own elaboration.

TABLE 10 Results of the linear regression analysis.

Variable	*B*	SE	*t*	*p*	Adjusted R^2
Constant	0.42	0.31	1.34	0.183	
Prior familiarity with GenAI	0.28	0.09	3.02	0.004	
Group (0 = INVTICUA24, 1 = INVTICUA25)	0.35	0.122	2.88	0.006	0.21

Own elaboration.

The results indicate that prior familiarity with GenAI significantly predicted the observed improvement (B = 0.28, t = 3.02, p = 0.004). Likewise, group membership (INVTICUA24 vs. INVTICUA25) was also associated with a positive effect. The model accounts for 21% of the variance (R^2 = 0.21), highlighting the influence of both prior familiarity and group membership on the improvement of attitudes toward GenAI.

4 Discussion

The comparison between the three courses shows a positive evolution in students' perceptions of the use of GenAI in the classroom. In #INVTICUA23 we were unable to obtain statistical data, but the activities were similar and there was a shift from initial widespread ignorance to growing interest throughout the class. In #INVTICUA24, the improvement between the two questionnaires was somewhat more moderate, with improvements of around 1 point observed in most of the selected items. The results in #INVTICUA25, on the other hand, were more significant, with differences sometimes exceeding one and a half points, indicating an impact on the group's learning experience. Media literacy and the development of pedagogical strategies are aspects that stand out as highly valued, but optimism toward AI also shows notable increases. Advances in communication skills and in expression and comprehension abilities are also areas that, in general, show a significant increase.

Se considera que en los dos cursos que se ha realizado la investigación educativa concreta las diferencias entre pretest y postest son estadísticamente significativas, por lo que se cumplen ambas hipótesis planteadas. En primer lugar, se confirma el desconocimiento generalizado de la IAGen y sus posibilidades educativas. En segundo lugar, se confirma la validez de las distintas herramientas y actividades propuestas para valorar positivamente las posibilidades didácticas de la IAGen y las transformaciones que suponen para la educación.

The specificity of this subject with regard to educational innovation and the use of technology enables the introduction of all these digital innovations but always focused on the teaching of language and literature (Mateo-Guillen et al., 2025) in secondary school classrooms. Like any emerging and disruptive technology, it has a huge impact on education. There are many different positions regarding its integration, including both great mistrust and outright rejection (García-Perales et al., 2025), and there are many voices that want to limit or prohibit its use in many educational settings. It is necessary to experiment and analyze its possibilities in order to integrate this technology into learning processes. At present, GenAI is the largest space for innovation in the field of education (Qu et al., 2022, Wang et al., 2024).

Creativity has been worked on in different practices, such as blog posts or stories about the future, but we want to explore further the possibilities for working with poetry (Hitsuwari et al., 2023), as well as the design and creation of specific assistants for working with specific poetic content (Ribes-Lafoz et al., 2025). The integration of GenAI into teacher training with structured practices will soon allow us to recognize all its possibilities (Radford et al., 2019). The Education 2050 practice and the analysis of the prompts used by students confirm the great options that GenAI offers us within creative writing.

The basic tools used in the course (blogs, social media, Moodle) remain the same as those used fifteen years ago (Mula et al., 2010), but thanks to GenAI, we are witnessing a huge revolution in the possibilities for future teachers to work and create content. This can be seen in the results compared to previous editions. The digital transformations following the social crisis of 2020 have also taken root in this course (Hernández-Ortega and Álvarez-Herrero, 2021). It is essential to continue working on media and information literacy in this era of disinformation (García-Roca and Amo Sánchez-Fortún, 2023).

This study compiles both concrete evidence of student learning and illustrative examples of practices involving artificial intelligence, thereby confirming the practical relevance of each activity across different educational contexts. The open dissemination of these activities serves as a model of educational innovation and of the integration of generative AI in secondary education. It is plausible that many teachers have already begun to incorporate such tools into their lessons, while students are undoubtedly experimenting with them in various ways. The specific objectives of the research have been fulfilled. A practical application of generative AI to the teaching of Spanish language and literature is presented—an approach absent from previous editions of the course. A blog under the same name has been maintained since 2010. The knowledge of prospective teachers was examined both prior to and following completion of the course, confirming a broad interest in the transformations introduced by generative AI. Furthermore, a curated selection of activities focused on writing and creativity has been presented, offering potential transferability to other educational contexts (Lee, 2022).

In collaboration with other faculties within the field, ongoing work explores the potential applications of generative AI in early childhood and primary education. Although interaction with technology must be limited at these stages, such tools nonetheless prove highly valuable in teacher training and in the preparation of instructional materials. In addition, specific initiatives have been organized, such as the outreach workshop series *"AI in Literary and Reading Contexts,"* coordinated by the Mario Benedetti Center for Ibero-American Literary Studies.[20] Of special relevance are the

20 https://web.ua.es/es/centrobenedetti/documentos/actividades-curso-2024-2025/mayo/la-ia-en-contextos-literarios.pdf

virtual assistants created in recent years in the area of Language and Literature Didactics:

- https://chatgpt.com/g/g-OscQV9fs0-asistente-4dle25-ua: A virtual assistant developed for the course *Didactics of Reading and Writing* in the Bachelor's Degree in Primary Education, developed by Sebastián Miras.
- https://chatgpt.com/g/g-67c5d8064f188191b7ff6264bf860c03-constelaciones-multimodales-4dle24: A virtual assistant designed for the assessment of Multimodal Constellations on female protagonists in children's and young adult fiction, developed by Sebastián Miras and Rocío Cantó Delgado (Miras et al., 2026).
- https://chatgpt.com/g/g-dIpGAKCyK-chatbot-mario-benedetti: A virtual assistant focused on the figure of the Uruguayan poet Mario Benedetti, developed by Sebastián Miras and José Rovira-Collado (Ribes-Lafoz et al., 2025).
- https://chatgpt.com/g/g-67eff8e4cb6081919a34f8b28302e8b9-r-aiz: The *rAIz* virtual assistant on the work of the Spanish poet Miguel Hernández, developed by Luis Martínez-Castillo, José Rovira-Collado and Ignacio Ballester-Pardo.

In the majority of implemented activities, the use of free tools is recommended to mitigate economic digital divides. Nevertheless, the research team is also exploring paid versions, which have demonstrated clear differences in outcomes. For Master's-level courses, only free tools are utilized, alongside blogs and social media platforms, while encouraging reflection on the implications of their frequent free use and the data-sharing practices often required by large technology companies. These considerations fall within the broader ethical issues that must be addressed when integrating AI into the educational process (Nur et al., 2024). Ethical concerns related to the use of artificial intelligence, as well as the recognition of copyright in many textual and visual productions derived from pre-existing works, are addressed from the initial stages of the activities. However, this remains a future line of work to be further developed within the framework of the European project *Slow Tech Innovation: AI, Ethics, and New Teaching Methods* (KA220-SCH-C80F5323).

Generative AI has undoubtedly become an indispensable resource for academic research, educational innovation, and the effective integration of ICT in the teaching of Spanish language and literature (Urmeneta and Romero, 2025). It should be regarded as an assistant or resource that fosters student creativity.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the Ethics Committee of the University of Alicante after carefully reviewing the documentation submitted for the research project "Inteligencia Artificial Generativa para la Didáctica de la Lengua y la Literatura" (with approval number UA -2025-04-30). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

JR-C: Conceptualization, Formal analysis, Methodology, Investigation, Writing – review & editing. SM: Conceptualization, Formal analysis, Methodology, Writing – original draft. CM-G: Formal analysis, Methodology, Writing – review & editing. MR-B: Investigation, Methodology, Writing – original draft, Validation.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The authors declare that no Generative AI was used in the creation of this manuscript.

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